WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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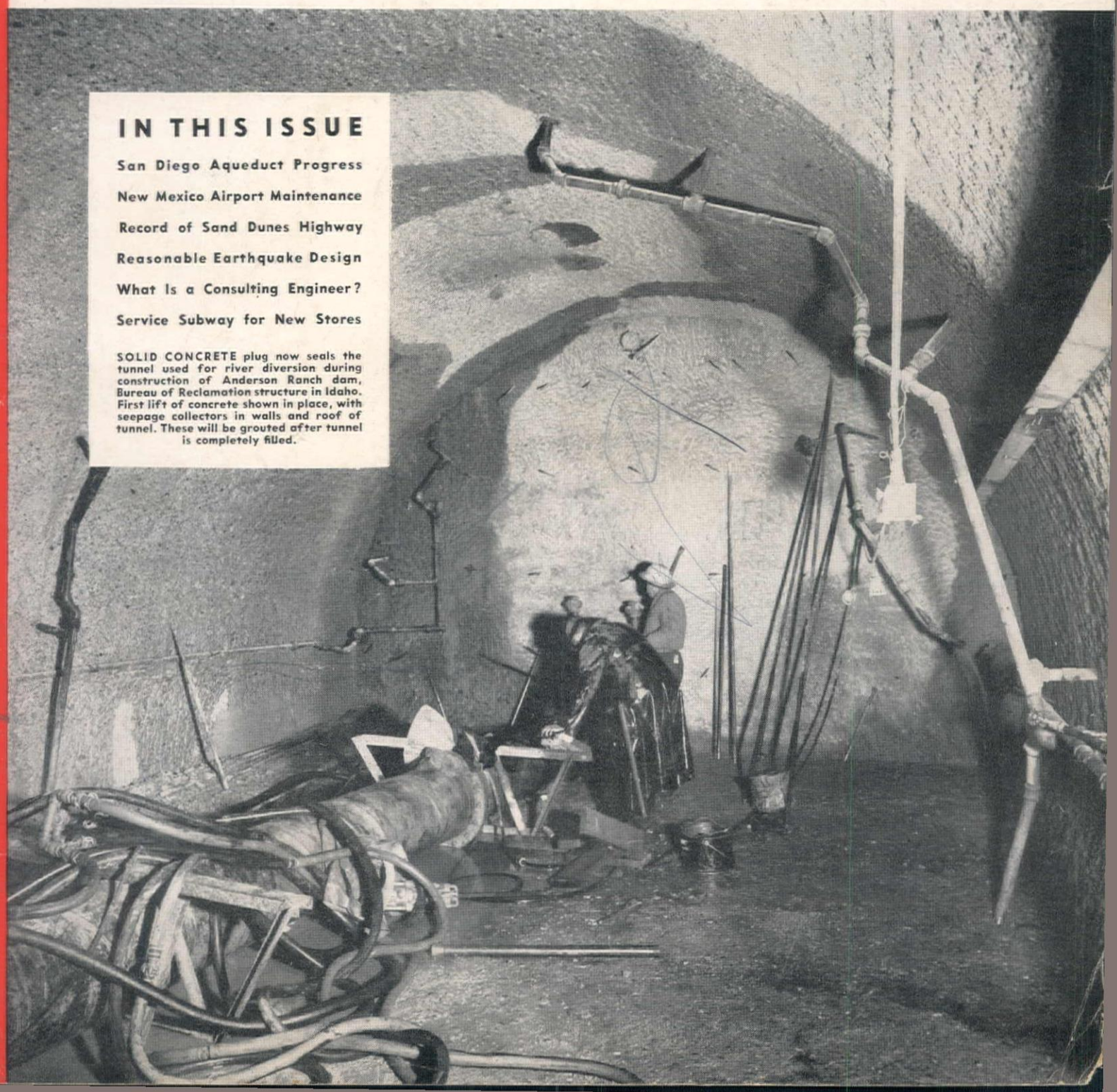
IN THIS ISSUE



SOLID CONCRETE plug now seals the tunnel used for river diversion during construction of Anderson Ranch dam, Bureau of Reclamation structure in Idaho. First lift of concrete shown in place, with seepage collectors in walls and roof of tunnel. These will be grouted after tunnel is completely filled.

GET FULL POWER

FULL power from heavy duty gasoline and Diesel engines demands really effective lubrication — and you *get* it with *Texaco Ursa Oil X***. This famous detergent-dispersive oil keeps engines *clean*—resists oxidation, protects alloy bearings, prevents scuffing of rings, pistons and cylinders.

The property of detergency in *Ursa Oil X*** keeps rings free. Dispersion holds deposit-forming materials in suspension until drained. Thus, you get better compression and combustion, greater power and fuel economy.

To lubricate air compressors effectively, use *Texaco Alcaid, Algol* or *Ursa Oil.* You'll be sure of wide-opening, tight-shutting valves, free rings, more efficient operation with fewer repairs and replacements.

For Texaco Products and Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write:

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

TEXACO

REG. T M

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

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

Twelve Northwests FOR GUY F. ATKINSON SAN FRANCISCO, CALIF.

12

A power shovel is a major tool. It can be a colossal headache to you—or a real scource of profit! There is a lot more than the price you pay to be considered when you buy a major tool of this kind. Who uses it? How long have they used it? What kind of work do they put it in? How many have they bought?

Big names, big jobs and Northwests go together. Year in, year out, for more than 20 years one or more Northwests out of every three have been repeat orders. Check the names of responsible outfits in your territory. Note that a high percentage of them —outfits like Guy F. Atkinson of San Francisco, outfits that have used other makes of machines and know machinery — are repeat order buyers of Northwests. It is significant that Guy F. Atkinson has just bought his 12th Northwest machine.

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

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Northwest Sales Agents:
ARNOLD MACHY. CO., INC.,
149 W. 2nd South St.,
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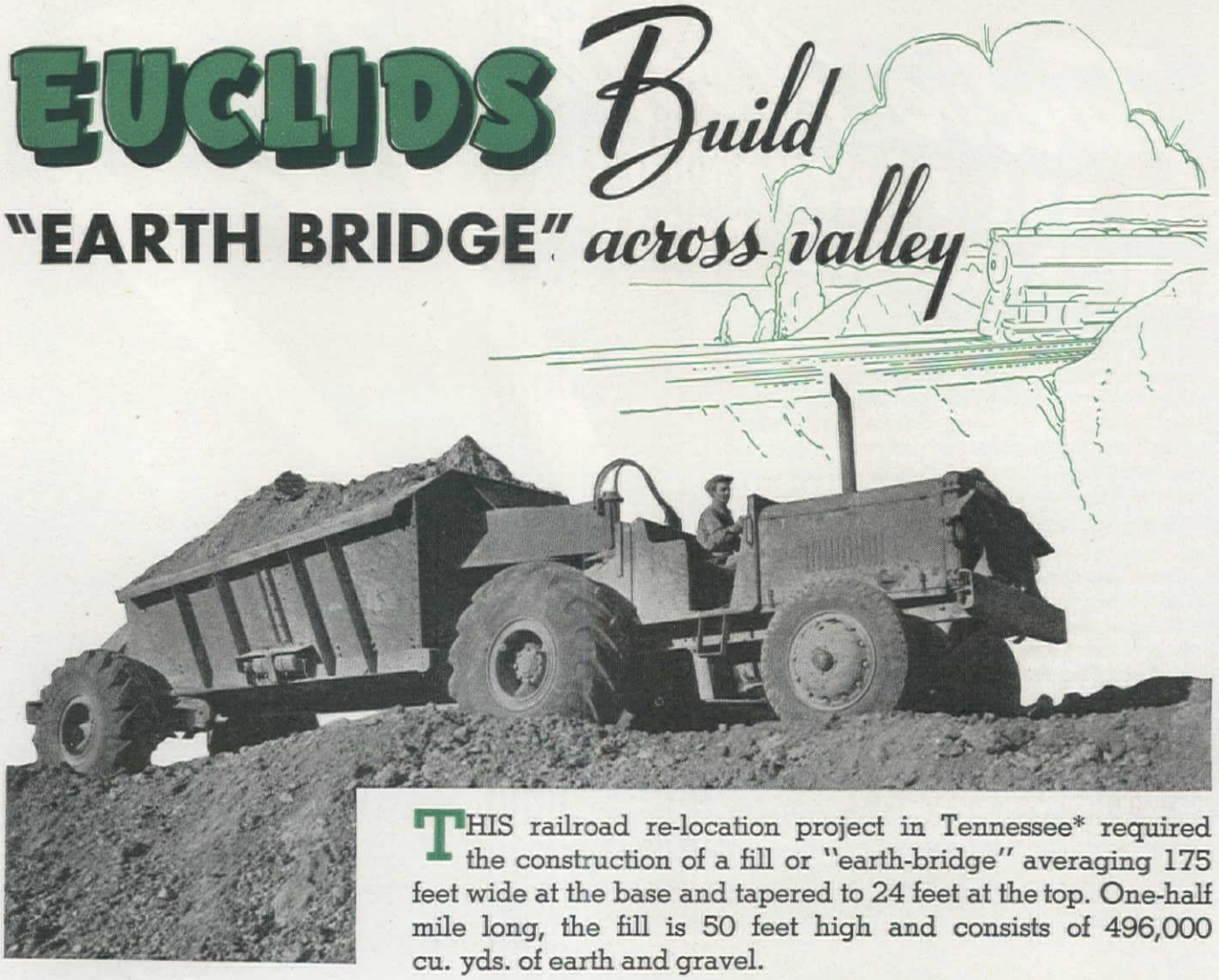
EUCLIDS *Build* "EARTH BRIDGE" *across valley*



THIS railroad re-location project in Tennessee* required the construction of a fill or "earth-bridge" averaging 175 feet wide at the base and tapered to 24 feet at the top. One-half mile long, the fill is 50 feet high and consists of 496,000 cu. yds. of earth and gravel.

The Wolfe-Michael Co. used five Bottom-Dump Euclids of 13 yd. capacity which were loaded by a 1¾ cu. yd. shovel. Average speed of the Euclids for the 7,040 ft. haul was 12.5 m.p.h. including turns on fill and at the loading shovel.

Exceptional maneuverability and short turning radius of the Bottom-Dump Euclids were important on this job because of the close working quarters and narrow fill. Fast travel speed on the difficult haul road and the ability of Euclids to dump their loads quickly saved time and reduced hauling costs.

All Euclid models, Rear-Dump and Bottom-Dump, are designed and constructed for a single purpose — to move earth and other materials over off-the-highway hauls at lowest cost. Your Euclid distributor will be glad to provide information and specifications on the models best suited to your requirements.

*Part of the improvement program of the Nashville, Chattanooga and St. Louis R. R. near Dickson, Tennessee, west of Nashville.

★

BOTTOM-DUMP EUCLID ADVANTAGES

FASTER TURNING

Sturdy, universal trailer hitch with ample clearance for hopper and doors.

QUICKER DUMPING

Steep, smooth sides of the trailer and unobstructed door openings full length and width — control for opening and closing the doors is conveniently located on the steering column.

★

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

EUCLIDS *Move the Earth*

Brown, Fraser & Co., Ltd., Vancouver; A. H. Cox & Co., Seattle; Hall-Perry Machinery Co., Butte; Intermountain Equipment Co., Boise and Spokane; The Lang Co., Salt Lake City; Lively Equipment Co., Albuquerque; Constructors Equipment Co., Denver. Factory Branch: 3710 San Pablo Avenue, Emeryville, California.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for April, 1946

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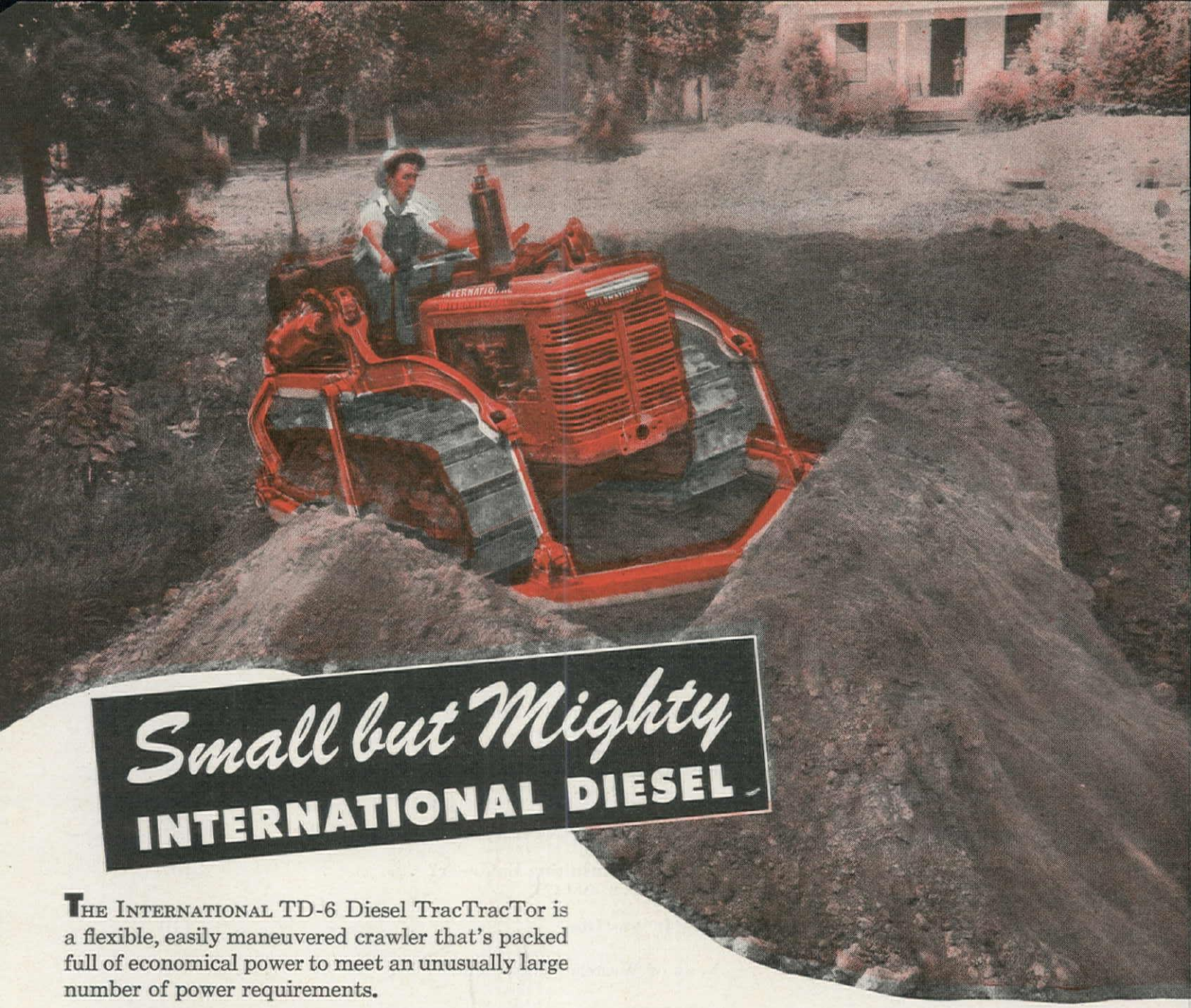

Small but Mighty
INTERNATIONAL DIESEL

THE INTERNATIONAL TD-6 Diesel TracTracTor is a flexible, easily maneuvered crawler that's packed full of economical power to meet an unusually large number of power requirements.

Take its performance on the backfilling job illustrated. With a bullgrader of matched size, it backfills 700 to 800 feet of 6 to 8 ft. ditch each 10 hour day.

Positive, instant starting, combined with International construction, performance and long life, gives the TD-6 everything: fast action, modern appearance, balanced power and weight, and *full-Diesel* economy. Put it to work on the many jobs now coming up for attention and see how it takes on punishing work at new low cost.

The nearest International Industrial Power Distributor will give you further facts, answer your questions and take your order for the International Tractors or Power Units best suited to your needs.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue **Chicago 1, Illinois**

DISTRIBUTORS:

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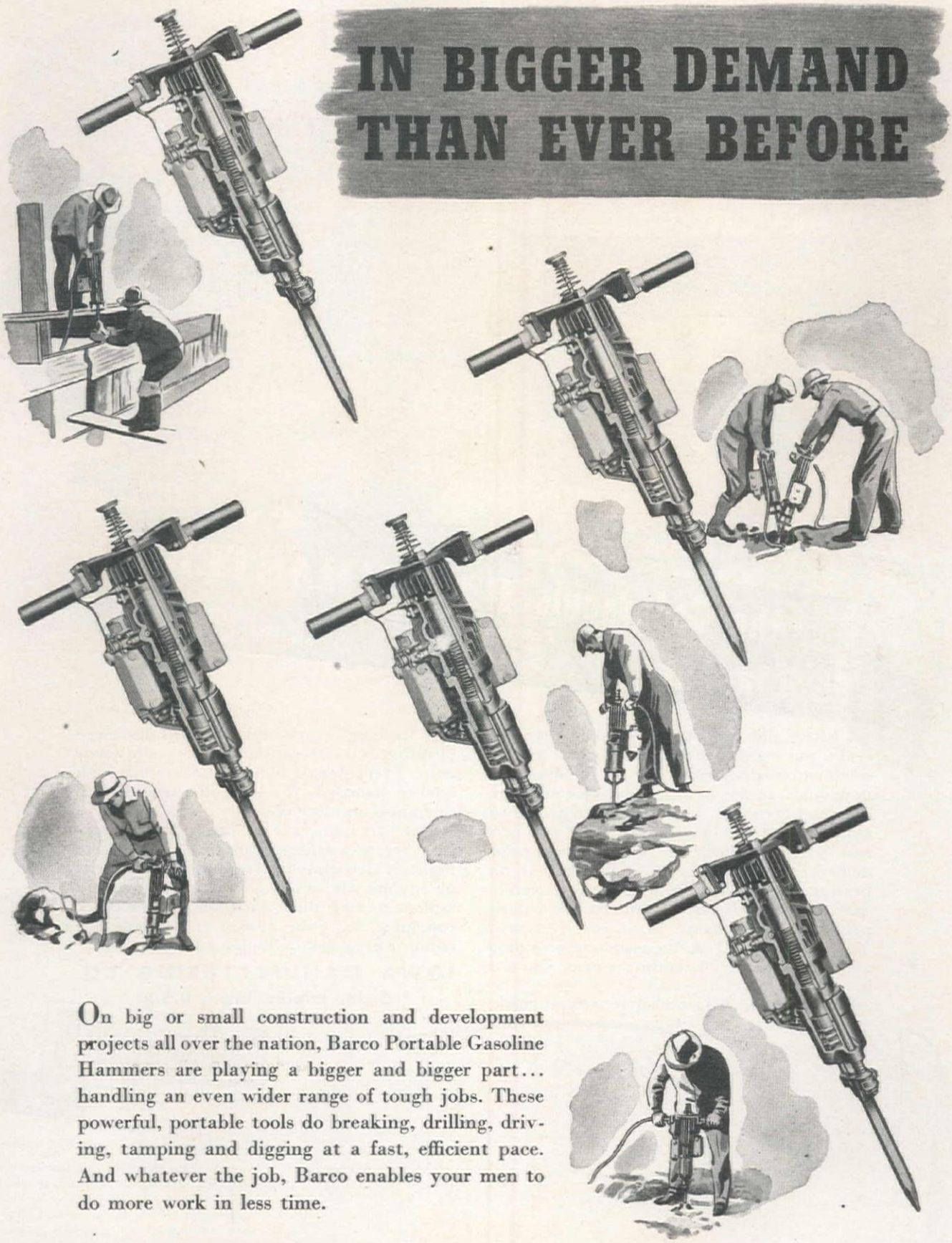
TRACTRACTORS

POWER UNITS

WHEEL TRACTORS

INTERNATIONAL INTERNATIONAL HARVESTER **Industrial Power**

IN BIGGER DEMAND THAN EVER BEFORE



On big or small construction and development projects all over the nation, Barco Portable Gasoline Hammers are playing a bigger and bigger part... handling an even wider range of tough jobs. These powerful, portable tools do breaking, drilling, driving, tamping and digging at a fast, efficient pace. And whatever the job, Barco enables your men to do more work in less time.

BARCO

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

Portable Gasoline Hammers

Barco Manufacturing Company, Not Inc., 1819 Winnemac Avenue, Chicago 40, Illinois · In Canada: The Holden Co., Ltd., Montreal, Canada

now you can make money on the smaller black top jobs, too!

the Cedarapids PATCHMASTER

Continuous Mixing

Portable . . . Stationary . . . Low Cost

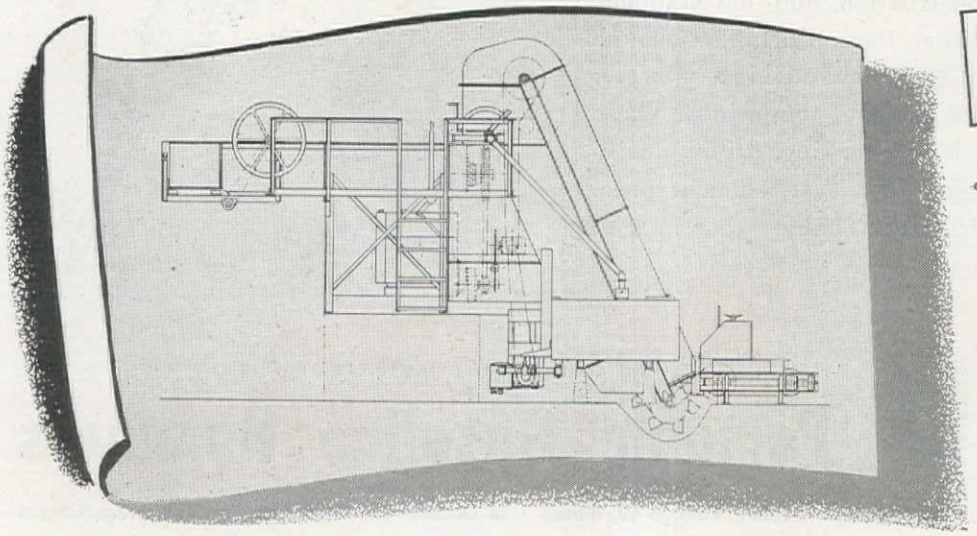
HERE'S the asphalt mixing plant that will really put money into your pockets on all small and medium sized jobs. 25 to 30 tons an hour—150 to 250 tons per day—of uniform, thoroughly coated and mixed aggregate are a cinch for the Patchmaster. Set it up as a permanent plant wherever you have a regular demand for patching material. Keep it on pneumatics if your jobs are widely scattered. Either way you'll find it is the handiest, most profitable maintenance plant you ever saw. You'll be amazed at its accuracy, economy and high capacity. By adding a drier you can handle hot mixes as well.

Ground-level charging hopper assures quick, easy loading. Truck-high pug mill discharge eliminates troublesome delivery conveyor belts. Every part is built to Cedarapids high quality standards for long life, trouble-free operation and low cost.

The Patchmaster is the ideal plant for contractors, townships, counties, cities, state highway departments, large industrial plants or anyone who wants a low-cost, low-priced asphalt mixing plant for their smaller black top jobs. See your nearest Cedarapids distributor or write for Bulletin PM-1.

IOWA MANUFACTURING CO.

Cedar Rapids, Iowa, U.S.A.



Cedarapids — Built by IOWA

THE IOWA LINE

of Material Handling Equipment distributed by

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

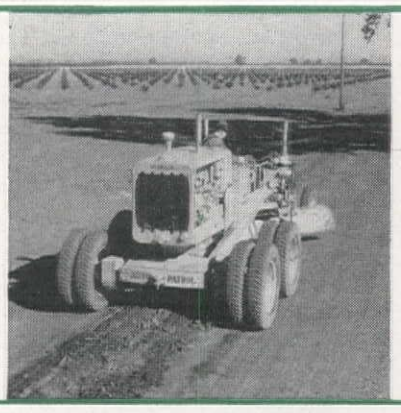
GET *all 7*

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

1. **REMOVE ACIDS** by special neutralizing agents.
2. **STOP MOISTURE** at water-repellent surface, absorb residue in fibers within element.
3. **TRAP ABRASIVES** such as gritty carbon, dust, or metal particles.
4. **TRIPLE SAFETY:** Patented double covering prevents rupture; all materials in element are harmless to engine; leaves the additives unchanged in modern compounded lubricating oils.
5. **FREE FLOW:** Entire outside surface filters oil; spring coil core maintains free flow.
6. **TOP EFFICIENCY:** Channels narrow toward center, stop large particles first, small ones later, distributing dirt evenly through element.
7. **LONGER LIFE:** Fibers in element straighten as they absorb impurities, keep channels open for longer effective service.

To fit any standard filter, there's a Winslow Replacement Element from among over 130 types and sizes. And there's a complete Winslow Oil Conditioner or Fuel Oil Filter for every marine, industrial or automotive power plant . . . for any capacity! Backed by 23 years of engineering research and experience, every Winslow product combines correct design with top quality. Send coupon today for details.

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



WINSLOW
ENGINEERING COMPANY
4069 HOLLIS STREET, OAKLAND 8, CALIFORNIA

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

Please send me, without obligation, the colorful 20-page booklet entitled *"The Case of the Dirty Drip* or *The Inside Story of Winslow."*

Name_____

Company_____

Street_____

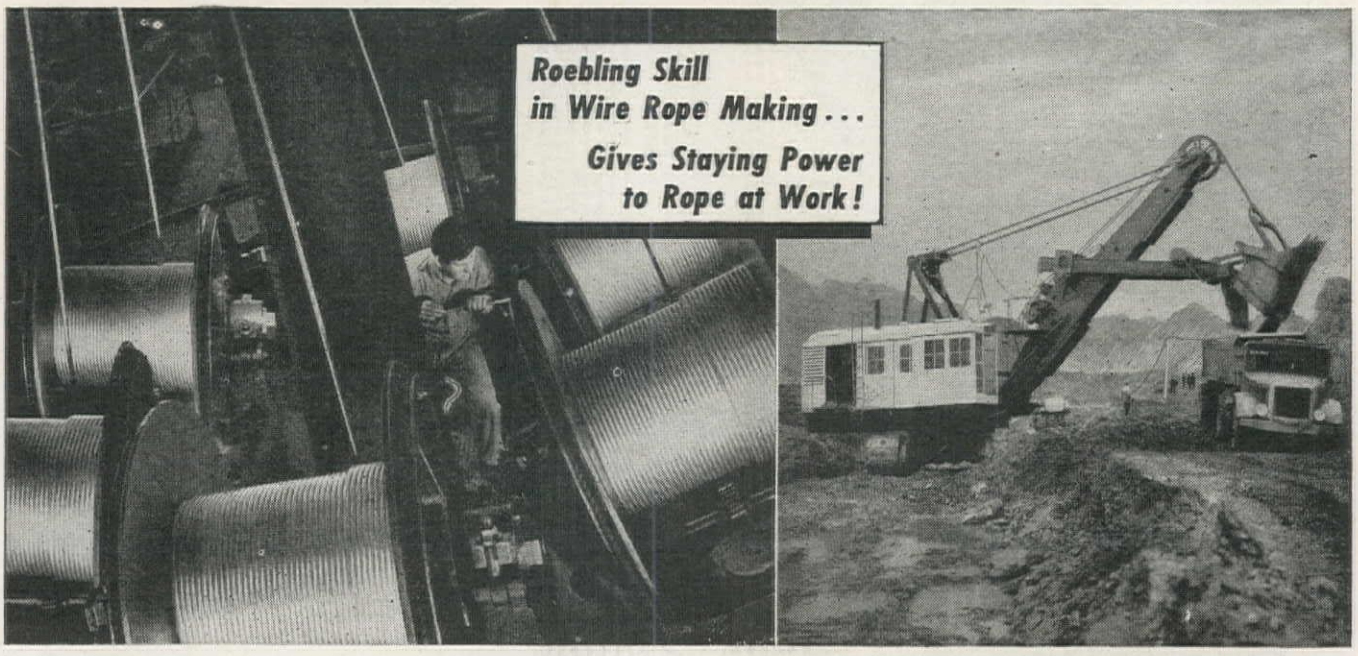
City_____ Zone____ State_____

C-4632

O.M.C. says:

(OLD MAN COMPETITION)

Keep production up—costs down—use the right wire rope!



SUCCESSFUL BUSINESS OPERATION in the face of growing competition will force utmost economy from all industrial equipment and supplies. Production costs must be kept to a minimum.

Roebling wire rope can help do this job. It is economical because of its low average cost, its toughness, its reserve strength under *all* conditions of operation. It helps *save* while it *serves!*

The modern facilities and craftsmanship of America's first wire rope maker are unsurpassed. Constant research and practical engineering back every phase of Roebling operation. Vital factors like these make Roebling "Blue Center" Steel Wire Rope the choice to help you produce in volume . . . keep costs down . . . meet competition profitably.

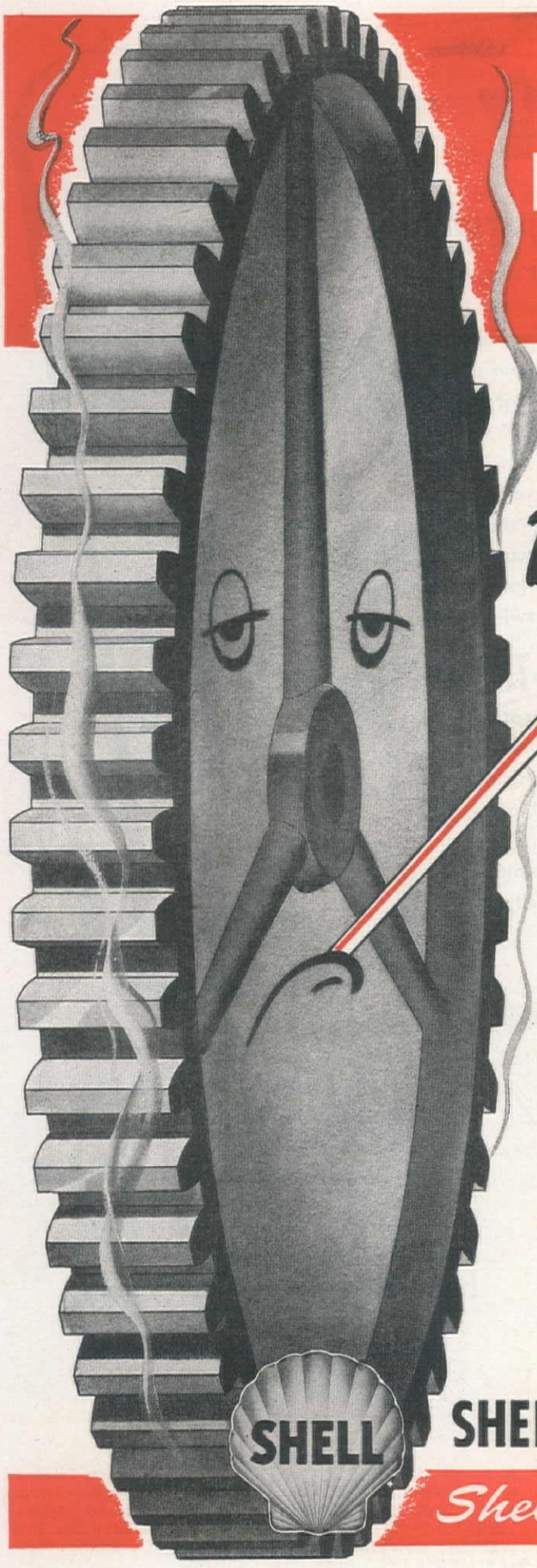
JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA

San Francisco • Los Angeles • Seattle • Portland

WIRE ROPE AND STRAND • FITTINGS • SLINGS • SUSPENSION BRIDGES AND CABLES
COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS
AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • AERIAL WIRE ROPE SYSTEMS • ROUND
AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING

ROEBLING

PACEMAKER IN WIRE PRODUCTS



HOW TO SAVE EXPOSED GEARS AND WIRE ROPE

FROM *Running a Fever*

SHELL makes a superior lubricant to stand up under the friction and high pressures encountered where open gears, wire rope or chain are doing heavy work.

It is Shell Cardium Compound — a tough, non-corrosive lubricant with extra adhesiveness to prevent throw-off or squeeze-out, even where maximum gear-tooth load capacity is being approached.

Used on wire rope, Shell Cardium Compound is effective in lengthening life of the cable because this lubricant works its way around each individual strand, *and then stays put.*

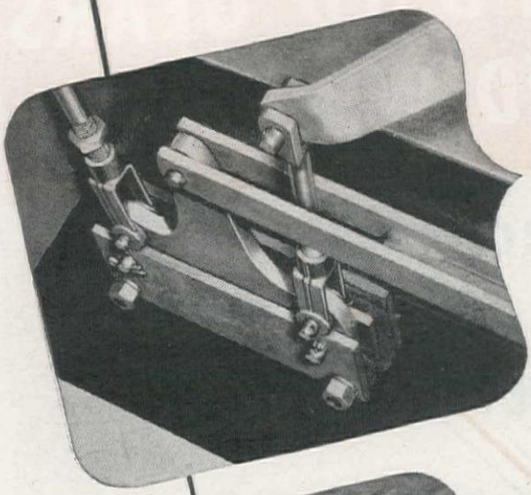
Regardless of type of service, temperatures, or other conditions on your own job, you'll find one of the five grades of Shell Cardium Compound is exactly suited to your problem. Ask your Shell man to recommend the right grade. Shell Oil Company, *Incorporated.*

SHELL

SHELL CARDIUM COMPOUND

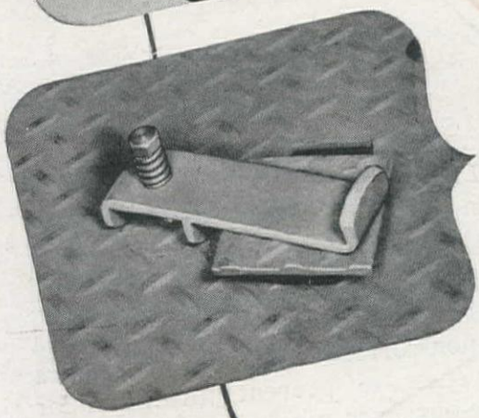
Shellengineered for the job

HOW TO . .



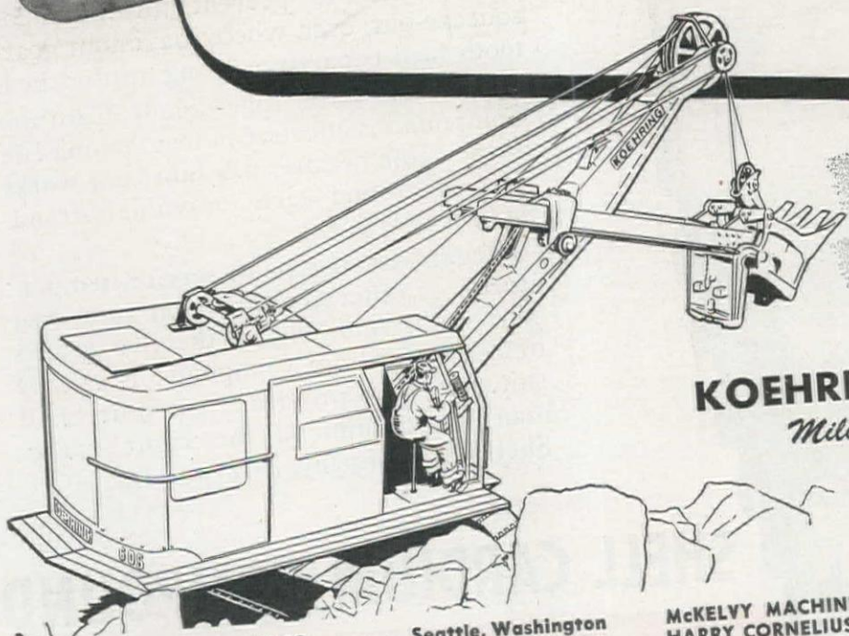
KEEP THE OPERATOR FRESH

A total of 7 hours out of every 8, the shovel operator has his hands on the levers controlling crowd-retract and swing-traction. Make them easier to move and production goes up as operator fatigue goes down. On the Koehring 605, these levers move easily, smoothly, with minimum pull, because double fulcrum units have been built into the linkage. Double fulcrum units eliminate clutch overtravel, increase accuracy of control, give the operator an important mechanical advantage every time he swings, travels, crowds or racks in.



KEEP THE OILER SAFE . . .

With this safety catch set, oiler, or operator, works in complete safety when lubricating the Koehring 605. Main engine clutch cannot be engaged, machinery cannot be set in motion. Safety catch, located on the left front platform, is quickly and easily set and as easily released.



KOEHRING
605
1½ YARD SHOVEL

KOEHRING COMPANY
Milwaukee 10, Wis.

PACIFIC HOIST & DERRICK CO. . . . Seattle, Washington
WESTERN MACHINERY CO. . . . . Spokane, Washington
COLUMBIA EQUIPMENT CO. . . . . Portland, Oregon
MOORE EQUIPMENT CO. . . . . Stockton, California
HARRON, RICKARD & McCONE CO., San Francisco-Los Angeles
KOEHRING COMPANY WEST COAST PARTS WAREHOUSE . Sacramento, California

McKELVY MACHINERY CO. . . . . Denver, Colorado
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LUND MACHINERY CO. . . . . Salt Lake City, Utah
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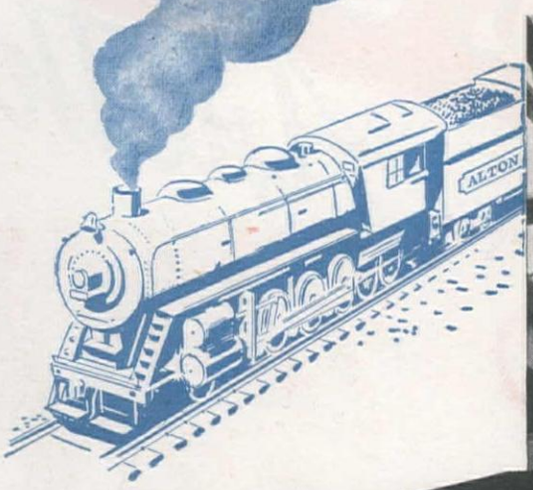
Train Smoke Spelled TROUBLE for the Alton & Southern



. . . Now ALCOA ALUMINUM is on the job

The locomotive house beams you see in the photograph above are brand-new replacements of Alcoa Aluminum—another case where the corrosion resistance of Alcoa Aluminum solves a construction problem . . .

For it took only twelve years for corrosive engine smoke to damage the previous steel beams to a point where they demanded replacement. Alton & Southern decided to replace with structural members that would *last* under the severe conditions imposed by heat, moisture, and sulfur gases.

Corrosion resistance is only one of the advantages of Alcoa Aluminum for heavy construction. Members are light in weight, easier to handle. Easy to fabricate. Strong, with all the strength that Alcoa Research has built into the big family of Alcoa Aluminum Alloys.

Stock structural shapes are available from your nearby Alcoa distributor. Consult our nearest sales office, or write:

ALUMINUM COMPANY OF AMERICA, 1811 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA FIRST IN **ALUMINUM** REG. T. M. ALCOA ALUMINUM

DIRECT-ACTING HYDRAULIC CONTROL

Another

EASIER TO OPERATE . . MORE RESPONSIVE

The P&H system of direct acting hydraulic control is the same principle as used in the automotive braking system — just as simple and trouble-free.

With this low pressure system there is no guesswork . . . control is positive. You can feel the load against braking action . . . just as you do in braking your car. The cushioned action in controlling the load makes operation smoother and faster — easier on both the machine and the operator.

And, this positive, responsive action will pay for itself many times over in greater production and lower maintenance costs.

P&H Added Value

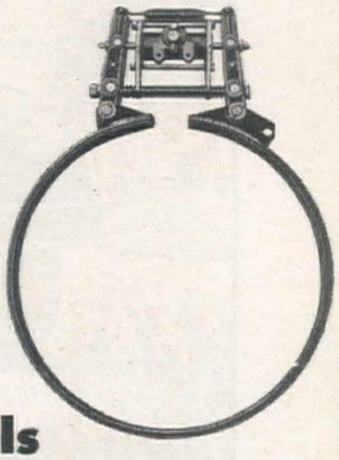
Extremely Simple and Dependable

P&H's Hydraulic Control System is direct acting . . . therefore, extremely simple and dependable. Movement of the controls is transferred directly to clutches and brakes by low, uniform hydraulic pressure. Lost motion common to mechanical linkage is eliminated — so are the maintenance problems and their time-eating delays.

15 to 20% More Braking Surface

P&H's hydraulic control permits the use of brake and clutch bands with nearly full wrap on the drums providing from 15 to 20% more braking surface than mechanically operated brakes. There is less operating effort required, less wear. Moreover, bands can be easily reversed for double the life.

P&H's hydraulic control with its steadier, faster operation and greater freedom from repairs is but one of P&H's added values. Learn about all of them.



All Controls Conveniently Located

In this view, the cab has been removed to show all controls. Everything is within easy reach, and controls are so arranged as to provide a natural co-ordination for the operator. Because all levers are full length to provide maximum leverage, less physical effort is required. All parts on P&H's hydraulic system are accessible for adjustment. And standard replacement parts are available quickly, easily and at low cost.

See your nearest P&H representative or write for full information.

P&H HARNISCHFEGER CORPORATION

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

EXCAVATORS

4490 West National Avenue
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HARNISCHFEGER CORPORATION: SAN FRANCISCO, Calif., 82 Beale Street

***Warehouses Service Stations:* SEATTLE, LOS ANGELES, SAN FRANCISCO**

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War-Proved Power
for Post-War Hauling

Heavy duty GMCs are "made to order" for all kinds of heavy hauling jobs. On or off the highway, you can count on GMCs to provide peak performance and pulling power.

Patterned after the power plant used in nearly 600,000 GMC military vehicles, GMC valve-in-head engines have been battle-tested, war-proved and improved. GMC heavy duty engines are famous for such features as Turbo-Top pistons, stellite-faced exhaust valve seat inserts, full pressure lubrication, full length water jackets and 7-bearing crankshafts with steel-backed, precision-type bearings.

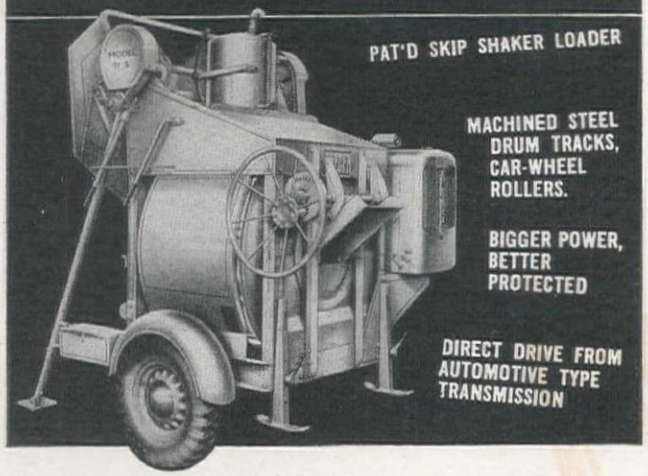
Ruggedness and stamina are built into every feature of GMC chassis. Heavy duty clutches . . . five-speed, syncro-mesh transmissions . . . power hydraulic or air brakes . . . dual-performance, double reduction or worm drive axles...add super strength to heavy duty GMCs.

Remember, too, every GMC, ½ to 20 tons, is truck-engineered and truck-built by the largest exclusive producer of commercial vehicles.

THE TRUCK OF VALUE **GMC TRUCKS** **GASOLINE • DIESEL**

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

JAEGER MIXERS for big, low-cost yardage



PAT'D SKIP SHAKER LOADER

MACHINED STEEL DRUM TRACKS, CAR-WHEEL ROLLERS.

BIGGER POWER, BETTER PROTECTED

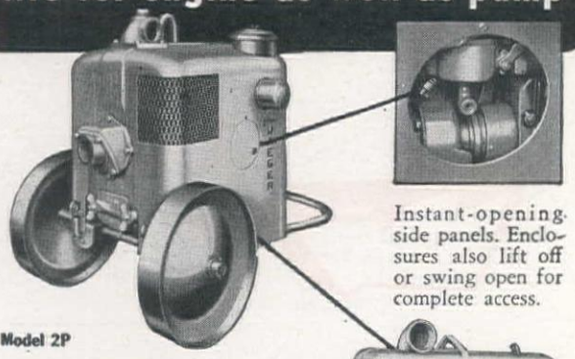
DIRECT DRIVE FROM AUTOMOTIVE TYPE TRANSMISSION

Ask about 3½S with Shaker Batch Hopper

Look for these and many other advantages that mean greater speed, bigger daily yardage, longer life and lowest upkeep cost in 3½S, 6S, 11S and 16S trailers built by the world's largest manufacturer of concrete, plaster, mortar mixers. Get Catalog M-5.

ENCLOSED YET FULLY ACCESSIBLE

JAEGER "SURE PRIME" design now insures efficiency and long life for engine as well as pump



Instant-opening side panels. Enclosures also lift off or swing open for complete access.

Model 2P

Keep the weather off the engine and move more water with your pump — that's one of the post-war improvements Jaeger alone gives you, along with doubly sure priming and "better than guaranteed" performance in the world's largest selling line of pumps. Ask for Catalog P-45.

Model 10 PH

AIR PLUS JAEGER COMPRESSOR

ENGINEERED FOR THE MOST MODERN GASOLINE OR DIESEL POWER

—AND BUILT TO OUTLAST ANY ENGINE 3-TO-1

Every equipment man "takes off his hat" to Continental, Caterpillar and International for the precision manufacture, the fuel economy, low upkeep, long life and complete dependability of their latest engines.

Jaeger Compressors are equipped with Continental, Caterpillar and International power — built to the same micro-precision standards, to operate at far slower speeds, cooler temperatures and only a fraction of the cost of engine upkeep, and to outlast their original power plants, plus a second, AND A THIRD.

For the LOWEST COST AIR you've ever known, equip with "AIR PLUS."

Sizes 60 to 500 feet—sold, serviced in 120 cities.

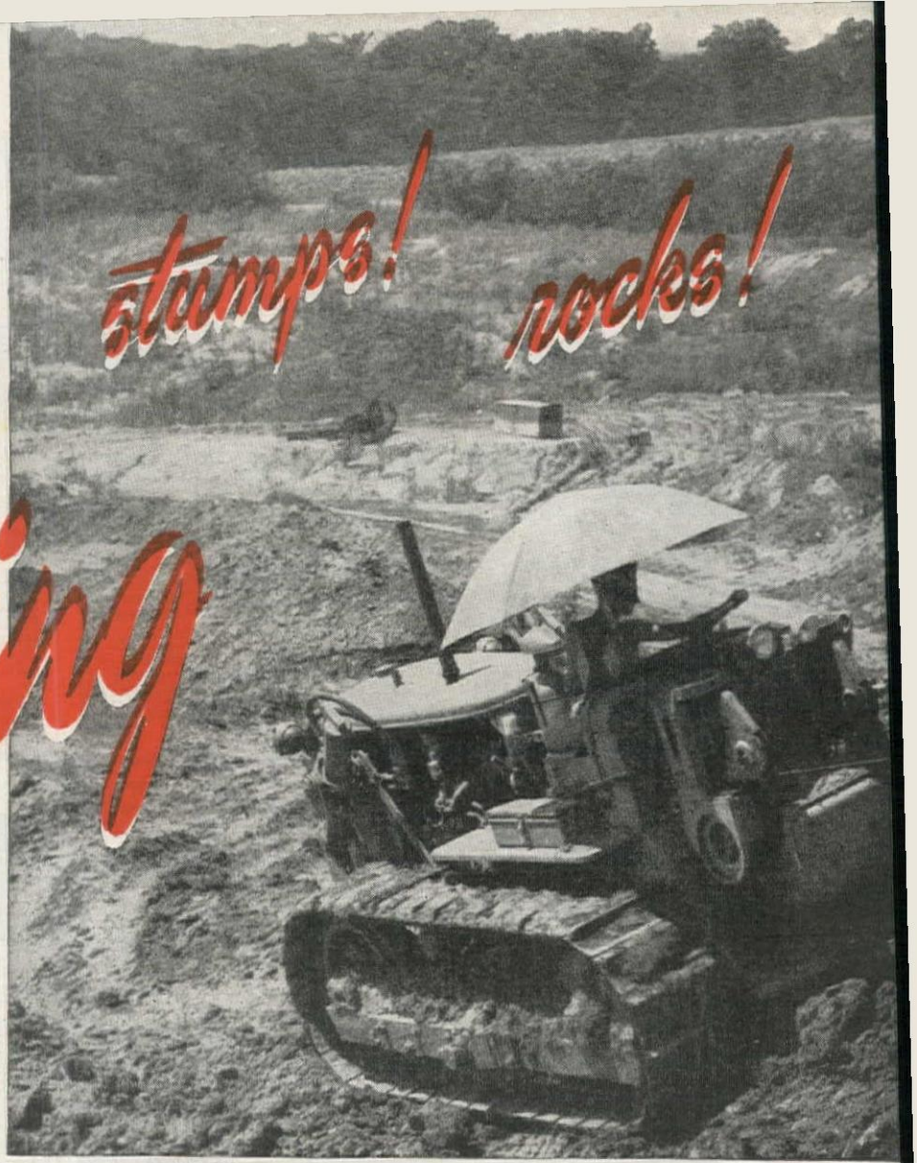
Why Buy an Obsolete Compressor When You Can Get a Jaeger?

- Air-cooled, 2-stage vertical compressors built in a balanced "W" with larger valves, interchangeable precision parts, full force feed lubricated.
- 20% to 30% slower, long-life piston speed, 100% efficient intercooling and automatic drainage.
- Massive main frame with recessed fuel tank, 30% to 50% larger air receivers, bigger tool boxes, life-time clutches, sectional radiators and intercoolers, electric starter, grouped controls, Timken bearing wheels, "Auto-Steer" axle, etc. all standard.

Leading Distributors Throughout the West Sell and Service Jaeger Equipment

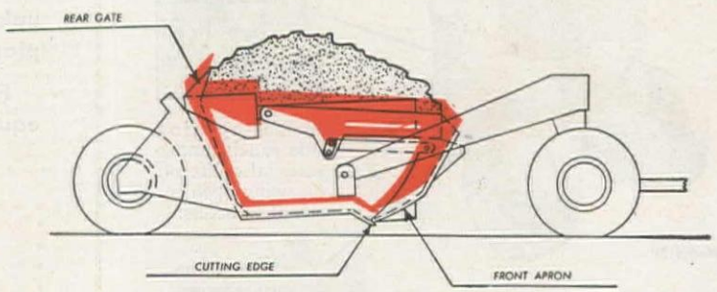
EDWARD R. BACON CO.	San Francisco 10
A. H. COX & CO.	Seattle 4
WESTERN MACHINERY CO.	Salt Lake City, Denver
HARDIN & COGGINS	Albuquerque
TRACTOR & EQUIPMENT CO.	Sidney, Mont.
SMITH BOOTH USHER CO.	Los Angeles 54, Phoenix
NELSON EQUIPMENT CO.	Portland 14, Spokane, Twin Falls
CONNELLY MACHINERY CO.	Billings, Great Falls
WORTHAM MACHINERY CO.	Cheyenne
MOUNTAIN TRACTOR CO.	Missoula, Mont.

FASTER . . .
. . . EASIER
CLEANER . . .
Dumping



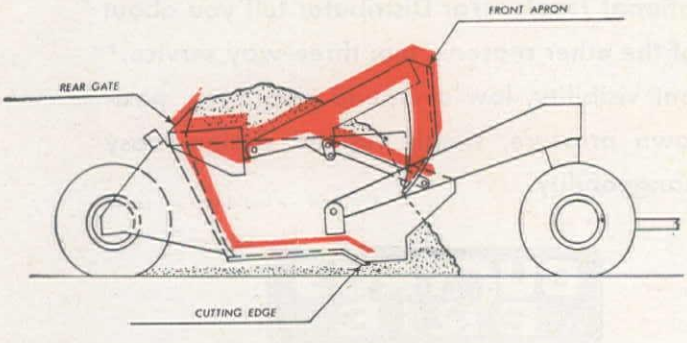
Regardless of the kind of material you have to load, you can always be sure that it will be dumped positively and cleanly on every trip with a LaPlant-Choate "Carrimor." This is because the rear gate of the "Carrimor" not only bulldozes all material out of the bowl but the front apron moves ahead and out of the way at the same time. So there's no chance of jamming or sticking . . . no lost time or broken cables trying to get rid of that "last yard." With a "Carrimor" the full load is dumped quickly and easily and the rear gate is positively returned the full distance, ready for the next trip.

Moreover, these new LaPlant-Choate scrapers in 8- and 14-yard capacities will carry a uniform spread at consistently higher tractor speeds because the cutting edge is positively controlled and completely independent of other moving elements. Add to these advantages superior "load-ability," "grade-ability" and low horsepower requirements and you'll see why so many agree on LPC for lowest possible cost per yard. See your LaPlant-Choate "Caterpillar" distributor, or write: LaPlant-Choate Manufacturing Company, Inc., Cedar Rapids, Iowa; Oakland, California.

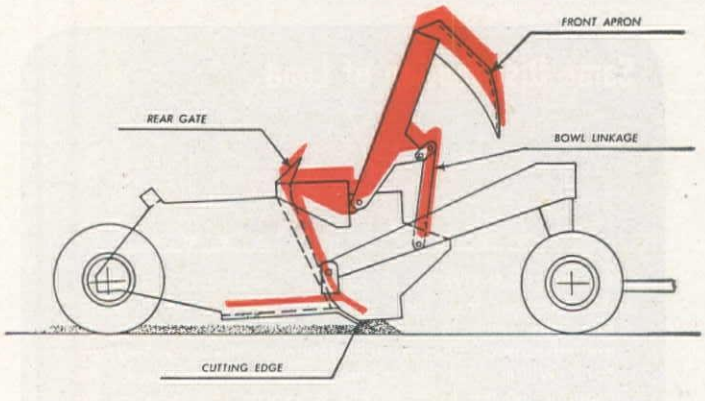


Here is an LPC "Carrimor" shown with a full heaped load, ready for dumping. Thanks to a newly designed cable arrangement, the cutting edge can now be lowered to any desired spreading depth and positively locked to insure a smooth, even spread, without further manipulation of the power control unit.

LaPLANT
Engineered



This sketch shows you the generous initial opening of the front apron, which allows the material in the front of the bowl to spill out by gravity before the rear gate starts forward. Note how the front apron moves ahead as it travels up, thus assuring an absolutely free exit of material.



Here you see an LPC "Carrimor" in full dumping position, showing how LaPlant-Choate's patented linkage arrangement functions in emptying the scraper bowl completely, without any chance of jamming sticky or bulky material between the rear gate and front apron—an exclusive LaPlant-Choate feature!

LaPLANT-CHOATE

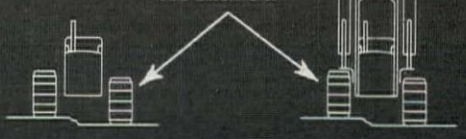
Earthmoving

Lowest Possible Cost per yard

The Tractor is Harnessed... Not Shackled

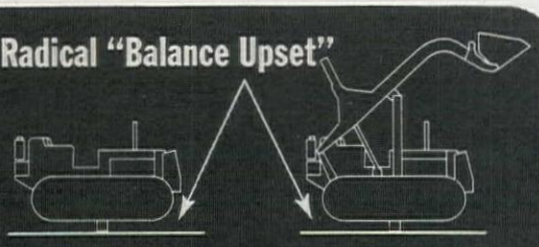
When an International TracTracTor is equipped with a Bucyrus-Erie DOZER-SHOVEL, all the speed, power and flexibility of the TracTracTor are retained because its original characteristics remain unchanged:

Free Track Oscillation Retained



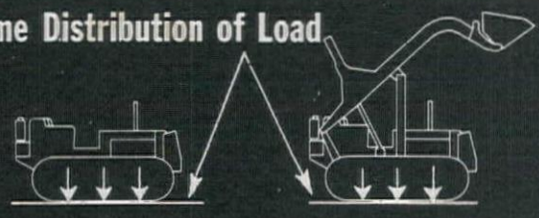
With the DOZER-SHOVEL mounted to the TracTracTor, the full free track oscillation of the bare tractor is retained to give you the maximum track-to-ground contact that means so much to tractive effort and to stability.

No Radical "Balance Upset"



Almost exactly the same center of gravity as that found on the TracTracTor alone is maintained. The effective traction and stability of the bare tractor are retained. There is no loss of power, no excessive wear, no loss of the efficiency originally built into the tractor.

Same Distribution of Load



The DOZER-SHOVEL is so perfectly matched to the tractor that together they form a combination unit which maintains the same uniform distribution of weight over the ground-contact shoes as that found on the bare TracTracTor. While total weight is, of course, increased, distribution of the extra weight is exactly the same as the distribution of the tractor's weight.

Retention of original tractor characteristics is just one of the many reasons why the versatile DOZER-SHOVEL (for T6, TD6, T9, and TD9 TracTracTors) is UNIQUE among front-end loaders. Let your International TracTracTor Distributor tell you about some of the other reasons, too: three-way service,* full front visibility, low overhead clearance, positive down pressure, simple rugged design, easy interchangeability.

* shovel — bulldozer — crane

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

See Your INTERNATIONAL TracTracTor Distributor

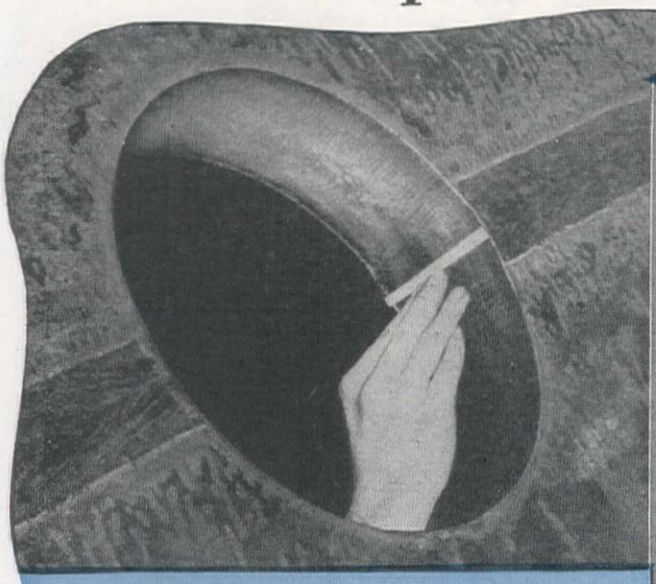
ARIZONA: John P. Duncan, Yuma; The Lines Co., Safford; F. Ronstadt Hardware Co., Tucson; The O. S. Stapley Co., Phoenix. CALIFORNIA: J. G. Bastain, Redding; Braman-Dickerson Co., Riverside; Brown Tractor Co., Fresno, Madera and Reedley; Edgar Implement Store, El Centro; M. Eltiste & Co., Inc., Santa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

TRACTOR BUCYRUS ERIE EQUIPMENT TE-2

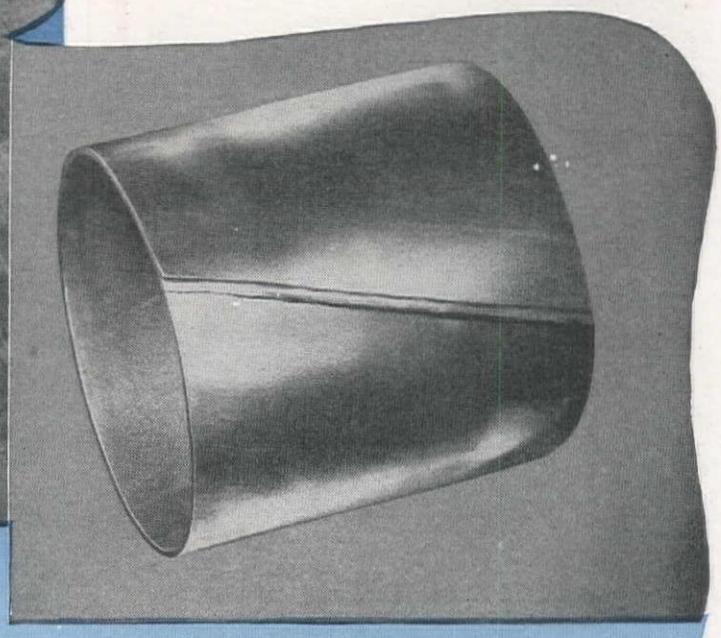
Linde's

UNIONMELT WELDING PROCESS

Speeds Joining of Metal



4½-in. steel slabs for diesel switcher underframes are welded in two passes.



14-gage sheet is spirally welded into pipe at a rate of 110 in. per minute.

18-GAGE SHEET can be welded at 240 in. or more per minute.

ONE-PASS WELDS even 3 in. thick can be made.

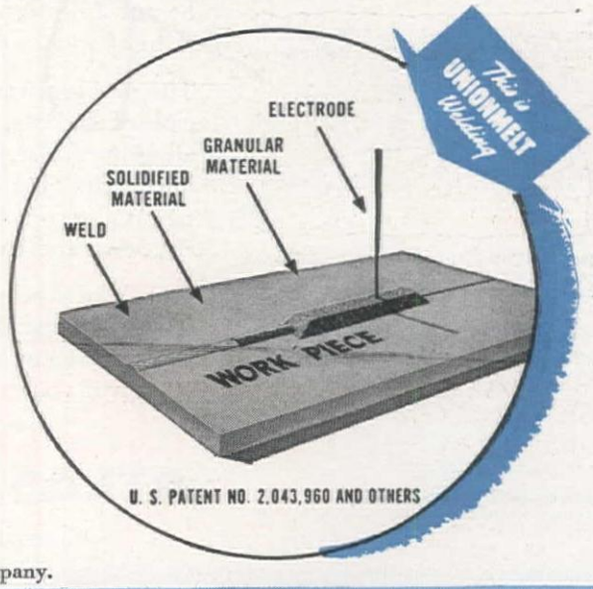
WELDING CURRENTS up to 4,000 amperes or more, a.c. or d.c. can be used.

BUTT, TEE AND LAP FILLETS, plug and molded welds can be made.

MINIMIZED DISTORTION is a result of high speed, narrow weld zone, and concentrated heat.

NO METAL LOSS from spatter or vaporization is encountered.

Anyone who wishes to use this patented invention may do so under Linde's standard license agreement. Send for a copy of the new **UNIONMELT** book, Form 6077.



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

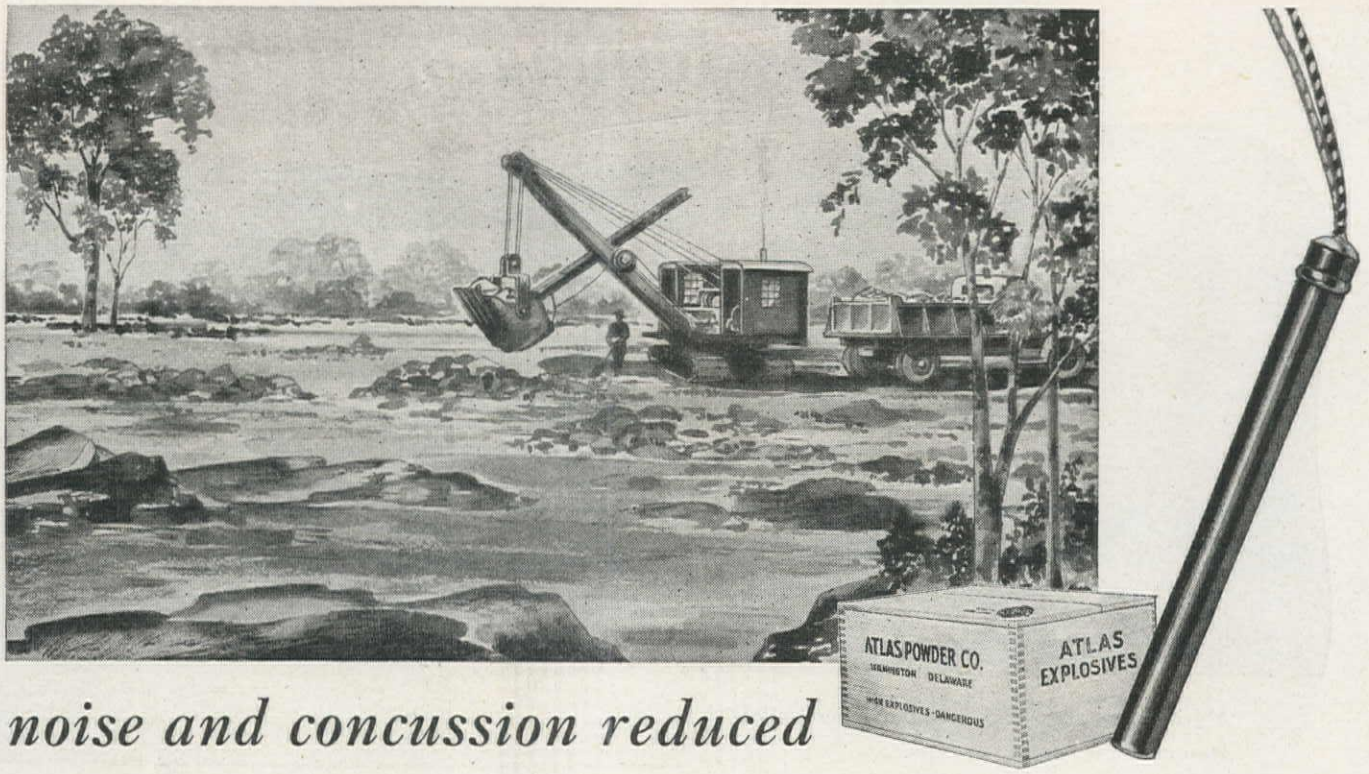
THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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

In Canada: Dominion Oxygen Company, Limited, Toronto

Never such breakage as with
ATLAS ROCKMASTERS



noise and concussion reduced

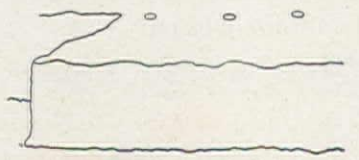


FIG. A—Alternate holes are loaded with "A" Rockmasters and with "B" Rockmasters.

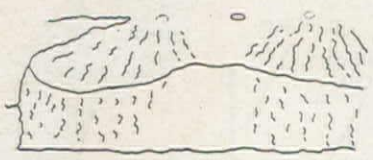


FIG. B—Detonation of "A" Rockmasters places rock under tremendous tension—*almost* to the breaking point.

FIG. C—Split-seconds later, the "B" Rockmaster completes the job—*thoroughly* shatters the rock.

Unusual rock formation caused a lot of breakage trouble on a recent airport job.

The formation consisted of a layer of hard rock, some three or four feet thick, under which was softer rock. To obtain the required grading, bore holes had to be put down into this lower strata. When the blast was set off, however, large slabs of stone were turned up that had to be redrilled and blasted.

The problem was solved by a system of controlled time blasts—the basic principle of the Atlas Rockmaster Blasting System. Instead of detonating the charge all at once, a series of delayed impulses was set up. Instantly fragmentation was improved. That's what the Atlas Rockmaster does in nine blasting jobs out of ten. It gives much better breakage. Moreover, noise and concussion are drastically cut down and back break is also reduced.

Can Atlas Rockmaster improve operations for you, too? With your knowledge of the job, and our knowledge of explosives, the answer is probably yes. Let the Atlas representative show you how the Rockmaster works. Remember that it also gives you

• • • • ***the greater safety of***

ATLAS MANASITE DETONATORS

Offices in Principal Cities

ATLAS EXPLOSIVES

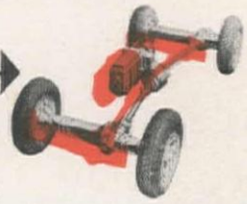
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

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

FOUR-WHEEL-DRIVE

A "Plus" that Pays in Many Ways!



FWD ... THE *One* TRUCK FOR *Many* JOBS IN HIGHWAY CONSTRUCTION and MAINTENANCE

The all-purpose, all-season truck is FWD . . . the one truck that does many jobs . . . so dependable, rugged and economical that it has become first choice of highway construction and maintenance men who "know their highways."

FWD engineering is responsible for superior performance in road blading, new road construction or maintenance patrolling, earth moving, material hauling, pulling heavy equipment, snow clearing and other heavy-duty highway work. FWD engineering provides the highest development of the true four-wheel-drive principle with center differential . . . power and load distribution equalized . . . working-strains divided over two driving axles . . . driving power and traction on all wheels . . . ruggedness that stands the gaff of years of punishing highway duties of all sorts.

See your FWD dealer, or write for information on FWD Trucks now ready to go to work for you.

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

FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

For 36 years owners have said: "FWD -- the Best Truck Built"

HALF MILLION YARDS MOVED OVER STEEP

Loads heaped to spring-pipe, 11 pay yards in 75', one minute.

40 to 50% downgrades, 27% adverse return grades, all in a day's work for Nate Moore's 9 TOURNAPULLS

To provide fill for a building site at Camp Pendleton, Oceanside, California, Nathan A. Moore is using 9 Tournapulls to move 500,000 of his estimated 700,000 cubic yards, under conditions that are really rugged.

Sandstone-Clay Ripped out of Mountainside

Borrow is located on a mountainside, ½ mile from fill. Material is sandstone mixed with clay, heavy but dry, rooted for fast loading. Tournapulls are pusher loaded in 75', taking one minute average to heap to the spring pipe. Despite voids, loads average better than 11 pay yards.

Part of the loads (about 10 to 15%) were taken down the mountainside over a 500' ramp. Started at 50% grade this had been worked down to around 40% when these pictures were taken.

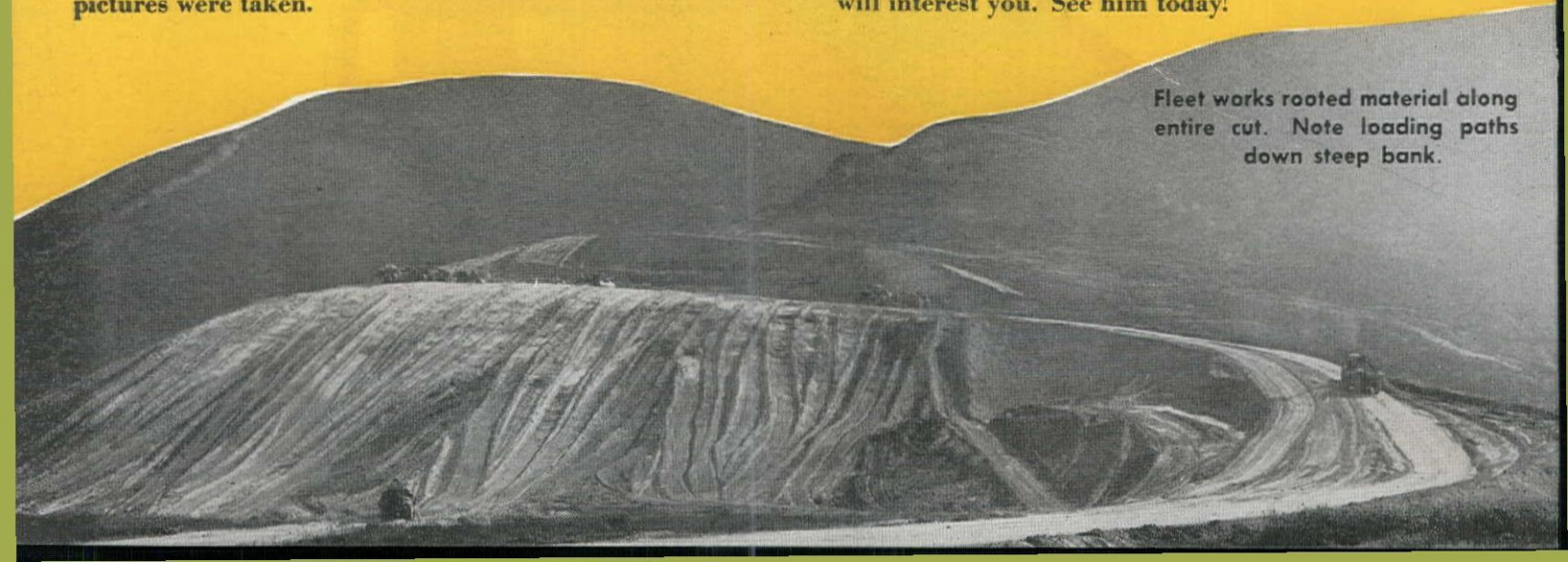
Return haul includes 0.2 mile of 27% adverse grade, climbed by Tournapulls in 2nd gear.

Fleet output 99 loads in 2 hours

During a two hour time study the 9 Tournapulls delivered 99 heaped loads to the fill on the 1 mile round-trip haul, a total of 1089 pay yards. Confirming this figure as conservative is the claim of the job superintendent that the Tournapulls are placing 6,000 yards on the fill each 9-hour shift.

Check Tournapull estimate on your jobs

Considering grades encountered and type of material loaded, this job performance is typical of field evidence coming in daily to show what Tournapulls can do to give you lowest-net-cost-per-yard under your job conditions. Your nearest LeTourneau Distributor has facts and figures that will interest you. See him today!



Fleet works rooted material along entire cut. Note loading paths down steep bank.

# of TOUGH MATERIAL GRADES with *TOURNAPULLS*

Rooted Sandstone . . . LeTourneau heavy-duty Rooter breaks up sandstone and dry clay to speed Tournapull loading.

27% Return Grade . . . Tournapulls climb 1000 feet along this 27% grade up the mountain, making it easily in 2nd gear.

40 to 50% Down Grade . . . on this 500' slope. (Check slope with plumb line of falling dirt). On grades like this, pushers are not needed to obtain good loads.

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED
Over 4250 Built and Shipped

TOURNAPULLS

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

. . . Now comes the

THIRD GENERATION

of Byers Partial Swing Utility Shovels

For those plentiful excavating and material handling jobs of smaller size, you will want the new ⅜-yd. partial swing Byers "Junior" shown here.

Byers Junior is a modern designed excavator throughout, built for heavy duty ⅜-yd. work of every kind. Its low cost of operation and maintenance, its easy portability and the wide variety of work it does fast and easily, add up to economy and profit.

ECONOMY for state, county, township and municipal users.

PROFIT for contractors who need a sturdy ⅜-yd. shovel, crane, dragline or back hoe.

The Junior is not an old design modernized. All of Byers' many years of experience with the original Bearcat and the popular Bearcat Junior are embodied in a more rugged "super" design for this 1946 Junior that has been thoroughly tested, proved and approved.

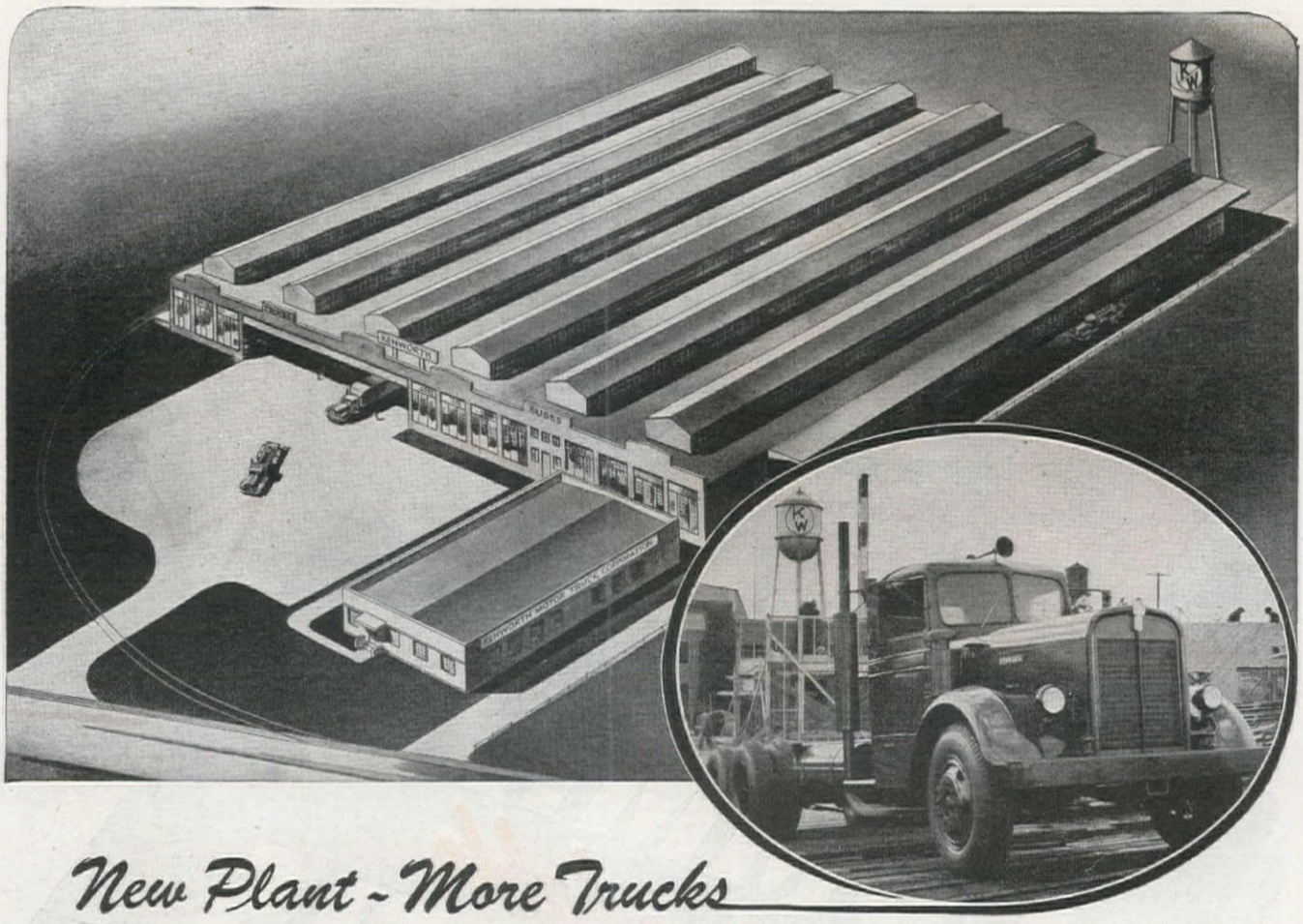
Write for catalog that shows important construction features, improvements and specifications.

THE BYERS MACHINE CO., RAVENNA, OHIO • *Distributors throughout the world*

Byers shovels are distributed through:

EDWARD R. BACON COMPANY, San Francisco
NELSON EQUIPMENT CO., Portland, Spokane & Seattle Offices
RAY CORSON MACHINERY CO., Denver
WILLARD EQUIPMENT, LTD., Vancouver, B. C.
EQUIPMENT SALES CO., Phoenix, Arizona

BYERS 3/8 Yd. JUNIOR



New Plant - More Trucks

With the demand for Kenworth trucks and buses as great as it is today, there can be no pause in production—even on moving day. Nine days after the Seattle division of the truck production department had moved into Kenworth's big, new, modern plant, the first truck—the heavy duty model 523 pictured above—was completed and ready for delivery. This was accomplished while much conversion work was still underway in the new plant —while other divisions of Kenworth, not yet moved to the new quarters, were still producing on schedule.

By the first of June all Kenworth truck and bus manufacturing and servicing activities will be centralized in the new plant. Greatly increased and improved facilities are made available by this Marginal Way property, comprising more than 15 acres, fully equipped with the most modern production machinery.

Kenworth—the largest and oldest truck manufacturing firm on the Pacific Coast —is now better prepared than ever to help you solve your specialized transportation problems.

KENWORTH

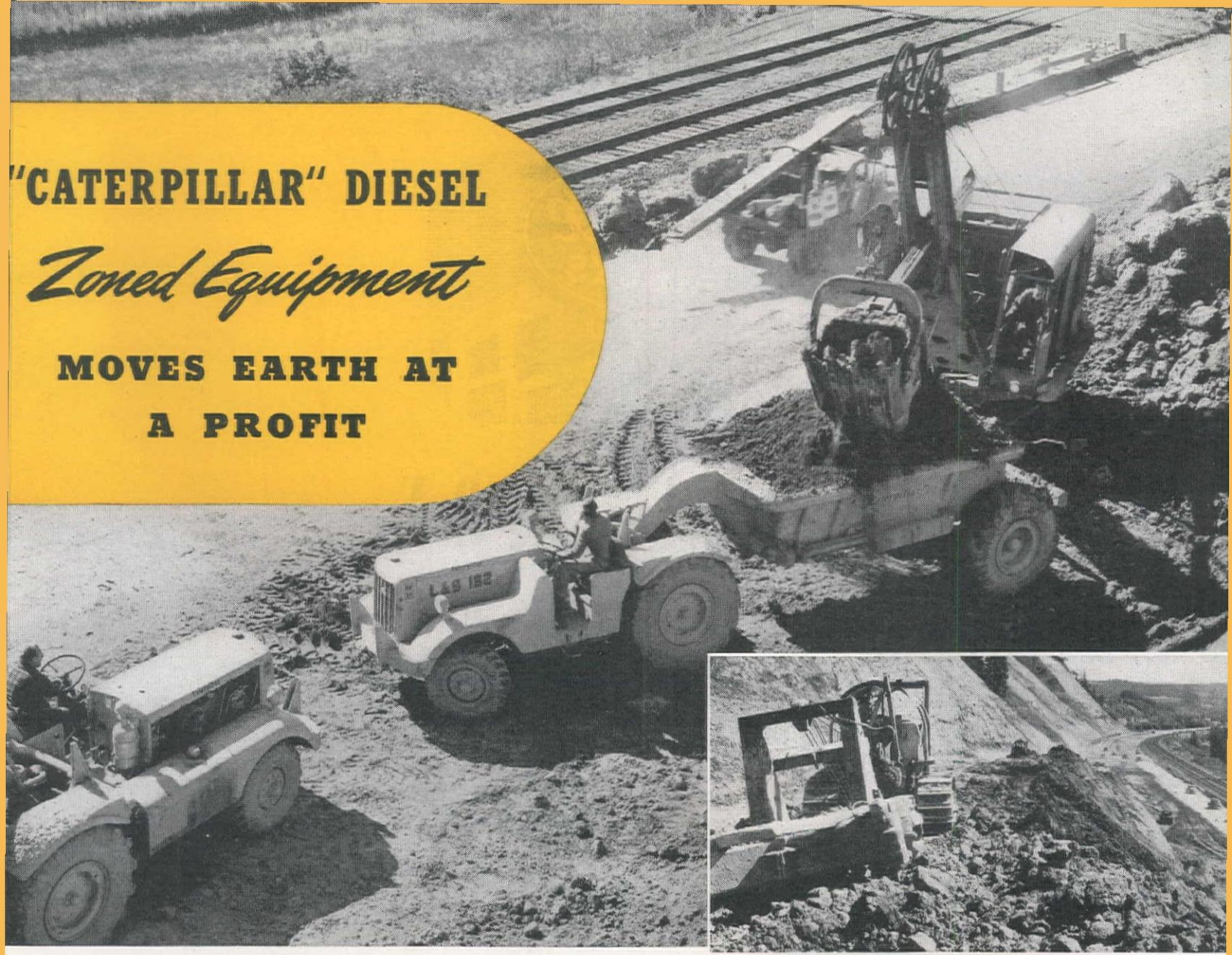
TRUCKS ★ BUSES

FACTORY AND HOME OFFICE: SEATTLE • *DISTRIBUTORS IN* PRINCIPAL WESTERN CITIES AND HAWAII

"CATERPILLAR" DIESEL

Zoned Equipment

MOVES EARTH AT A PROFIT



"Caterpillar" Diesel DW10 Tractors and W10 Wagons being loaded by a "Caterpillar" Diesel-powered Lorain shovel, on the Woodland-Martin's Bluff highway job.

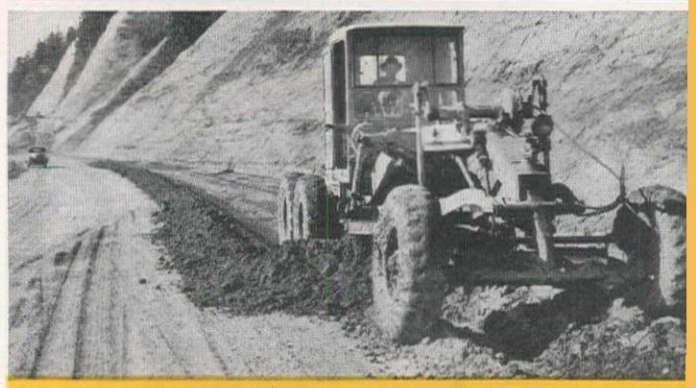
LEONARD & SLATE, Portland contractors, used the "Caterpillar" *zoned equipment* system on a highway-widening job between Woodland and Martin's Bluff, Wash.

Husky "Caterpillar" Diesel Tractors—D8s and D7s—did the ripping and bulldozing. A "Caterpillar" Diesel-powered Lorain shovel loaded "Caterpillar" W10 Wagons, hauled to the fill by "Caterpillar" Diesel DW10 Tractors, rolling fast on rubber. And the fine grading was done by "Caterpillar" Diesel No. 12 Motor Graders.

It's being proved every day that most modern earth-moving jobs need *both* track-type and wheel tractors to move most yards in shortest time. Nothing can take the place of the D8 when it comes to tough 'dozing and scraper-loading work. But more and more owners are praising the speed, power, easy steering and excellent brakes of rubber-tired "Caterpillar" Diesel DW10 Tractors on the longer hauls and faster haul roads.

"Caterpillar" doesn't take sides. It builds *all* kinds of earthmoving machines—with typical "Caterpillar" quality—to do the job at LOWEST COSTS ON EARTH.

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



(Upper) A "Caterpillar" Diesel D8 Tractor pulls ripper through rocky ground. (Lower) Fine grading is done by a "Caterpillar" Diesel No. 12 Motor Grader.

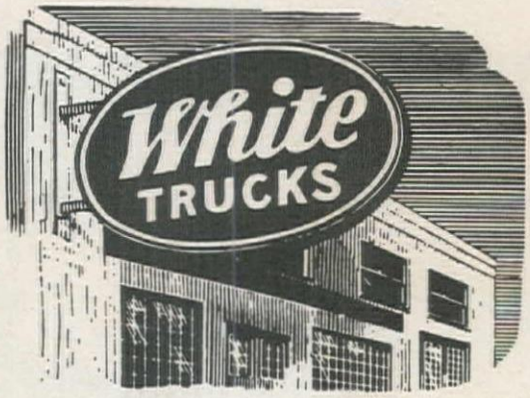
CATERPILLAR

REG. U.S. PAT. OFF.

ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

DIESEL

THE DISCHARGED VETERAN WEARS THIS EMBLEM. REMEMBER HIS SERVICE AND HONOR HIM.



EXPANSION...

highlighted by SERVICE

WHITE TRUCK DISTRIBUTORS
PACIFIC COAST REGION

WASHINGTON
Murphy White Trucks, Seattle
Jones White Truck Co., Spokane
McCoy Auto Company, Vancouver

OREGON
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Southern Garage, Bakersfield
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J. R. Townsend Co. Inc., San Diego
Sawyer Motor Comapny, Long Beach
Connell Motor Truck Company, Stockton
Fresno Trailer Company, Fresno
Henwood Motor Company, San Jose
P. E. Van Pelt, Oakdale
Routzan White Truck Sales, Oakland

IDAHO
Logsdon Motor Company, Boise

UTAH
Lindner and Wood, Salt Lake City

MONTANA
Nybo and Company, Missoula

NEVADA
Dennison Tractor & Supply Co., Reno

ARIZONA
Truck Equipment Co., Phoenix

HAWAII
Schuman Carriage Company, Honolulu

—in addition, more than forty White Truck Dealers serve White owners in other key Pacific Coast communities.

The increasing demand of truck owners everywhere for White Super Power . . . based on its extra performance, dependability and low cost maintenance over tremendously high mileages . . . has created the need for an expansion of production facilities and a program is underway to double White's output of trucks and busses.

White has always fully appreciated the importance of complete and dependable service facilities to truck owners throughout the nation. And in preparation for its increased production, White has modernized and is increasing the number of White Service Stations. In them you will find skilled mechanics, special testing devices, modern repair machines and factory methods.

In fact, the successful experience of owners with White Personalized Service during the critical war years is the reason why the Scientific Maintenance methods it makes possible will keynote White's expansion program now.

THE WHITE MOTOR COMPANY • Cleveland
Pacific Coast Branches: Portland, San Francisco, Los Angeles

White

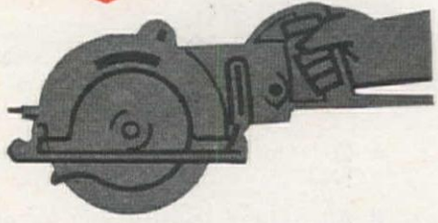
FOR MORE THAN 45 YEARS THE GREATEST NAME IN TRUCKS

3 MINUTES converts your PORTABLE SKILSAW... into an efficient RADIAL SAW

ONE BRACKET HOLDS SKILSAW MODEL "77" "825" OR "87"

3 MINUTES MORE and your SKILSAW is free to go to any job!

• The SKILSAW that you can use anywhere readily fits this precision-built RADIAL ARM ... makes cut-offs, bevel cut-offs, miters, bevel miters, rips, bevel rips, grooves with or across the grain ... makes all these cuts better, faster, more accurately ... then is quickly available again as a portable saw. No progressive builder can afford to be without one or more SKILSAWS and this RADIAL ARM ... a money-saving combination that enables you to bid lower and still make more money on every job. Ask your distributor today for a demonstration.



SKILSAW, INC.
5033-43 Elston Ave., Chicago 30, Ill.
Factory Branches in All Principal Cities

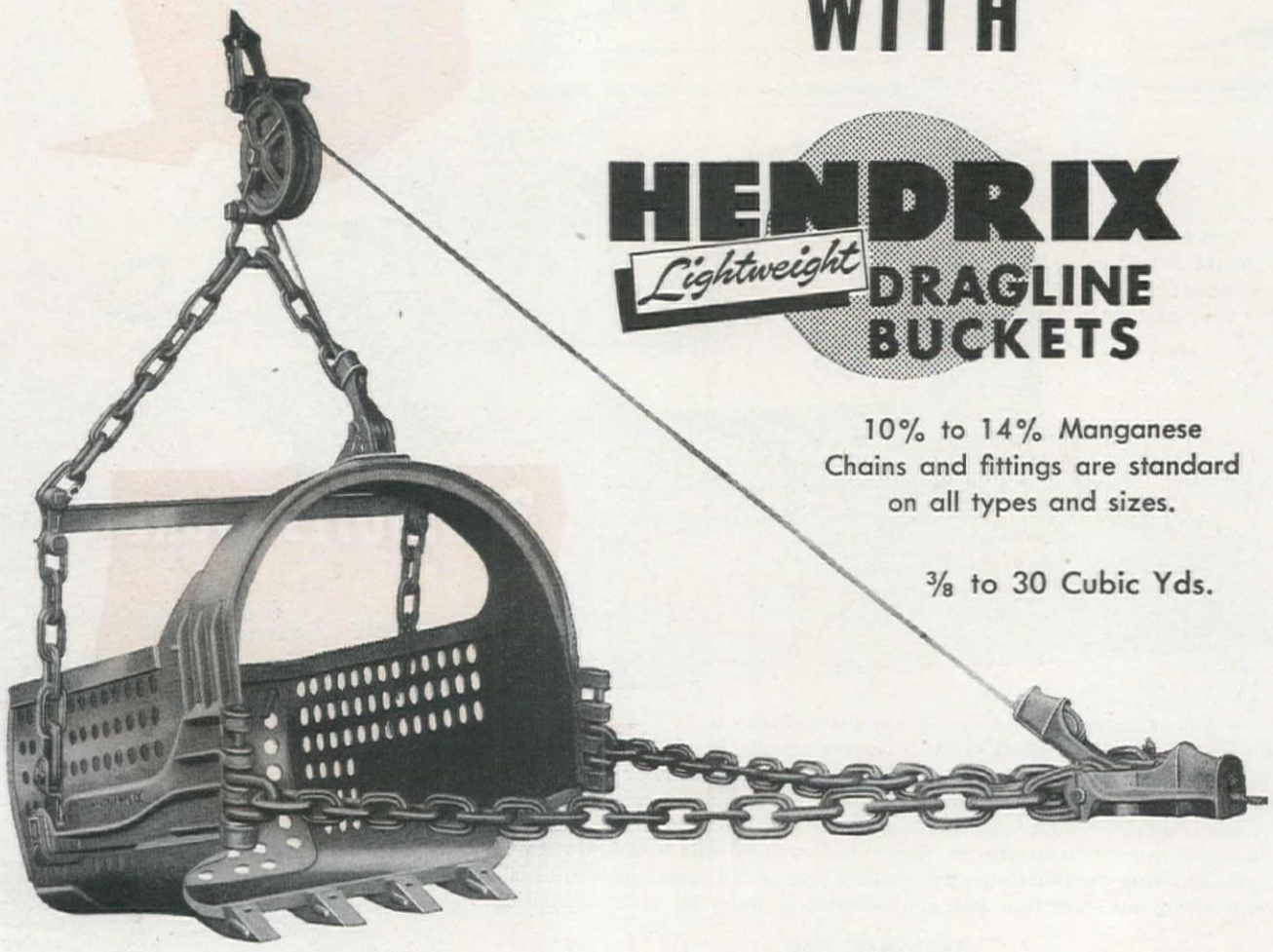
PORTABLE ELECTRIC

SKILTOOLS

MADE BY SKILSAW, INC.

GET-- MORE YARDAGE AT LOWER COST! WITH

HENDRIX *Lightweight* DRAGLINE BUCKETS



10% to 14% Manganese
Chains and fittings are standard
on all types and sizes.

⅜ to 30 Cubic Yds.

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

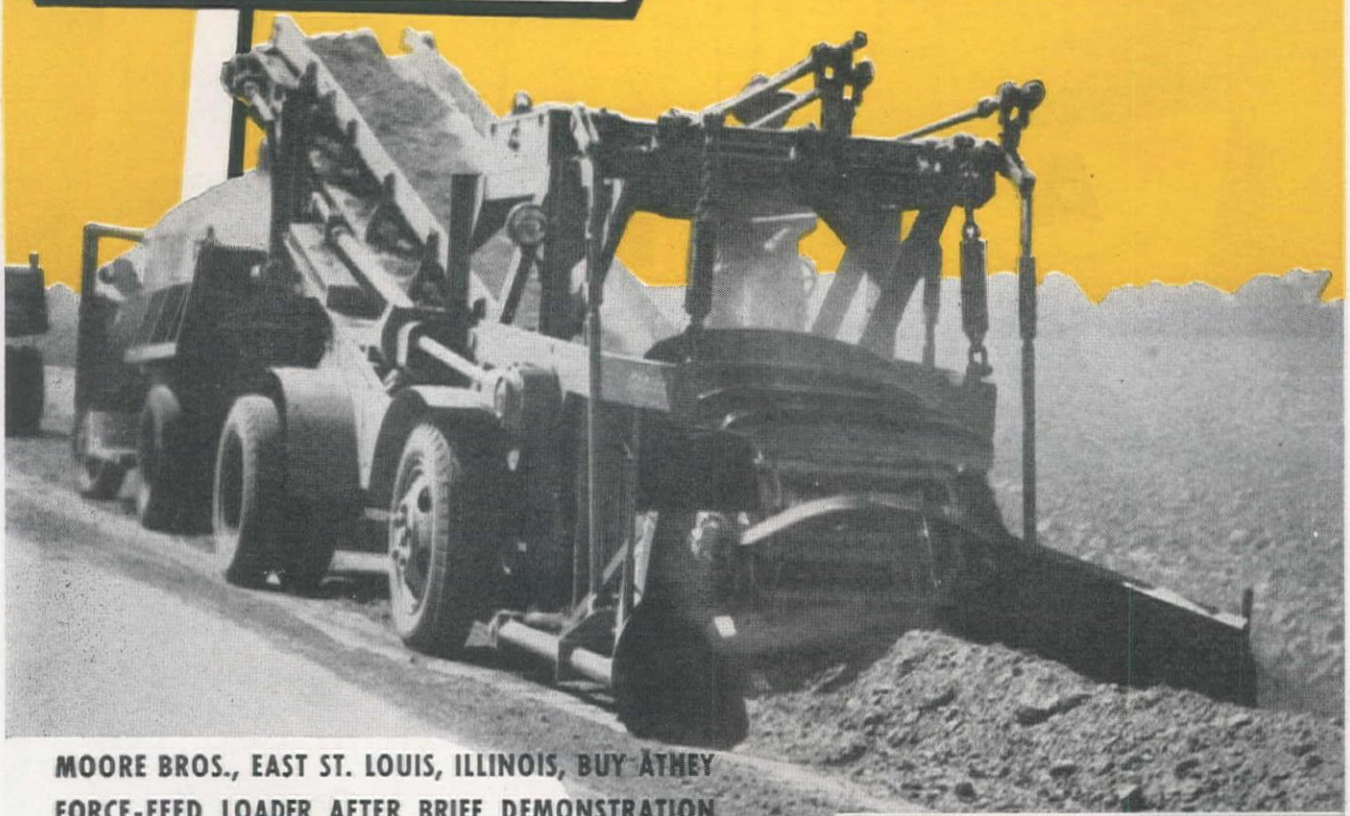
You automatically step up the YARDAGE of your dragline by hooking up a Hendrix Lightweight Bucket! It's 20% to 40% lighter than other buckets, type for type! Can be used on a machine designed for small operations and still maintain the allowable loaded weight. You'll get bigger payloads on operations requiring a long boom, and in wet digging you'll increase your payloads by leaving the water in the pit. We took the load *out of the bucket* . . . to let you put it *inside!*

WRITE FOR DESCRIPTIVE LITERATURE—
OR ASK YOUR DEALER

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

23 MILES OF LOW COST LOADING

BY Athey FORCE-FEED LOADER



MOORE BROS., EAST ST. LOUIS, ILLINOIS, BUY ATHEY FORCE-FEED LOADER AFTER BRIEF DEMONSTRATION

When they contracted for 23 miles of shoulder and ditch repair work, Moore Brothers had planned on another method for loading excess material into trucks. An Athey Force-Feed Loader was driven to their job and demonstrated.

Following the demonstration Moore Brothers would not permit the Force-Feed Loader to leave their job. Working in conjunction with a "Caterpillar" Motor Grader, the Force-Feed Loader set a new record for loading windrowed material from shoulders . . . kept five 2-yard trucks constantly busy on a one mile haul . . . handling a mixture of sod and earth.

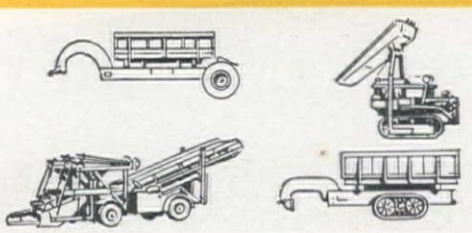
Your loading problems, too, can be solved . . . faster, more efficiently, at lowest cost . . . with the new, revolutionary Athey Force-Feed Loader. Get the story from your Athey-"Caterpillar" Dealer now!

ATHEY PRODUCTS CORPORATION, CHICAGO 38, ILL.

First step in this Illinois highway improvement job was grading shoulder and ditch with "Caterpillar" Motor Grader. Windrowed material was then loaded into truck by Athey Force-Feed Loader.

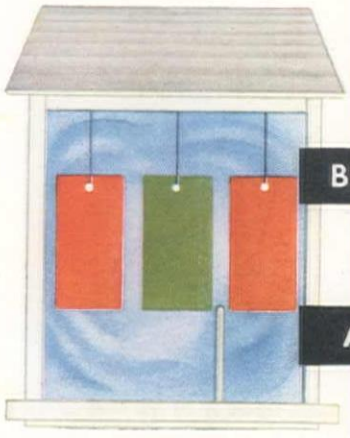
Athey APCOR Products

Athey



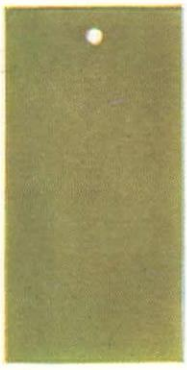
NOW PROOF

SYNCRO-GREEN VS. RED LEAD



BEFORE

Red Lead
Alkyd Vehicle



Syncro-Green
Metal Primer

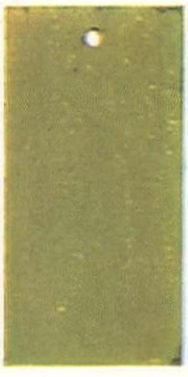
Red Lead
Pure Linseed Oil

AFTER

250 HOURS IN SALT SPRAY CABINET

ACTUAL REPRODUCTIONS OF TEST PANELS

Red Lead
Alkyd Vehicle



Syncro-Green
Metal Primer

Red Lead
Pure Linseed Oil

Tests were performed according to standard procedure of the American Society of Testing Materials, using a 20% salt solution at a constant temperature of 95 degrees Fahrenheit.

The United States Navy and Maritime Commission changed from red lead to zinc chromate primer because of its greater rust-resistance, toughness and adhesive film, quick drying and lower cost.

Now, Syncro-Green, the outstanding zinc chromate primer, is available to industry. Write today for complete information.

SYNFLEX
SYNCRO-GREEN
METAL PRIMER

We are interested in learning more about Syncro-Green — the modern metal primer now released to industry.

Name_____

Company_____

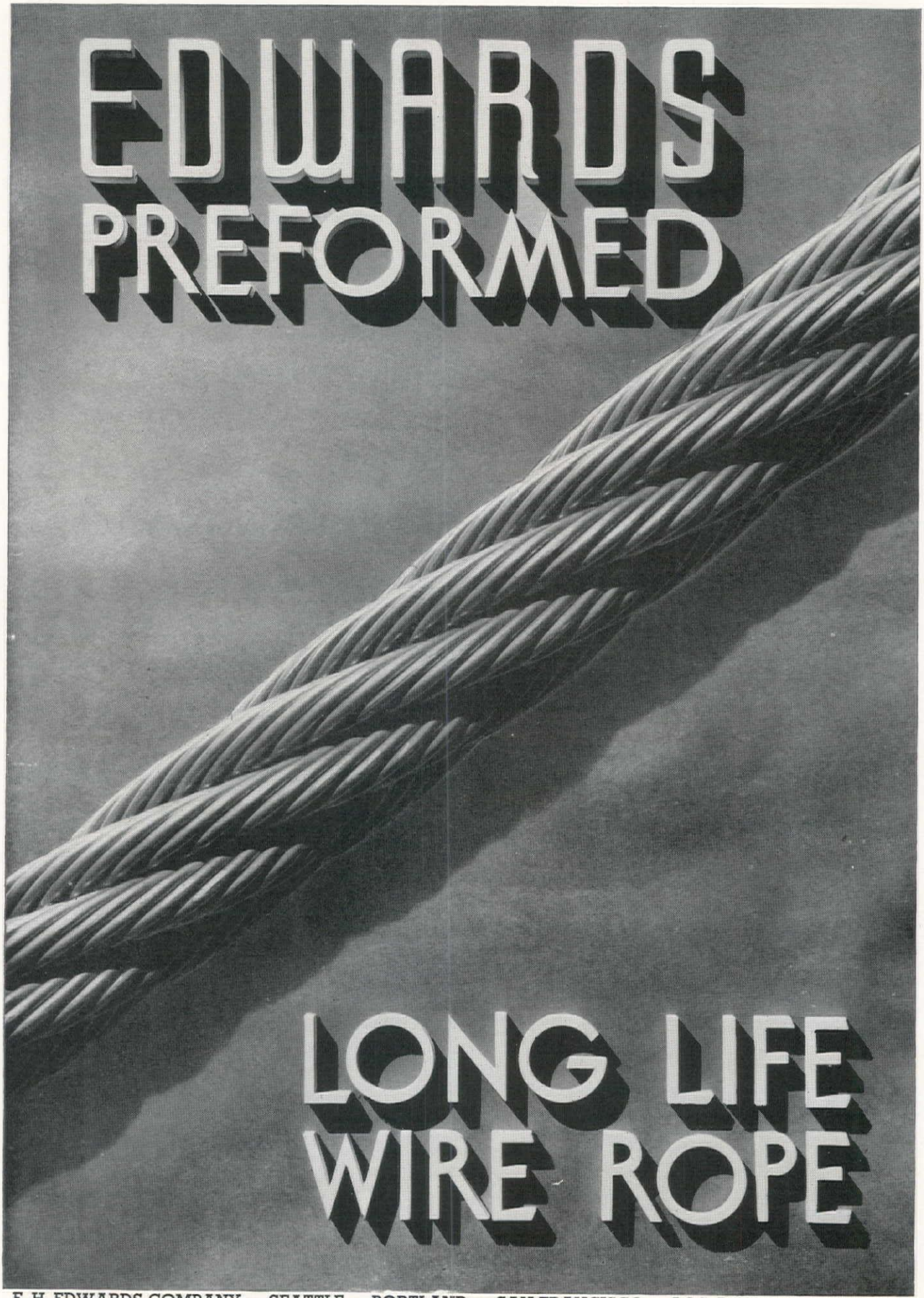
Address_____

City_____ Zone_____ State_____

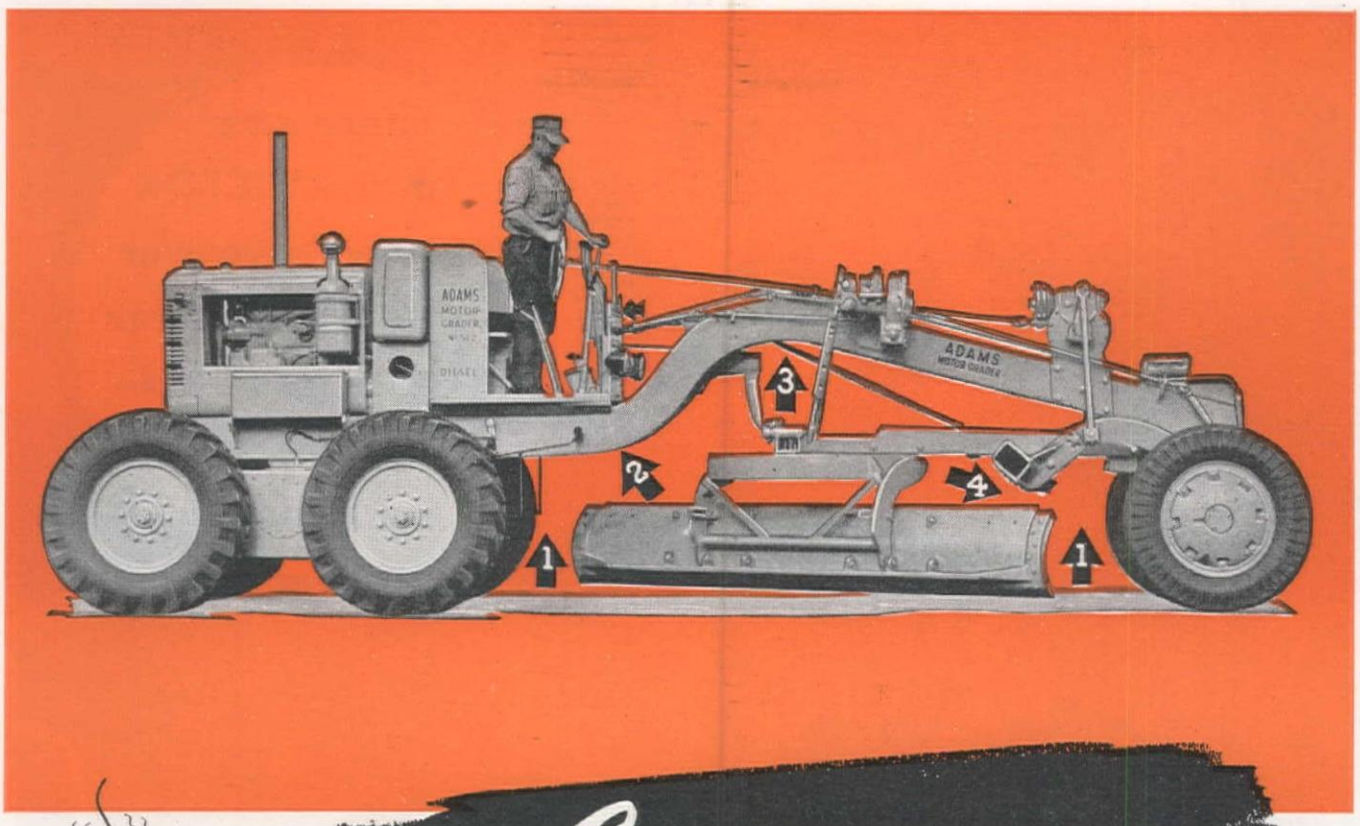
MANUFACTURED BY

ANDREW BROWN COMPANY 5400 DISTRICT BOULEVARD, LOS ANGELES 22, CALIFORNIA

244 CALIFORNIA ST., SAN FRANCISCO 11, CALIFORNIA • 1106 TWELFTH AVE., SEATTLE 22, WASHINGTON



E. H. EDWARDS COMPANY — SEATTLE — PORTLAND — SAN FRANCISCO — LOS ANGELES — HOUSTON



Clearance IN THE RIGHT PLACES WITH ADAMS MOTOR GRADERS

● **BLADE CLEARANCE**—*plenty of it—in all operating positions* . . . that's one of the important requisites for fast, efficient motor-grader performance—*every day, on every job.*

You get plenty of blade clearance in Adams Motor Graders—because they're designed and built that way. Note particularly how Adams' advanced design provides plenty of "elbow" room for the blade at all critical points:

1. Between blade ends and tires—allowing ample room for sharp blade angles, without tire interference, front or rear.
2. Between blade and frame—permitting free movement of blade heel.
3. Between blade assembly and frame arch—providing space for higher blade lift and better ground clearances.
4. Between blade and scarifier block—allowing easy reversing of blade under the scarifier block.

These are but a few of the advanced features that make Adams Motor Graders your best bet for efficient, high-speed production. Ask your local Adams dealer for complete facts, or write company direct.

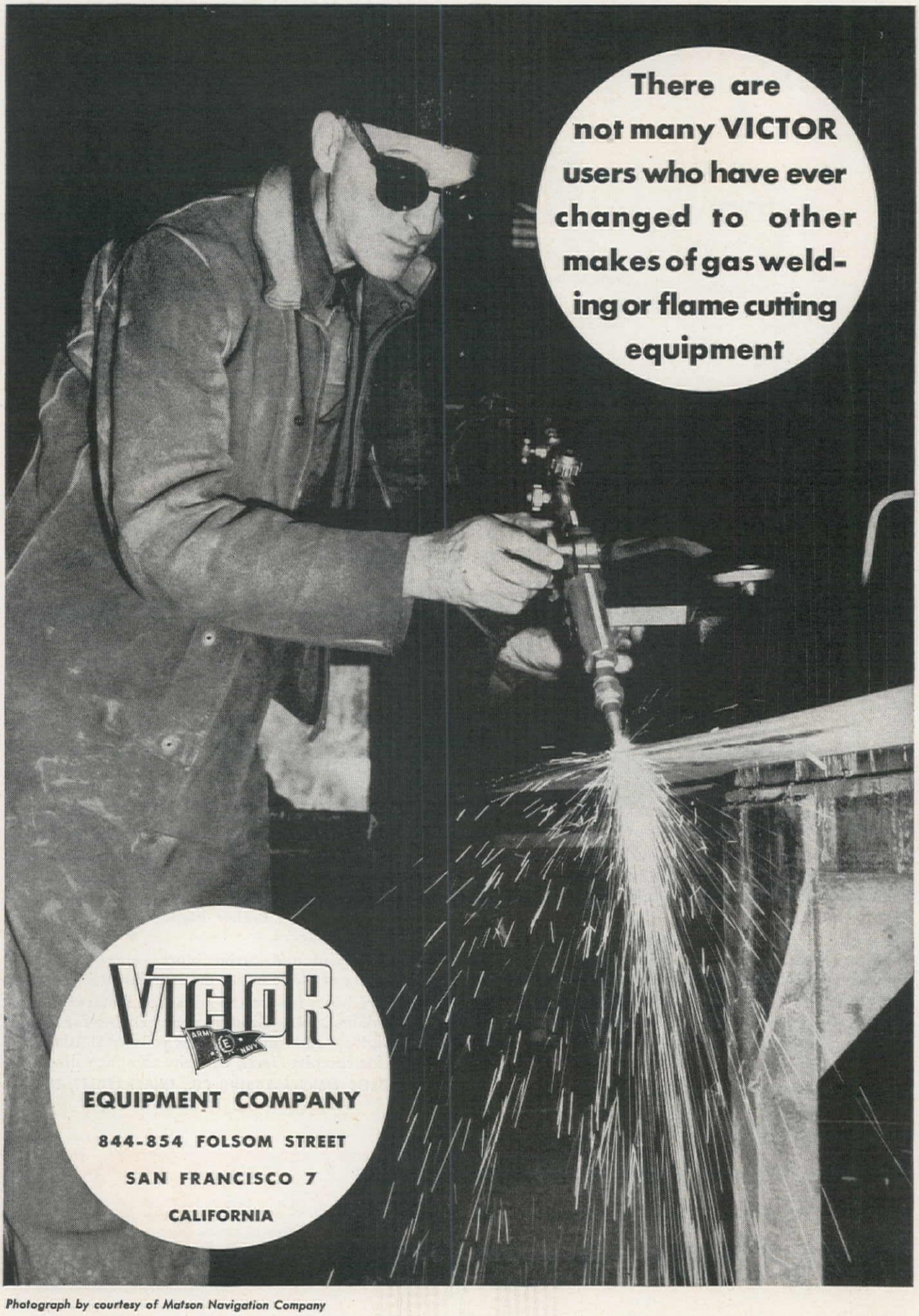
J. D. ADAMS MANUFACTURING CO., INDIANAPOLIS, IND.

LOCAL *Adams* DEALERS

CALIFORNIA—Western Factory Branch
J. D. ADAMS MANUFACTURING CO.
230 7th Street, San Francisco 3
Adams Distributors at: San Francisco, Los Angeles, Sacramento, Redding, Riverside, San Jose, Fresno, Stockton, Salinas, Santa Rosa, Modesto, Visalia, Merced, Bakersfield, Santa Maria and San Diego

ALASKA—Glenn Carrington & Co., Fairbanks
ARIZONA—O. S. Stapley Company, Phoenix
COLORADO—McKelvy Machinery Co., Denver
IDAHO—Intermountain Equipment Co., Boise, Pocatello
MONTANA—Industrial Equip. Co., Billings, Missoula
NEVADA—Brown Motors, Reno

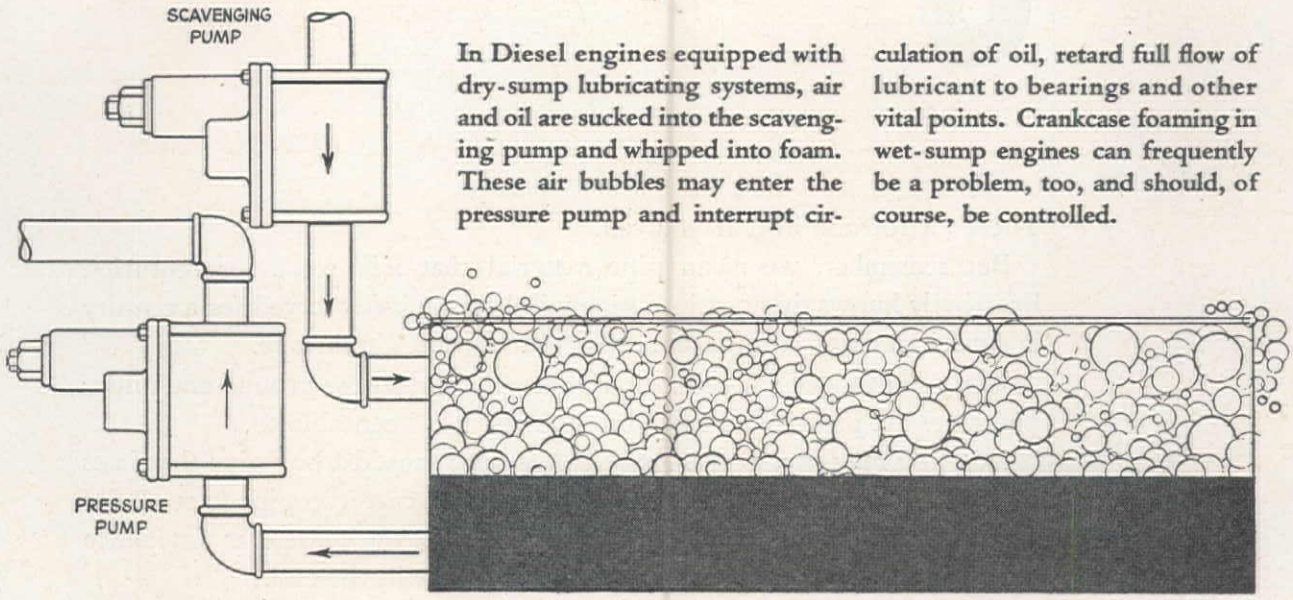
NEW MEXICO—Hardin & Coggins, Albuquerque
OREGON—Howard-Cooper Corp., Portland, Eugene
UTAH—The Lang Company, Salt Lake City
WASHINGTON—Howard-Cooper Corp., Seattle
Intermountain Equipment Co., Spokane
WYOMING—Industrial Equip. Co., Billings, Mont.
The Lang Company, Salt Lake City, Utah



Photograph by courtesy of Matson Navigation Company

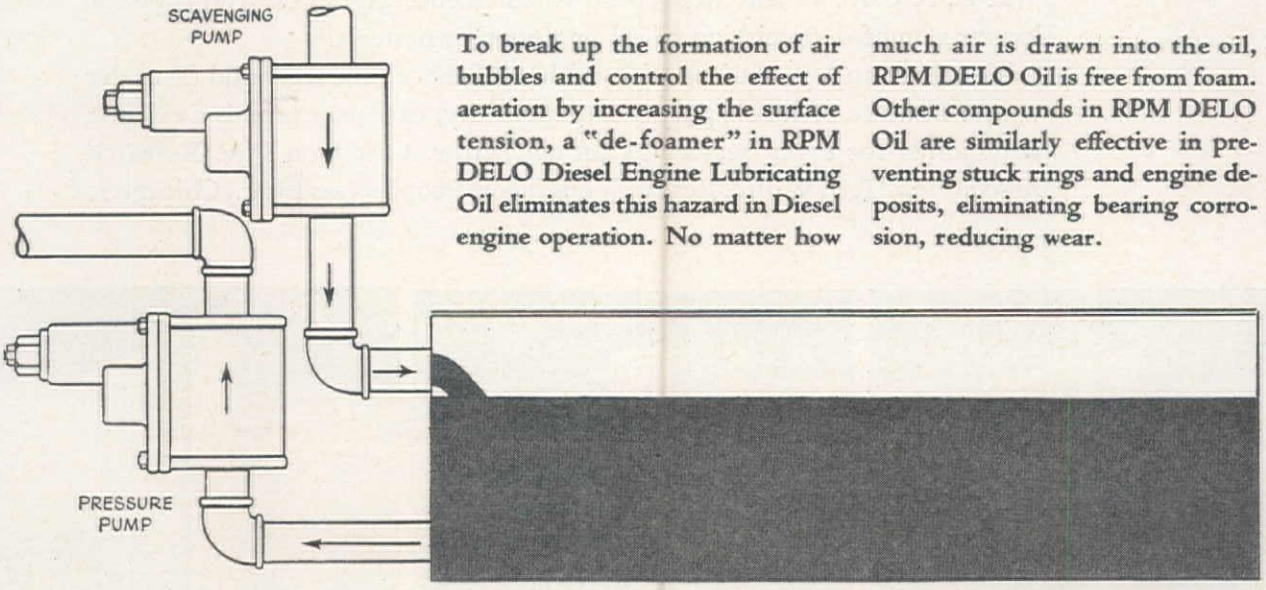
Diesel Engine DANGER points

AIR BUBBLES ENDANGER OIL CIRCULATION



In Diesel engines equipped with dry-sump lubricating systems, air and oil are sucked into the scavenging pump and whipped into foam. These air bubbles may enter the pressure pump and interrupt circulation of oil, retard full flow of lubricant to bearings and other vital points. Crankcase foaming in wet-sump engines can frequently be a problem, too, and should, of course, be controlled.

RPM DELO OIL PREVENTS CRANKCASE FOAMING



To break up the formation of air bubbles and control the effect of aeration by increasing the surface tension, a "de-foamer" in RPM DELO Diesel Engine Lubricating Oil eliminates this hazard in Diesel engine operation. No matter how much air is drawn into the oil, RPM DELO Oil is free from foam. Other compounds in RPM DELO Oil are similarly effective in preventing stuck rings and engine deposits, eliminating bearing corrosion, reducing wear.

To match the fine performance of RPM DELO OIL, use these equally efficient companion products from the same famous "RPM" line – RPM HEAVY DUTY MOTOR OIL – RPM COMPOUNDED MOTOR OIL – RPM GEAR OILS AND LUBRICANTS – RPM GREASES.

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert service – make your maintenance job easier. Call your local Standard Representative or write STANDARD OF CALIFORNIA, 225 Bush St., San Francisco 20, Calif.

RPM DELO
DIESEL ENGINE LUBRICATING OIL

Can you think

There's a fortune in it if you can.

But remember, we mean pipe material that *will* serve for centuries. Everybody knows that cast iron pipe will because it *has* served for a century in American cities, and for more than two centuries in Europe.

Can you think of any other kind that will? Under the ground and under pressure? At practicable cost? No one else has been able to.

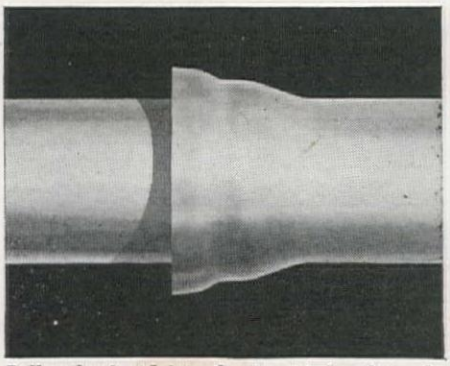
But, you may say, in this Atomic Age why should I buy pipe that lasts so long? Because the same qualities that enable cast iron pipe to serve for centuries also mean economy "in our time." Lower annual maintenance cost from the start. Lowest cost per service year in the end.

A survey among 195 waterworks superintendents proves that the maintenance cost of cast iron pipe for distribution mains is lowest by far.

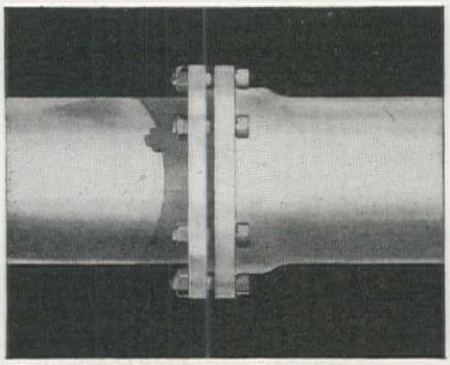
Engineers, in evaluating bids, continue to give cast iron pipe the highest rating for useful life—100 years or more.

A U. S. Government Report On Obsolescence gives cast iron pipe the lowest rate of depreciation of all engineering materials.

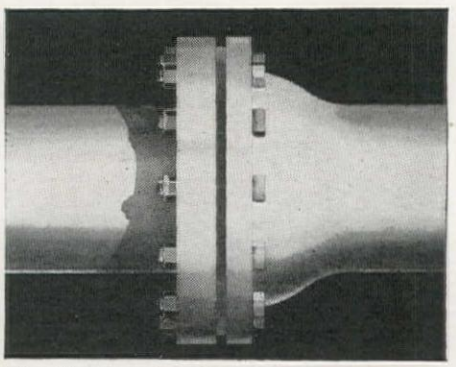
Yes, you can lay cast iron pipe with confidence, underground or under water. Because of its all-purpose adaptability, cast iron pipe is available with joints for every service as shown below. Cast Iron Pipe Research Association, T. F. Wolfe, Research Engineer, Peoples Gas Bldg., Chicago 3.



Bell-and-spigot Joint—the time-tried and standard for water, gas and sewerage service.



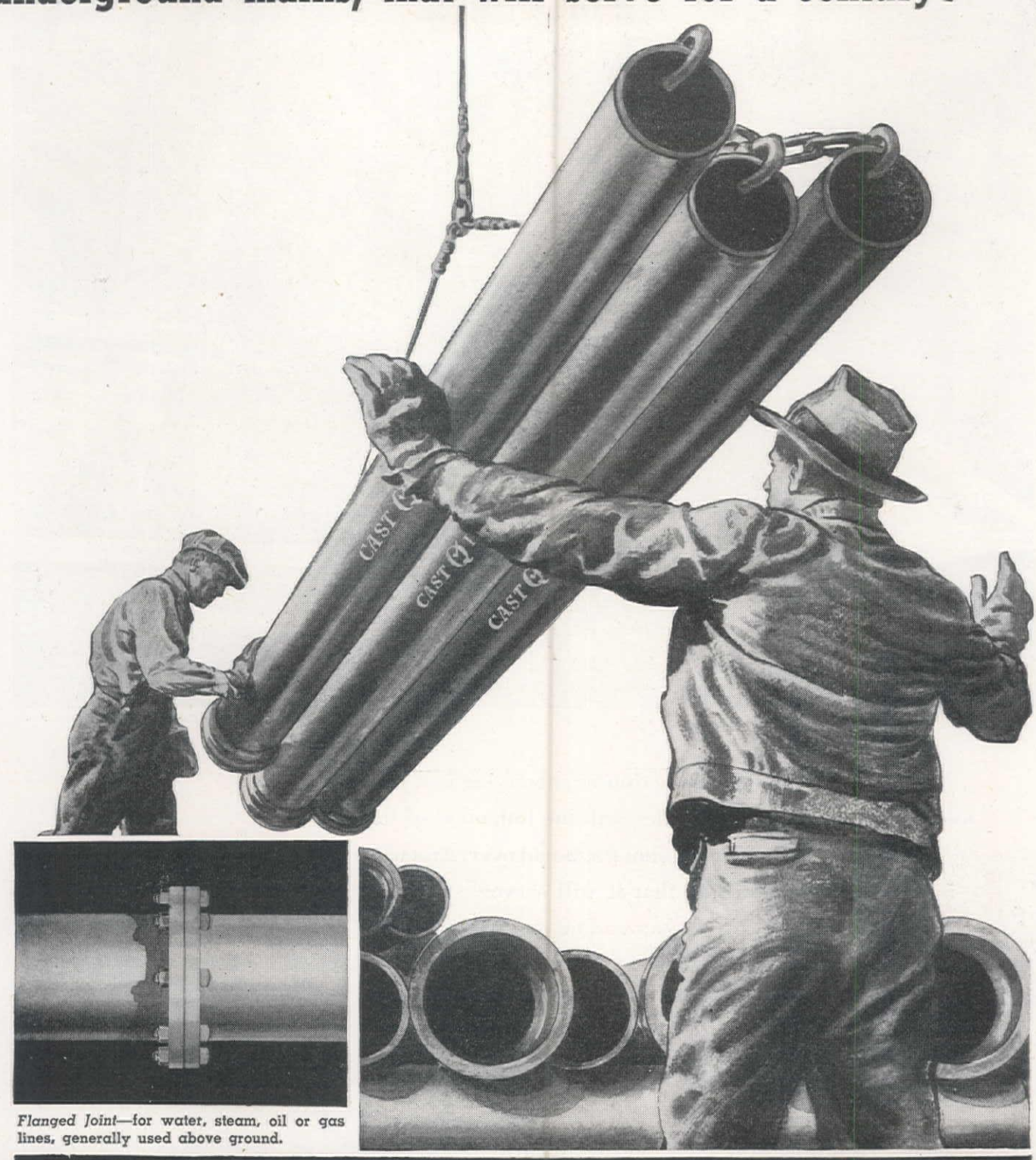
Mechanical Joint—for all pressures—now standardized with interchangeable parts.



Flexible Joint—for river crossings and other sub-aqueous installations.

CAST IRON PIPE

of any other pressure pipe material, practicable for underground mains, that will serve for a century?



Flanged Joint—for water, steam, oil or gas lines, generally used above ground.

Serves for Centuries

Original Woodcut by Lynd Ward

There's a solid satisfaction in specifying cast iron pipe. You know that your choice coincides with the judgment of leaders of your profession the world over. And when the line is backfilled, you are confident that it will serve throughout a long life at a low annual maintenance cost. This has been true of cast iron pipe for centuries; yet in the forty-odd years since our Company was founded, notable advances in manufacturing methods and controls have been made, resulting in a finer, more uniform pipe, either pit cast or centrifugally cast.

U.S.
cast iron
PIPE

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

SURPLUS for SALE at CALSHIP

In a short time, this great 14-way, emergency shipyard will be leveled to the ground. To make way for the demolition crews, there are large quantities and wide assortments of surplus materials and equipment now being offered at prices well below cost. No bidding! No red tape! Immediate delivery!

Wire Rope

Large stock of Wire Rope. Priced Right. Bright, hemp center, 6 x 19, plow steel, and improved plow steel in 9/16", 7/8", 1", 1 1/8", 1 1/2" diameter.

Bright, hemp center, 6 x 24, plow steel, and improved plow steel in 1 5/8" and 1-7/16" diameter.

Many other sizes and types available—most types also available in galvanized.

Valves—Brass & Bronze

Quantity lots of 150, 200, and 300 pound pressure, brass and bronze valves, in screwed and flanged types. Included are Crane, Walworth, Jenkins and Kennedy products. Wedge gate valves, 1/2" to 3"; globe, angle, and cross valves, 3/8" to 3"; swing check valves, 1/2" to 2 1/2"; check valves, 3/8" to 3". Steam cocks—square head, square head-three way, and flat head—1/4" to 2". Water cocks—square head, flat head, and tee head—1/4" to 2".

Pumps

332 pumps, various types, all suitable for general use. Included are: Duplex, vertical, and horizontal, reciprocating types. Close-coupled, horizontal, steam turbine types. Motor-driven, centrifugal types. Bilge pumps, motor-driven and hand-operated, 1/2" up to 2".

Mfgs.: Chicago Pump Co., Ingersoll-Rand, Deming Pump Co., Corpus Engr. Co.

Many Other Items Available

Rigging supplies
Welding electrodes
Welding and cutting equipment
Electric cable
Telephone cable
Misc. electrical materials
Steel plates and shapes
Packing and gasket material
Repair parts

Write or Wire

INDUSTRIAL EQUIPMENT COMPANY

Care of California Shipbuilding Corporation, P. O. Box 966, Wilmington, Calif.

Exclusive Sales Representatives for

CALIFORNIA SHIPBUILDING CORPORATION

ARIZONA HAULERS USE TRAILMOBILE LOW-BED

Wherever highways are built, dams constructed, oil wells drilled —there you will find TRAILMOBILE low bed trailers hauling the heavy excavating equipment, drilling rigs, turbines, transformers, boilers—equipment that is as heavy and bulky as it is expensive.

This is the type of hauling which is entrusted only to those with the experience, the right equipment, and the financial responsibility consistent with the importance and value of the cargo.

Many of these heavy hauling contractors, such as Lee Garrison of Phoenix and William Hansen of Prescott, depend upon TRAILMOBILE low-bed trailers, such as shown above. If you haul earth moving, power house, refinery or oil field equipment—let TRAILMOBILE build a low-bed trailer to your specific needs.

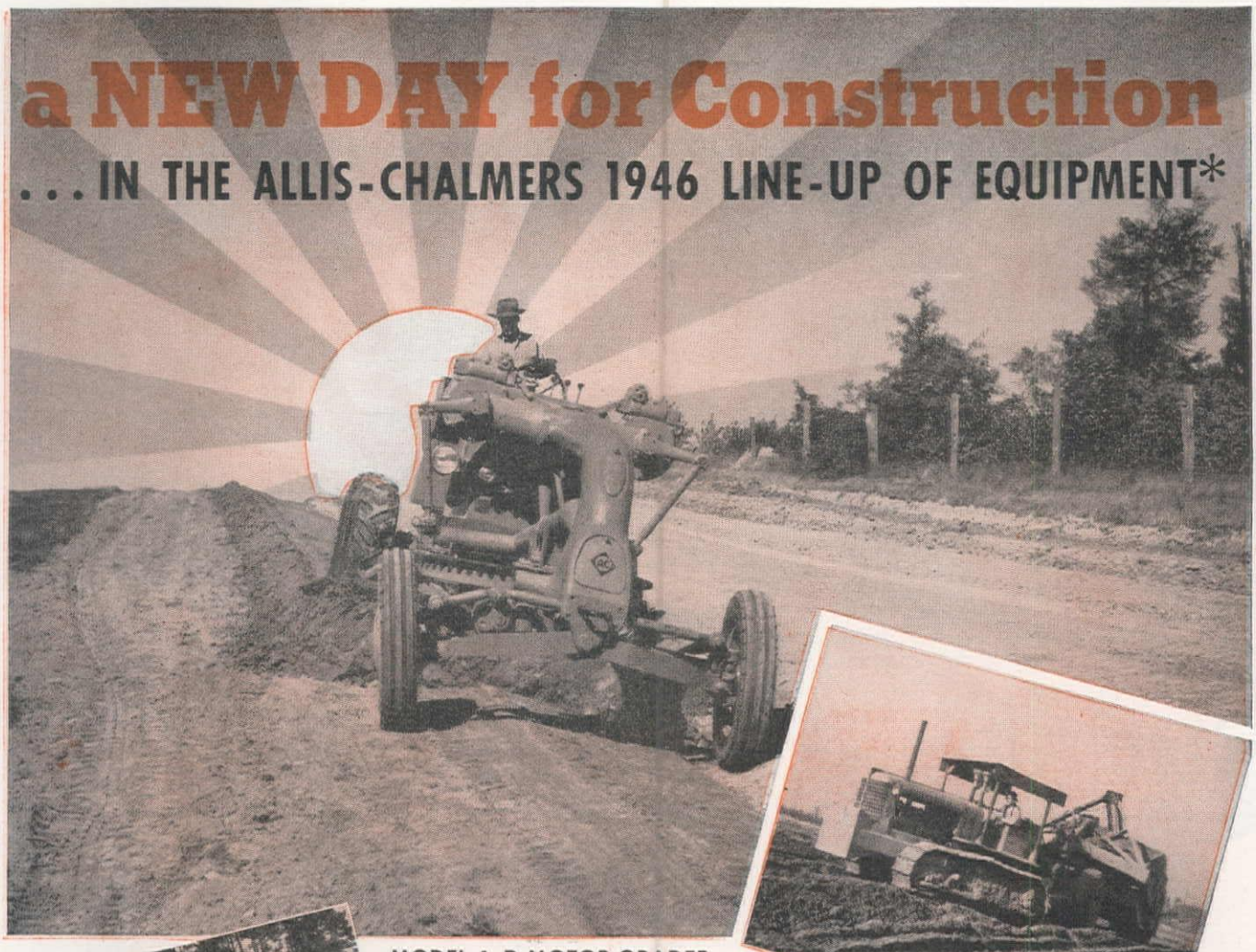
THE TRAILMOBILE COMPANY • BERKELEY, CALIFORNIA

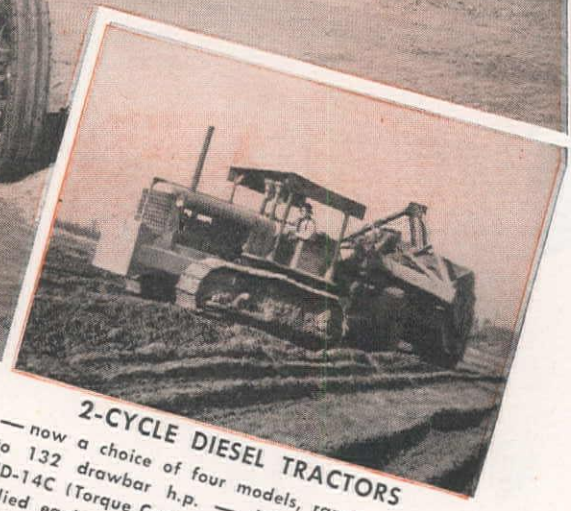
TRAILMOBILE

Los Angeles Berkeley Sacramento Fresno San Jose Bakersfield Stockton Ogden Seattle Honolulu

a NEW DAY for Construction

. . . IN THE ALLIS-CHALMERS 1946 LINE-UP OF EQUIPMENT*





2-CYCLE DIESEL TRACTORS
— now a choice of four models, ranging from 60 to 132 drawbar h.p. — HD-7, HD-10, HD-14, HD-14C (Torque Converter Tractor) — with matched allied equipment — cable and hydraulic bulldozers and scrapers . . . snow plows, winches, sheepfoot rollers, rippers.

MODEL A-D MOTOR GRADER
— 75 Diesel h.p. engine . . . more traction, more clearance . . . a full range of blade positions for handling complete grading — slopes, ditches, surface.

MODEL W-SPEED PATROL
— for light construction and maintenance . . . performs at fraction of usual grading cost—low original cost, low operating cost.

Up-to-the-minute in design!
Modern in performance!

A new high in productivity . .
a new ease in operation . .
a new low in grading cost.

It's a New Day for construction men . . . with Allis-Chalmers power!

MODEL I-B WHEEL TRACTOR
— the ideal, economical unit for countless pulling and pushing jobs—especially popular for sweeping streets, blacktop, snow.

POWER UNITS
— for driving crushers, conveyors, compressors, screens, shovels, draglines, pumps and other equipment. Available with various accessories to fit the application. 5 sizes. Choice of fuels.

* MORE MACHINES ARE TO BE ADDED . . *Watch for Announcements!*

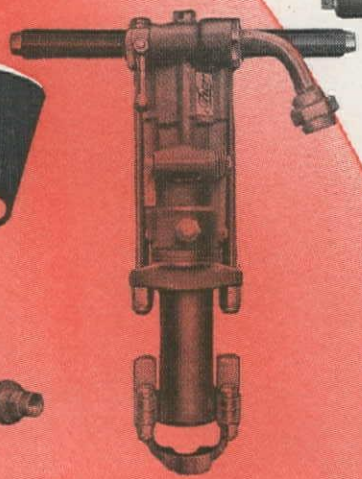
ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

ALL OVER THE WORLD—

YOU

Thor

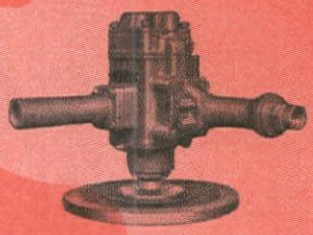
CONTRACTORS AIR TOOLS



Rock Drills

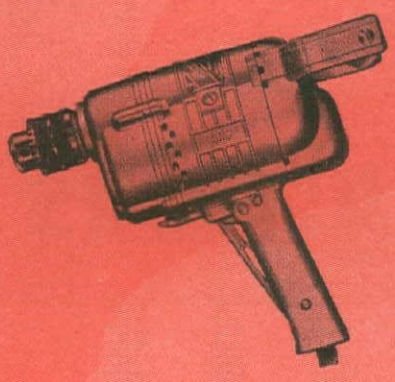
Paving Breakers

Rotary Grinders



Concrete Sanders

Universal • ELECTRIC TOOLS • High Frequency



Drills

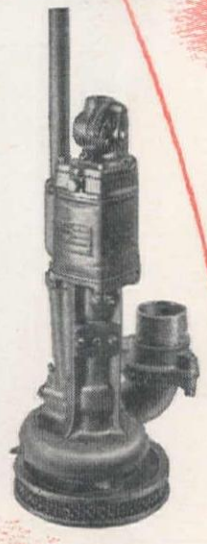
Drill Stands

NAME THE JOB...

will Name the Tools

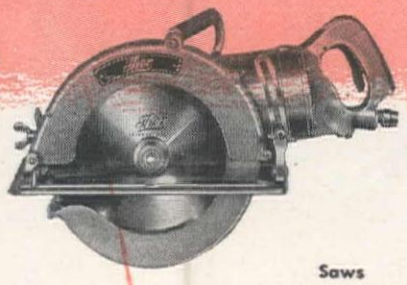
TO DO IT FASTER, BETTER AND AT LOWER COST!

Clay Diggers

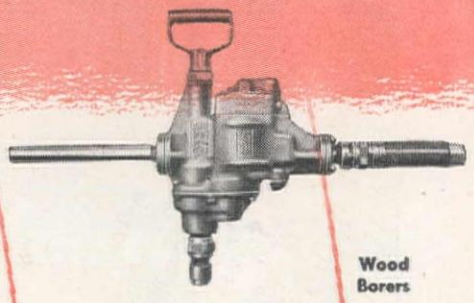


Sump Pumps

Tampers



Saws

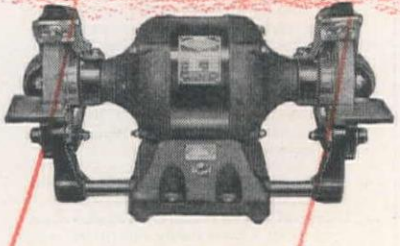


Wood Borers

Riveting Hammers

Chipping Hammers

Nail Drivers



Bench Grinders

Leading contractors everywhere specify Thor Portable Power Tools to save time and cut costs. Favorites for more than fifty years, Thor tools have proved again and again their superiority in advanced design and rugged construction. Your nearby Thor Representative can help you choose just the right tools for your work from Thor's *complete* line.

INDEPENDENT PNEUMATIC TOOL COMPANY

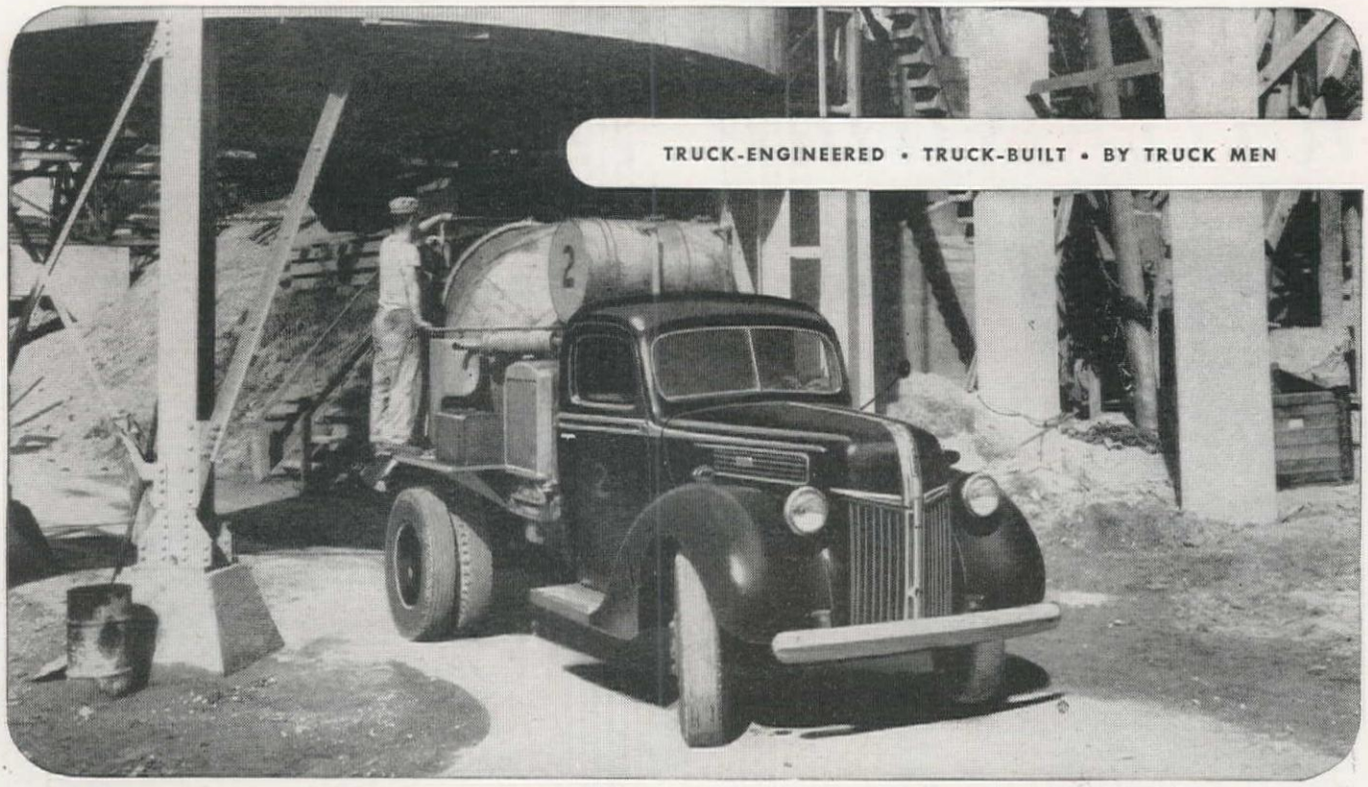
600 W. Jackson Boulevard, Chicago 6, Illinois

BIRMINGHAM BOSTON BUFFALO CLEVELAND DETROIT LOS ANGELES MILWAUKEE NEW YORK
PHILADELPHIA PITTSBURGH ST. LOUIS SALT LAKE CITY SAN FRANCISCO TORONTO, CANADA LONDON, ENGLAND

Thor PORTABLE POWER **TOOLS**

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

Better Trucks for YOUR Business!



"CONSTANT HEAVY LOADINGS; VERY LOW TON-MILE COSTS"

"For the past twenty-four years," wrote Mr. J. Roy Pennell, president of Pennell & Harley, Inc., construction engineers, of Spartansburg, S. C., recently, *"we have been constant users of Ford Trucks in construction work and our experience has been such that we are continuing to use Ford Trucks."*

Carrying, as illustrated, the charged mixer plus its power unit, the Pennell & Harley Ford Trucks are getting a real workout every minute they're on the job.

"These trucks have been constantly loaded beyond the Ford Motor Company's rated capacity," Mr. Pennell stated, *"yet they have carried the loads at a very low ton-mile cost."*

It's steady, and thoroughly capable performance such as this that has made the Ford Truck one of the prime favorites in construction work. Generous frame strength, ample axle and clutch capacity and Ford-engineered V-8 or 6-cylinder power that's won a world-wide reputation for rugged reliability—all this is enhanced by important new engineering developments in today's new Ford Trucks. Let your Ford Dealer furnish you with the full facts.

Ford

ADVANCED ENGINEERING IN NEW FORD TRUCKS

More Economy and Endurance
Easier Servicing

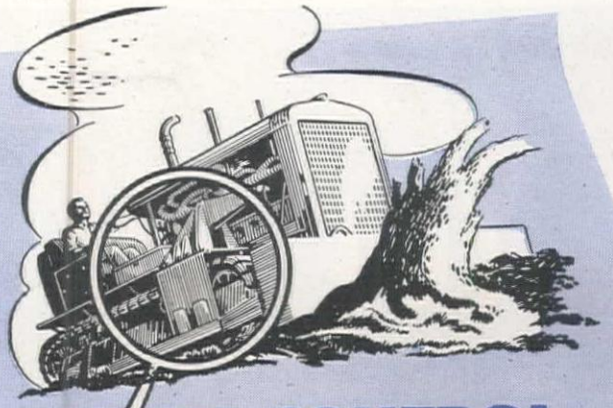
A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground 4-ring pistons for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW longer-lived valve springs • NEW improvements in cooling • NEW efficiency in ignition • in carburetion • in lubrication • in ease and economy of servicing operations • And available in all truck chassis except C.O.E. units—the rugged, thrifty 90 HP FORD SIX-CYLINDER ENGINE, with many important advancements.

FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Tough, forged front axles • Extra-sturdy rear axles with pinion straddle-mounted on 3 large roller bearings, ¾-floating type in light duty units, full-floating in all others • 3 axle ratios available (2 in 1-ton unit) • 2-speed axle available in heavy duty units at extra cost • Powerful hydraulic brakes, large drums, cast braking surfaces • Rugged 4-speed transmission with NEW internal reverse lock optional at extra cost on light duty units, standard on all others.

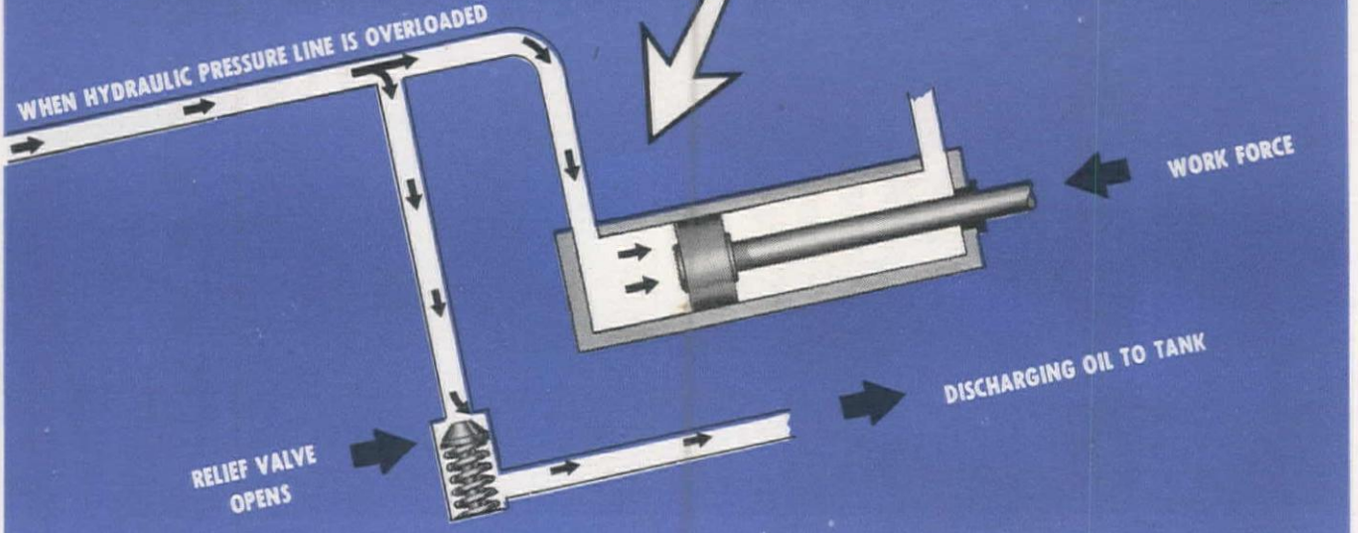
FORD TRUCKS

MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

Overload DOES NOT DAMAGE Construction Equipment having



VICKERS HYDRAULIC CONTROL



NOTHING SNAPS—NOTHING BREAKS

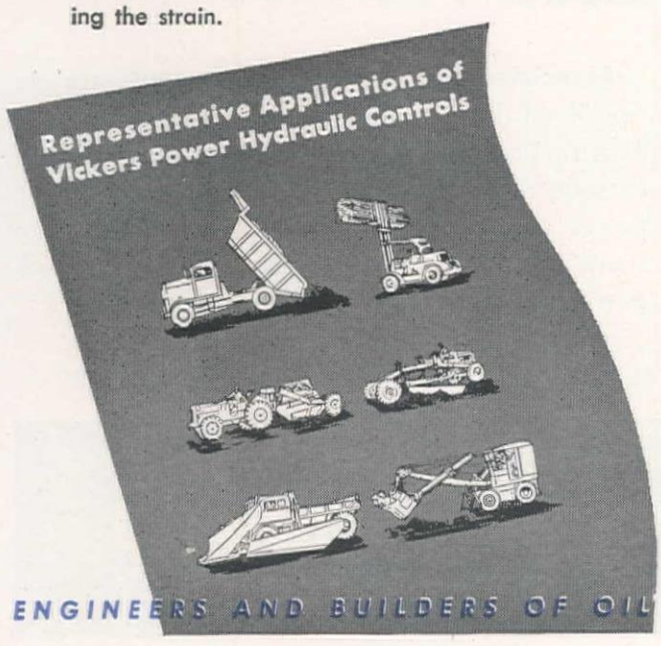
Overload protection is *built into* Vickers Power Hydraulic Controls for construction equipment. A relief valve stands guard on each circuit, so when overload occurs, the valve opens—returns oil to the tank—relieving the strain.

Nothing is injured. When the overload is cleared, the relief valve automatically closes, and the circuit is ready to go back to work.

Overload cannot damage equipment having Vickers Power Hydraulic Control—it cannot even cause any inconvenience—the relief valve takes care of it.

The effect of this automatic protection on the life of the equipment is obvious. But there is another advantage—the operator doesn't have to "baby" the machine. He knows there is overload protection—hence he can work as fast and crowd as hard as he likes—an important feature when the "going is tough."

For easier and more accurate control—faster work—specify Vickers Power Hydraulic Controls.



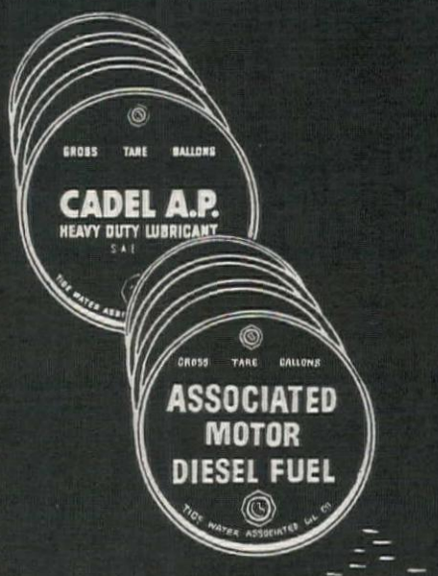
VICKERS Incorporated

1498 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices: Chicago • Cincinnati Cleveland • Detroit • Los Angeles • Newark • Philadelphia Rochester • Rockford • Tulsa • Worcester

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

for all diesel engines



Cadel A. P. Heavy Duty Lubricant
Associated Motor Diesel Fuel

Cadel A. P. (all-purpose) Heavy Duty Lubricant is blended with special additives, to give it dispersive, detergent, and inhibiting properties. *Result:* Cleaner engines, lower engine wear, freer piston rings and valve stems, longer bearing life, easier starting at low temperatures. *Proved* with millions of miles of actual road usage.

Associated Motor Diesel Fuel is the 100% straight run diesel that is so outstanding in its cleanliness. This fuel contains no water or suspended solids to corrode or wear the closely fitting parts of the power system. High volatility and combustion characteristics insure quick starting and maximum power under all conditions. Ask for prices.

Tell Your Associated Dealer You Want a Credit Card

Correct Lubrication is Machinery's Most Vital Need

TIDE WATER ASSOCIATED OIL COMPANY

For Insley Service and Sales in Your Territory

ANDREWS EQUIPMENT SERVICE
404 N. W. Broadway
Portland 9, Oregon

ANDREWS EQUIPMENT SERVICE
126 South Walnut Street
Spokane 9, Washington

CHOGUILL TRACTOR CO., INC.
1748 Grand Avenue
Phoenix, Arizona

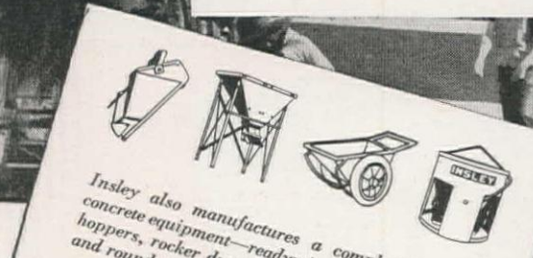
CONSTRUCTORS EQUIPMENT CO.
3707 Downing St.
Denver 4, Colorado

MOTOR EQUIPMENT CO.
507 N. 2nd Street
Albuquerque, New Mexico

H. H. NIELSEN COMPANY
541 W. 2nd Street
Salt Lake City 1, Utah

SERVICE EQUIPMENT CO.
300 Aurora Avenue
Seattle 9, Washington

SHAW SALES AND SERVICE CO.
5100 Anaheim-Telegraph Rd.
Los Angeles 22, California

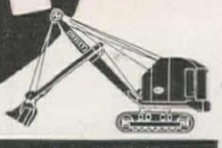


Insley also manufactures a complete line of concrete equipment—readymix receiving buckets, hoppers, rocker dump and standard hand carts and round type concrete buckets.

On this municipal sewer project, where trench depths ran more than 14 feet and widths 6 to 8 feet, a ½-yd. Insley Excavator with clamshell attachment handled the complete job—excavating, laying in the sewer, and backfilling—*and handled it fast.*

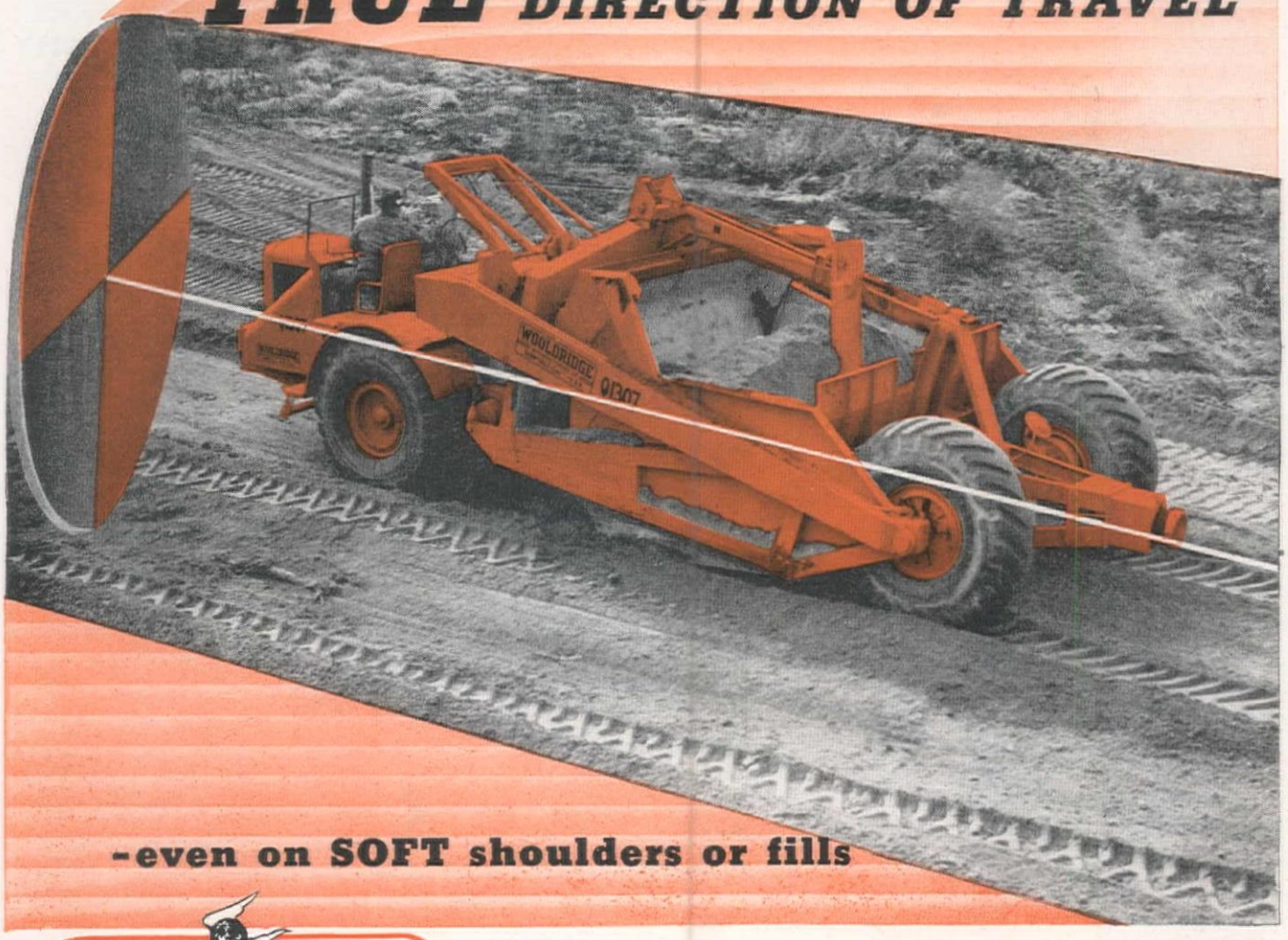
When it comes to an excavator that will go in anywhere and get the job done . . . in less time . . . at more profit to you . . . *you can't beat an Insley for lower cost yardage.* Insley Excavators (⅜ or ½-yds.) are designed for use with five interchangeable attachments . . . shovel, crane, hoe, clamshell and dragline.

EXCAVATORS ★ **INSLEY** ★ CONCRETE EQUIPMENT



INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

TRUE DIRECTION OF TRAVEL



-even on SOFT shoulders or fills

WOOLDRIDGE
EARTHMOVING EQUIPMENT
Includes

★ **SCRAPERS**
Tractor-drawn for handling heaping yardages from 6 to 28 cu. yards.

★ **POWER CONTROL UNITS**
Single and multiple drum with universal or roller fairleads.

★ **BULLDOZERS**
Tough and rugged design for standard makes of tractors.

★ **TRAILBUILDERS**
Adjustable angle-blades for standard tractor mounting.

★ **RIPPERS**
Available in light, medium and heavy duty models with two sizes to each model.

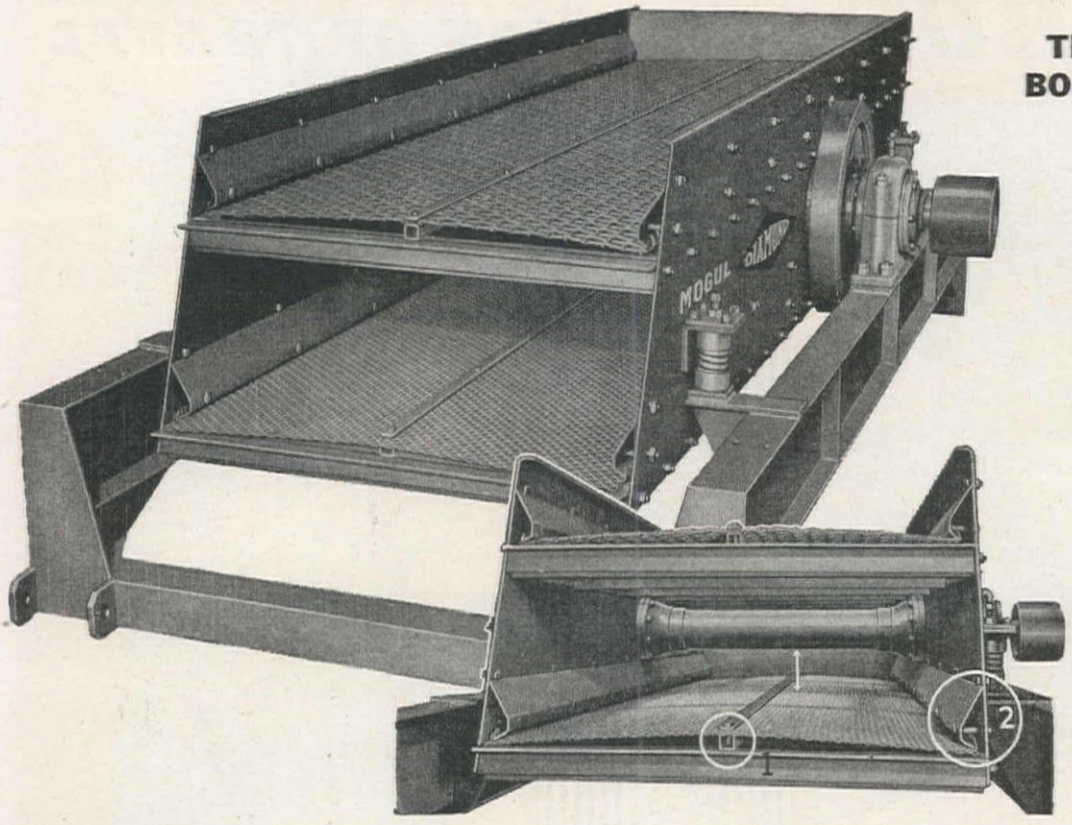
DISTRIBUTOR SALES & SERVICE FACILITIES IN ALL PRINCIPAL AREAS & FOREIGN TERRITORIES

Due to their exclusive, hydraulic steering system Wooldridge Terra-Cobras always maintain a fixed direction of travel over all types of ground including soft or slippery surfaces. Obstacles such as rocks, ruts or timbers in their path will not cause these high speed earthmovers to veer from their set course. A single steering bar permits operator to maintain positive *two-wheel* steering control from a fraction of a degree to a sharp angle turn. With no effort required, operators are able to maintain higher yardage averages throughout an entire shaft. To keep yardages on the move investigate Wooldridge Terra-Cobras for your jobs—today!

WOOLDRIDGE
MANUFACTURING COMPANY
SUNNYVALE · CALIFORNIA · U. S. A.

TERRA COBRA
Hi-Speed Self-Propelled
EARTHMOVERS

YOU CAN'T CHOKE A DIAMOND VIBRATOR!



THIS NEW FREE BOOK TELLS WHY

It tells you the many reasons for the acknowledged superiority of the DIAMOND vibrator, and it tells you more. It illustrates and describes DIAMOND scalping and combination scalping and scrubbing screens, and DIAMOND drag washers. Send to us, or ask your DIAMOND dealer for a copy of Bulletin D-45-V.

Look at the illustration above. Study it. Note the free space between decks, even with the shaft housing, as denoted by the white arrow. This gives the material the room it needs. The marvelously balanced *forward* action of the screen keeps the material moving from the feed end to the open end. Figure 1 shows how the screen on each deck is raised in the center to force the material to spread towards the sides. Users will invariably tell you that they consistently "get more material through their DIAMOND vibrators" which means greater capacity, important savings in time, and consequent savings in operating costs.

Figure 2 shows the DIAMOND method of screen locking. Here, the curved side plate holds the turned edge of the screen, and tightening bolts pulling straight out draw the screen taut without the constant cutting action so often found with other methods. This means considerably less screen replacement. Bulletin D-45-V fully illustrates and describes these and other important features. Ask for it.

ASK YOUR DIAMOND DEALER ABOUT THE NEW "DUAL-ACTION" CRUSHER

Get the facts about this startling new development in crushing. A primary (jaw) and finishing (roll) crusher in ONE UNIT! About half the weight, equal or greater capacity, dependable uniformity of product — these and other features make "DUAL-ACTION" the outstanding development in crushing in the past thirty years. Ask for Bulletin D-45-M which gives all the facts and information on the use of the "DUAL-ACTION" for replacement on your present used plant bringing its weight well within minimum load limits anywhere on any highway. Other dependable DIAMOND products are:

Jaw and roll crushers . . . Conveyors, screens . . . Bucket elevators . . . Feeders, hoppers, bins . . . Portable, ROTOR-LIFT plants . . . Complete quarry plants.

DIAMOND DEALERS

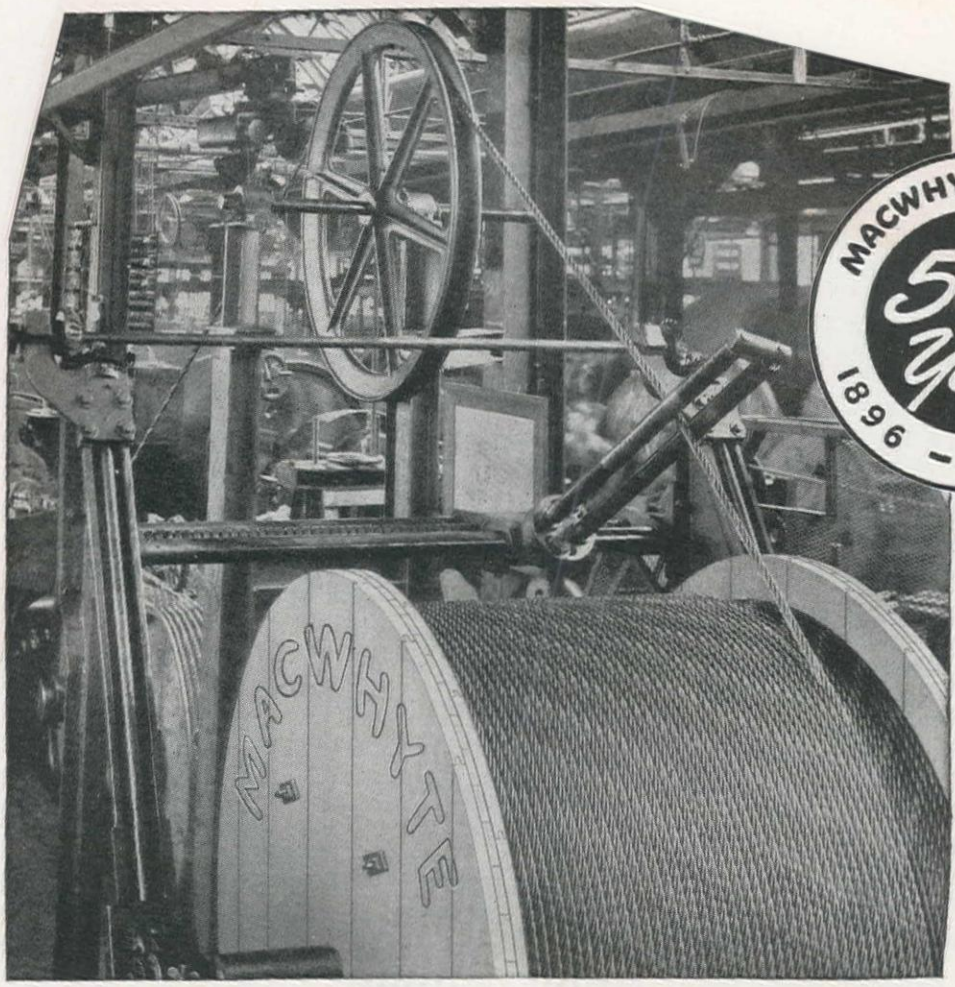
Oakland	SOULÈ EQUIP. CO.
Los Angeles	GARLINGHOUSE BROS.
Seattle	A. H. COX & CO.
Portland	LOGGERS & CONTRACT'S MACH. CO.
Boise and Spokane	WESTERN EQUIP. CO.
Salt Lake City	C. H. JONES EQUIP. CO.
Phoenix	O. S. STAPLEY CO.
Albuquerque	CONTRACTORS' EQUIP. & SUP. CO.

DIAMOND

DIAMOND IRON WORKS, INC.

AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH MINNEAPOLIS 11, MINNESOTA



MACWHYTE COMPANY
50th Year
1896 - 1946

Ready to start a long, useful life on your equipment

Here you see Macwhyte Wire Rope as it comes from the closing machine. It is now ready to start giving the long service that has been so carefully built into it.

Select quality steel rods were its beginning. They were scientifically heat-treated and cold-drawn, into tough, metallurgically uniform wire. Precision machines operated by wire rope craftsmen layed the wire into strands. Permanent internal lubrication was force-fed around each wire. Closing the lubricated strands completed the wire rope that will give longer, more economical performance on your equipment.

Macwhyte distributors and factory representatives are at your service.

Make MACWHYTE your headquarters for WIRE ROPE AND SLINGS

170-page Wire Rope Catalog G-15, yours for the asking

Lists Macwhyte's complete line. Gives other valuable information. Ask any Macwhyte representative or write Macwhyte Company.

MACWHYTE COMPANY

Wire Rope Manufacturers

2909 Fourteenth Avenue, Kenosha, Wisconsin

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

MACWHYTE PREformed and Non-PREformed Wire Ropes and Internally Lubricated Wire Rope . . . MONARCH WHYTE STRAND Wire Rope . . . Special Traction Elevator Rope . . . Braided Wire Rope Slings . . . Aircraft Cables, Assemblies and Tie-Rods . . . Stainless Steel Wire Rope, Monel Metal Wire Rope, Galvanized Wire Rope.

NO. 860

MOTO-PAVER

The Last Word in Asphalt Mixing and Paving

A Complete Traveling Asphalt Mixer and Paver

Engineered and built by America's oldest manufacturers of asphalt mixing equipment, the H & B MOTO-PAVER has been designed to meet the present day need for a highly flexible, mobile and efficient traveling mixer and paver in one self-contained, self-propelled unit.

The MOTO-PAVER mixes, spreads and lays any type of mixed-in-place bituminous material to any road width, thickness and crown condition. No separate loader, spreader or other paving equipment is required—no trailer to haul it from one job to another. The MOTO-PAVER does the *complete mixing and paving job,* and travels from one job to another under its own power.

Mounted on pneumatic tires, the MOTO-PAVER is powered by two gasoline engines—one driving the mixer and related units, the other driving the machine along the road. Paving speed is from 4 to 50 feet per minute, road speed up to 18 miles per hour. Mixing capacity is 100 to 120 tons per hour. The MOTO-PAVER will handle all but the highest types of bituminous concrete.

Especially suitable for resurfacing trunk roads and streets of smaller municipalities, the MOTO-PAVER is also an efficient unit for new construction work on roads, streets, airports, parking lots, driveways, etc. Bulletin MP-46, giving complete information and specifications, will be sent on request.

HETHERINGTON & BERNER INC.
739 Kentucky Ave., Indianapolis 7, Indiana

Hetherington & Berner

BUILDERS OF PORTABLE AND STATIONARY ASPHALT PLANTS OF ALL TYPES AND CAPACITIES

Why a BG Ditcher can cut through hard material

• Just as a milling head steadily cuts through a piece of steel, so does the Barber-Greene Ditcher mill through tough materials. The closely spaced buckets, each taking small, even bites, travel at a high rate of speed, giving a milling action against the digging face. The vertical boom, exclusive with Barber-Greene Ditchers, causes the buckets and digging teeth to pull straight up against the work.

Frozen ground, coral rock, caliche—these are some of the hard materials through which Barber-Greene Ditchers have successfully and economically cut.

Catalog 44 describes and illustrates the many mechanical features and models of these versatile ditchers. Obtain a copy from your Barber-Greene distributor or write direct to Barber-Greene Company, Aurora, Illinois.

DISTRIBUTORS—Brown-Bevis Equipment Co., Los Angeles 11, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Columbia Equipment Co., Spokane, Washington; Columbia Equipment Co., Seattle, Washington; Columbia Equipment Co., Boise, Idaho; Columbia Equipment Co., Portland 14, Oregon; Contractors Equipment & Supply Co., Albuquerque, New Mexico; Ray Corson Machinery Co., Denver 2, Colorado; Jenison Machinery Co., San Francisco 7, California; Western Construction Equipment Co., Billings, Montana; Western Construction Equipment Co., Missoula, Montana.

46-3

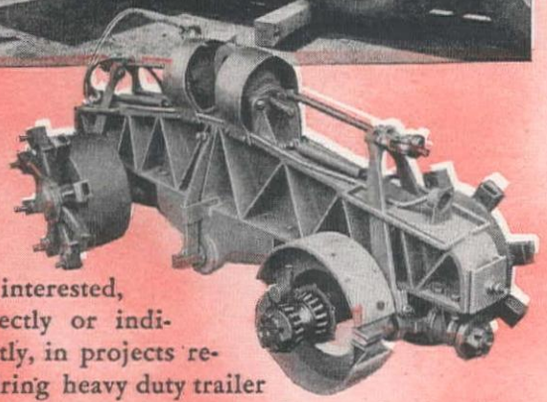
BG Barber-Greene

CONSTANT FLOW EQUIPMENT

LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES

LOGICALLY... the world's greatest trailer

was a ROGERS...



If interested, directly or indirectly, in projects requiring heavy duty trailer equipment, write for the Rogers Catalog illustrating and describing units exactly suited to all requirements.

The above trailer (*which actually had a capacity of 600 tons on improved roads with conventional heavy duty tires), was built for Eichleay Engineering Corporation, contractors for the military authorities and sold by Atlas Equipment Company, both of Pittsburgh, Penna.

THE necessity of moving a *300 ton burden, required in connection with a highly secret military test, presented unprecedented problems.

A railroad was out of the question. No vehicle of adequate capacity had ever been built. Failure was unthinkable and speed was imperative.

The search for specialized experience, engineering competency and plant facilities adequate to build a vehicle capable of handling this greatest of all moving projects led inevitably to the pioneer builders of heavy duty trailers.

Drawing upon a long career as manufacturers of commercial trailers and exceptional experience in building thousands of military tank trailers, this organization delivered in 30 days, a trailer 39 feet long and 17 feet wide.

Its sixty-four 14.00" x 24" military tires were mounted in banks of eight on axle units that permitted full oscillation to conform to uneven desert terrain and distribute the terrific load equally over all tires.

Significant was the fact that these axle units were duplicates of those that have long been used on ROGERS TRAILERS of larger capacity.

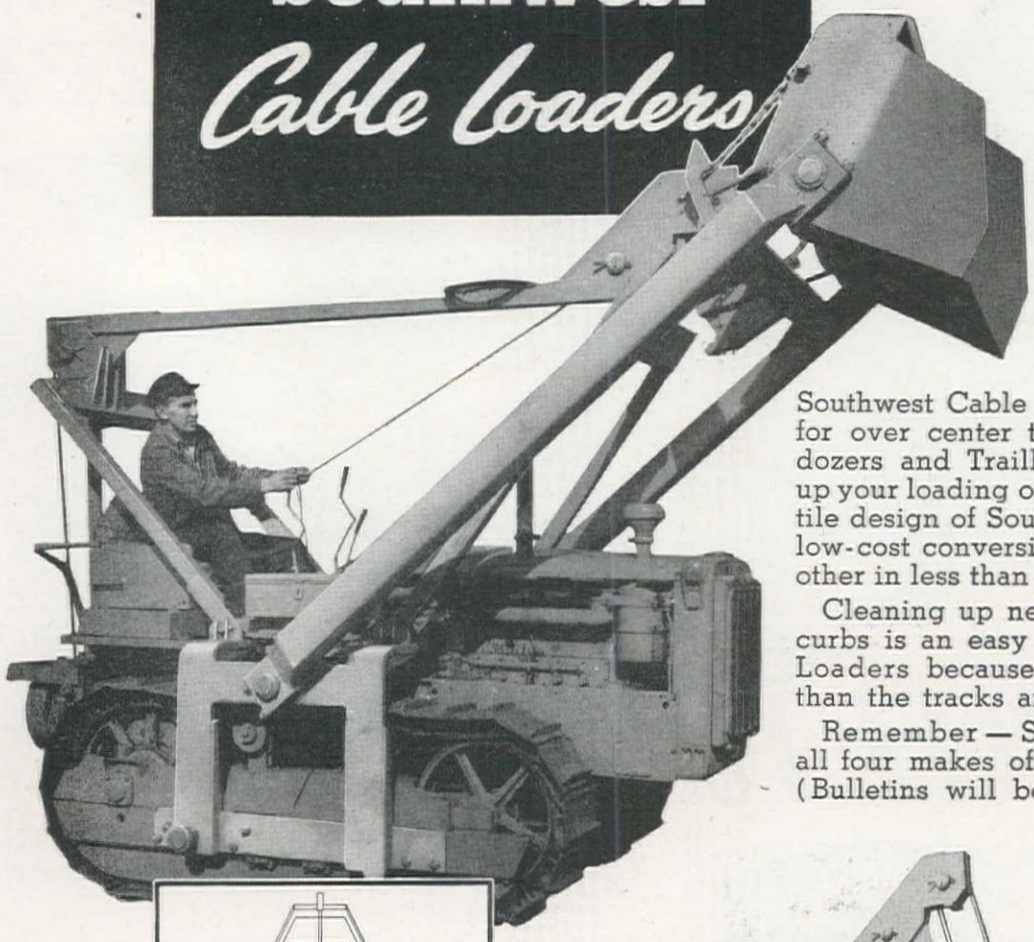
Yes, it is logical that the *world's largest trailer* should have been a ROGERS.

ROGERS BROTHERS CORPORATION

ALBION, PENNA.

EXPERIENCE builds 'em — ROGERS HEAVY DUTY Gooseneck Trailers — *PERFORMANCE sells 'em*

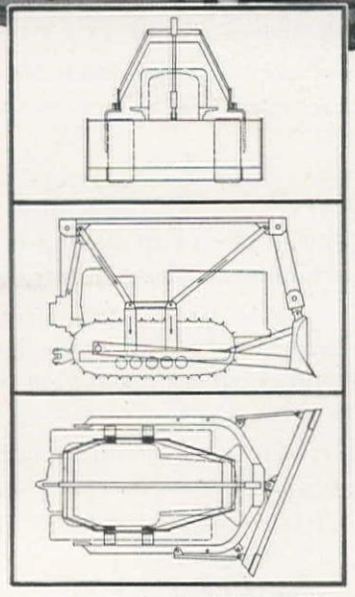
Southwest Cable Loaders

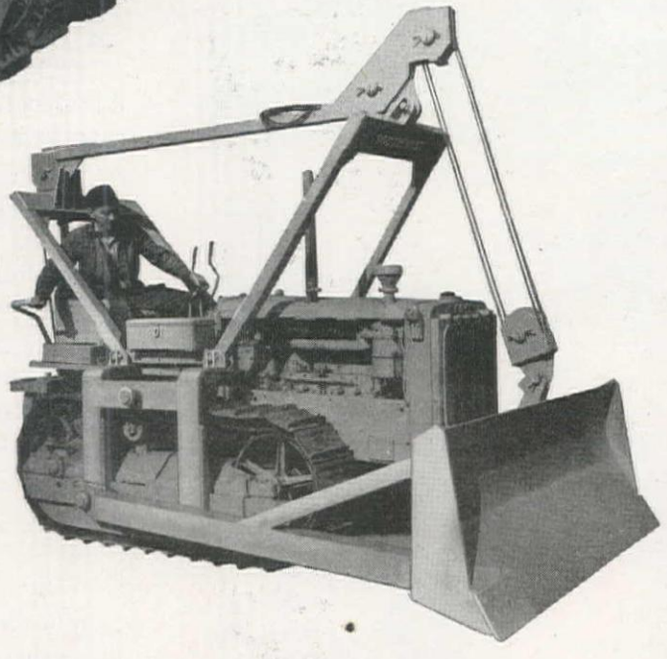


Southwest Cable Loader Attachments for over center track mounted Bulldozers and Trailbuilders will speed up your loading operations. The versatile design of Southwest units permits low-cost conversions from one to the other in less than 30 minutes.

Cleaning up next to buildings and curbs is an easy job with Southwest Loaders because the bowl is wider than the tracks and side arms.

Remember — Southwest builds for all four makes of track type tractors. (Bulletins will be sent on request.)



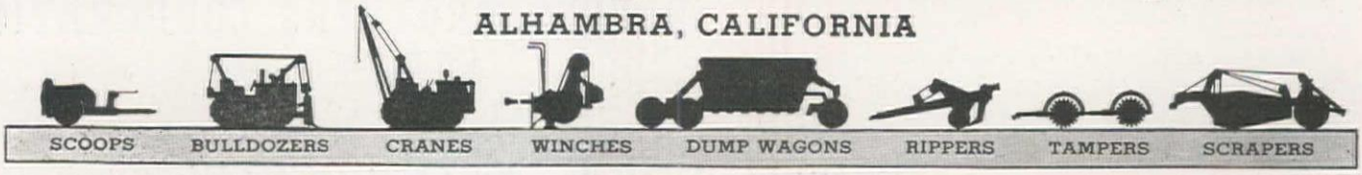


"Over Center Track Mounted" design gives perfect balance

CONSTRUCTION MACHINERY DIVISION

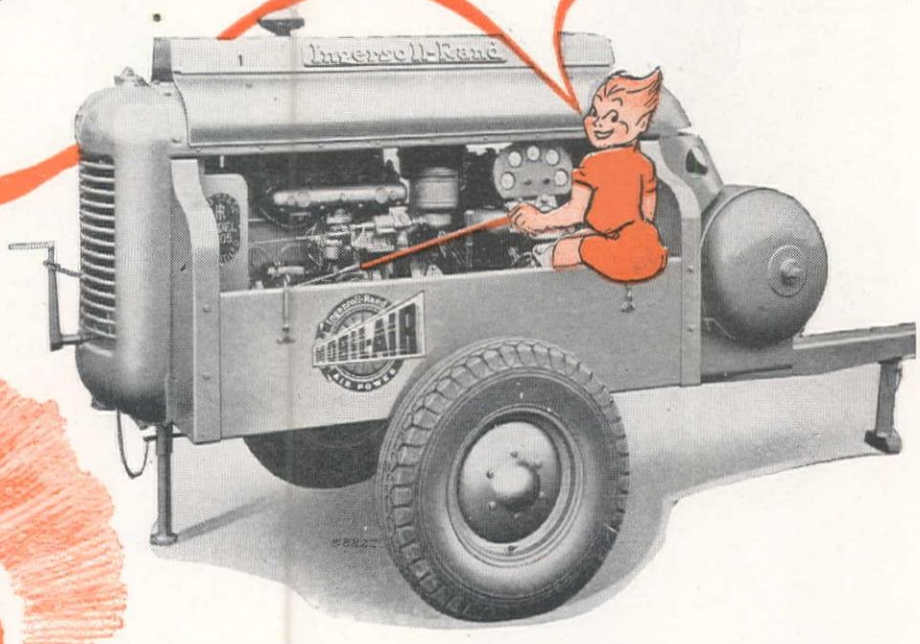
Southwest Welding & Manufacturing Co.

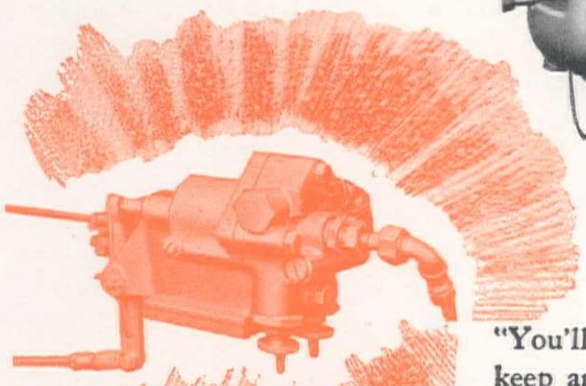
ALHAMBRA, CALIFORNIA



WHO...ME?

I'M THE DRILL-MORE REGULATOR ...the automatic pilot that saves fuel





Actually, the Drill-More Regulator looks like this. It has been standard on all K-Series Mobil-Air Compressors (105 to 500 cfm) since Ingersoll-Rand developed multi-speed regulation for portables.

"You'll find me in every K-Series MOBIL-AIR Compressor. I keep an eye on the air-pressure gauge, hold onto the engine-governor spring, and regulate the compressor speed according to the demand for air. When one of the air tools shuts off, the pressure goes up. If it reaches a given pressure, I ease up on the spring, and the compressor slows down a little but continues to compress air.

"I *unload* the compressor cylinders *only* when less than half capacity is used. When reloading, I hold *half* speed as long as the pressure stays up. That's how I eliminate wasteful idling.

"On many jobs, I can save up to 30% in fuel... by myself. I maintain a higher average and more uniform air pressure, too, so that air tools do as much as 15% more work.

"I'd like to help *you* save *fuel, time,* and *money.* When you need a portable compressor, remember me... *Drill-More Multi-Speed Regulator.*"

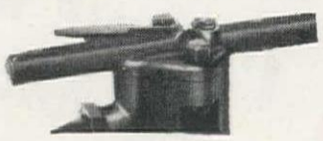
COMPRESSORS
CENTRIFUGAL PUMPS
OIL & GAS ENGINES
TURBO BLOWERS
CONDENSERS
AIR TOOLS
ROCK DRILLS

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 2-785

ANNOUNCING...

a new Gardner-Denver postwar breaker with the NEW SAFETY LATCH



It's a *postwar* Paving Breaker, in every sense of the word—this new Gardner-Denver Model B87! Thanks to the new Gardner-Denver safety latch—an exclusive feature—this breaker can be moved from place to place or from level to level on the job without shutting off the air—and without danger of injury to the operator. The throttle cannot open accidentally because the safety latch holds it securely against accidental openings. Quickly engaged or disengaged by a flip of the operator's thumb, the new latch works like the "safety" on the trigger of a gun—prevents accidents before they happen. Other new features of the B87 are—

SHORT WHERE IT COUNTS—*The B87 is shorter from top of gad to holding handles. It's easier to operate with standard length chisels and gads—more comfortable to operator when longer points are necessary.*

NO AIR OR OIL LEAKAGE—*Joints on the B87 breaker are not under air pressure—no wasteful nor annoying leakage of air or oil.*

FIVE-HOUR LUBRICATION—*Built-in lubricator holds enough oil for five hours of normal operation. Lubrication is positive to every working part, including gads.*

COOL HANDLES—*Heated air cannot cause discomfort to operator because air inlet is at side of cylinder and not through backhead.*

RENEWABLE CHUCK LINER—*No need to replace the entire chuck end when chuck wears to a loose fit of the gad shank. Renewable liner makes this repair quick and easy.*

TOOL RETAINER—*Extra heavy forged retainer pivots on substantial pin held positively in place. No nut to become loose.*

CONVERTIBLE TO SHEETING DRIVER—*The B87 is convertible to a sheeting driver by removing the standard chuck end and substituting a jaw-type sheeting driver head. Jaw assemblies adjustable to take up to 3-inch sheeting are available.*

GARDNER-DENVER

Since 1859

USE COMPRESSED AIR FOR SAFETY CONVENIENCE FLEXIBILITY

Gardner-Denver Company, Quincy, Illinois. Western Branch Offices: Butte, Mont.; Denver, Colo.; Los Angeles, Calif.; Portland, Oregon; Salt Lake City, Utah; San Francisco, Calif.; Seattle, Wash.; Wallace, Idaho; El Paso, Texas.

FRUEHAUF "DUMPERS" Move More Earth...

-and put it where you want it!

Cash in on the increased economy of Fruehauf Dump Trailers. You can handle bigger payloads with the same power unit. More yards and more tons—all within legal weight limits—quickly and flexibly.

The Fruehauf line is complete and sufficiently versatile to meet all conditions. The End Dump, 10 to 20 tons; Hopper Dump, around 12 tons; Side Dump, 20 to 40 tons; Screw Dump, 18 tons; Roll-off Dump, around 12 tons.

Each body type is especially designed and engineered for its job. More advantages than in conventional construction . . . PLUS the rugged Fruehauf understructure. Longer life, greater durability, lower maintenance.

Should emergency service be needed, there is a conveniently located Factory Branch to render it. Each has complete equipment, facilities, parts and skilled mechanics.

Roll-off Dump—
Trailer body telescopes into truck body after truck load is dumped permitting two loads to be dumped by single hoist. More payload on trailer, because of less dead weight.

End Dump—
Perfect in its field. Puts load right where you want it. Twice the ordinary load hauled on one-unit vehicle.

Side Dump—
Special advantages for hauling rock and ore for rail car loading, etc. Trebles tonnage of power unit.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

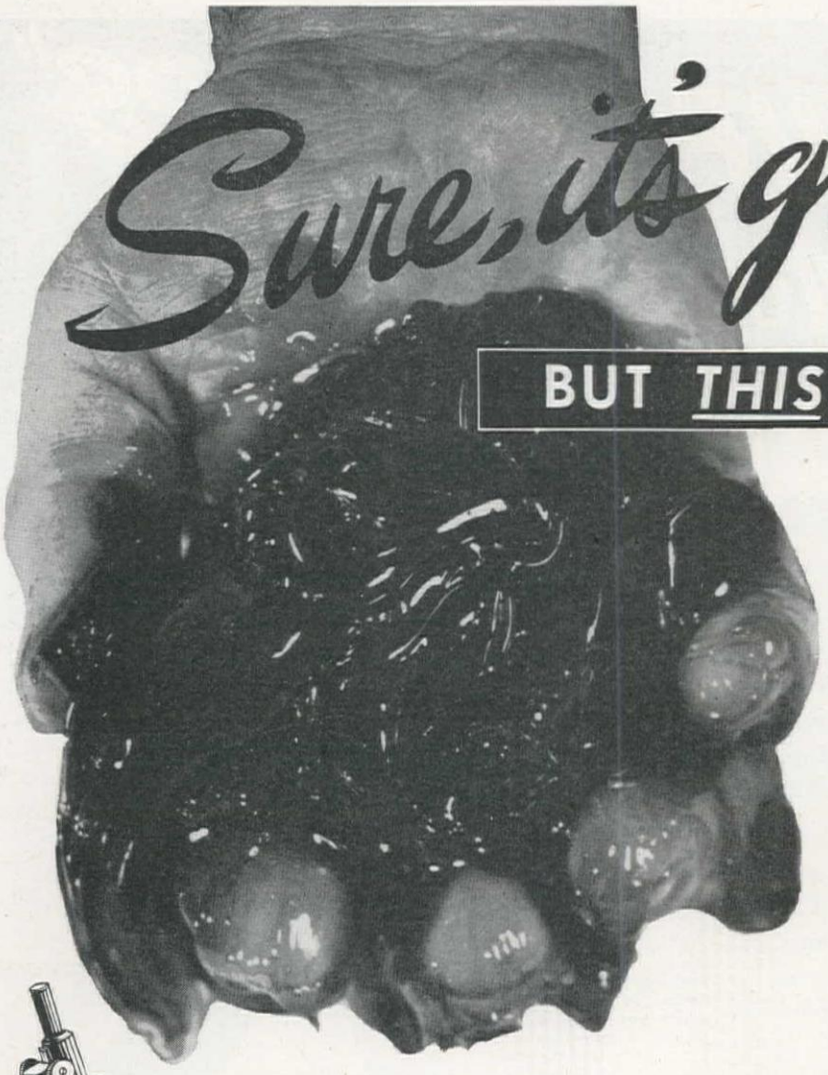
Western Manufacturing Plant—Los Angeles

SALES AND SERVICE BRANCHES
LOS ANGELES • SAN DIEGO • SAN FRANCISCO • SALT LAKE CITY • FRESNO
PHOENIX • SEATTLE • BILLINGS
PORTLAND • SPOKANE • DENVER
EL PASO

FRUEHAUF TRAILERS

A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

"ENGINEERED TRANSPORTATION"



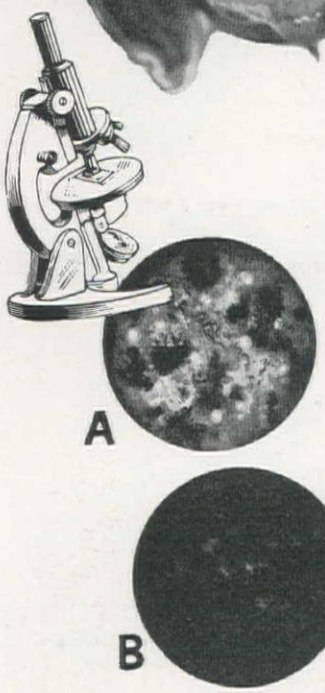
Sure, it's grease...

BUT *THIS* IS DIFFERENT

This handful of grease is a portrait of progress in lubrication. It's the same high quality Richfield lubricant you've used in the past but one mighty important thing has happened to it. IT'S HOMOGENIZED!

Homogenizing does three things that guarantee you safe, efficient and economical lubrication. First, it completely blends the oil in the bodying agent; second, it removes moisture and air; and third, it produces a lubricant so completely 'homogenized' that every particle is uniform in size, texture and quality of oiliness. As a final step—every drop is filtered to insure its being as clean and pure as any lubricant can be.

The correct homogenized lubricant provides complete protection at all times under all operating conditions. For the really tough lubricating jobs... use RICHFIELD HOMOGENIZED LUBRICANTS.



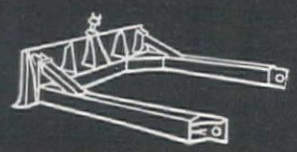
Under a microscope, non-homogenized grease looks like that shown in Figure A, full of minute particles of air, moisture and unassimilated droplets of oil. RICHFIELD HOMOGENIZED GREASE as shown in Figure B, is a homogenous lubricant with every harmful ingredient removed.

THERE IS A SCIENTIFIC RICHFIELD LUBRICANT FOR EVERY MACHINE IN EVERY TYPE OF SERVICE.

RICHFIELD

Details That Mean
DEPENDABILITY!

Operators aren't afraid to put their Buckeye Dozers and Trailbuilders to any test, because they know they'll take the toughest jobs in stride. This dependability adds up to more profit per contract through faster, smoother operation, lower maintenance costs, and more productive time on the job through less time out for adjustment and repair.



MOLDBOARD DESIGN

THESE DETAILS ASSURE *DEPENDABILITY:*

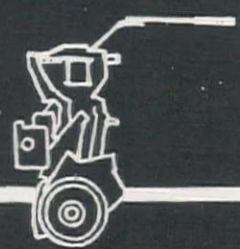
MOLDBOARD DESIGN — Rugged Buckeye Moldboard is structurally braced vertically and horizontally for extra strength with minimum weight. It will take all the stress a tractor can impose, either straight or at an angle.

BALANCED

BALANCED—Buckeye's balanced weight distribution keeps full length of crawlers on ground while working—assures maximum traction—minimizes slipping.

OVERHEAD CABLE SYSTEM

OVERHEAD CABLE SYSTEM—Buckeye's overhead cable system provides fast, smooth operation. Large sheaves, minimum cable turns assure long cable life, negligible power loss.



POWER CONTROL UNIT

POWER CONTROL UNIT—Brakes and clutches are so built that they must take hold of the load smoothly, without jerking, eliminating impact strains, and permitting the economy of smaller cable with efficiency and long life. Efficient application of power is assured.

BUCKEYE TRACTION DITCHER COMPANY
FINDLAY, OHIO

Another cost-cutting Buckeye! The ½ and ¾ yard Buckeye Clipper Convertible Power Shovels. Send for your copy of "Age of the Clippers" today.

built by **Buckeye**

CONVERTIBLE SHOVELS—BULLDOZERS—ROAD WIDENERS
TRENCHERS—MATERIAL SPREADERS—R-B FINEGRADERS

Precisionbilt LIKE A GIANT REFLECTING TELESCOPE

J&L WIRE ROPE

PERMASET PRE-FORMED

A giant reflecting telescope is built with precision. J&L Permaset Pre-formed Wire Rope is also Precisionbilt by men of experience and skill using the finest materials.

J&L Wire Rope is made of J&L Controlled Quality steel. Our engineers will be glad to discuss your requirements with you. Write for further information.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

BETTER ROADS

are coming at lower cost

Now, many of the road-building projects which have been held in abeyance awaiting funds and manpower, will be getting under way.

Those who are charged with the responsibility of these projects will find new and more efficient methods of soil stabilization ready to make budgets go further than ever before. By utilizing native, in-place materials to the greatest possible extent, one of the largest single cost factors (the importation of foreign materials) can be reduced to a minimum or entirely eliminated. Base courses, light traffic roads, streets, etc., can be built more quickly and at surprisingly low costs per mile.

Recognizing the tremendous advantages inherent in this process, P&H engineers have used their years of experience in designing and building earth-handling equipment to produce a machine which fulfills the eight basic requirements of soil stabilization *in a single pass.*

With the ability to handle all types of admixtures—to control every step in the processing—and do it at a good rate of speed—the *P&H Single Pass STABILIZER* stands ready to make road-building history in the years just ahead. Highway Departments and contractors who are figuring on work of this nature should write us for complete information.

P&H

SINGLE PASS STABILIZERS

4490 W. National Avenue
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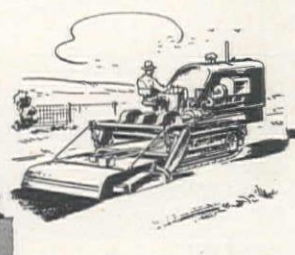
HARNISCHFEGER CORPORATION

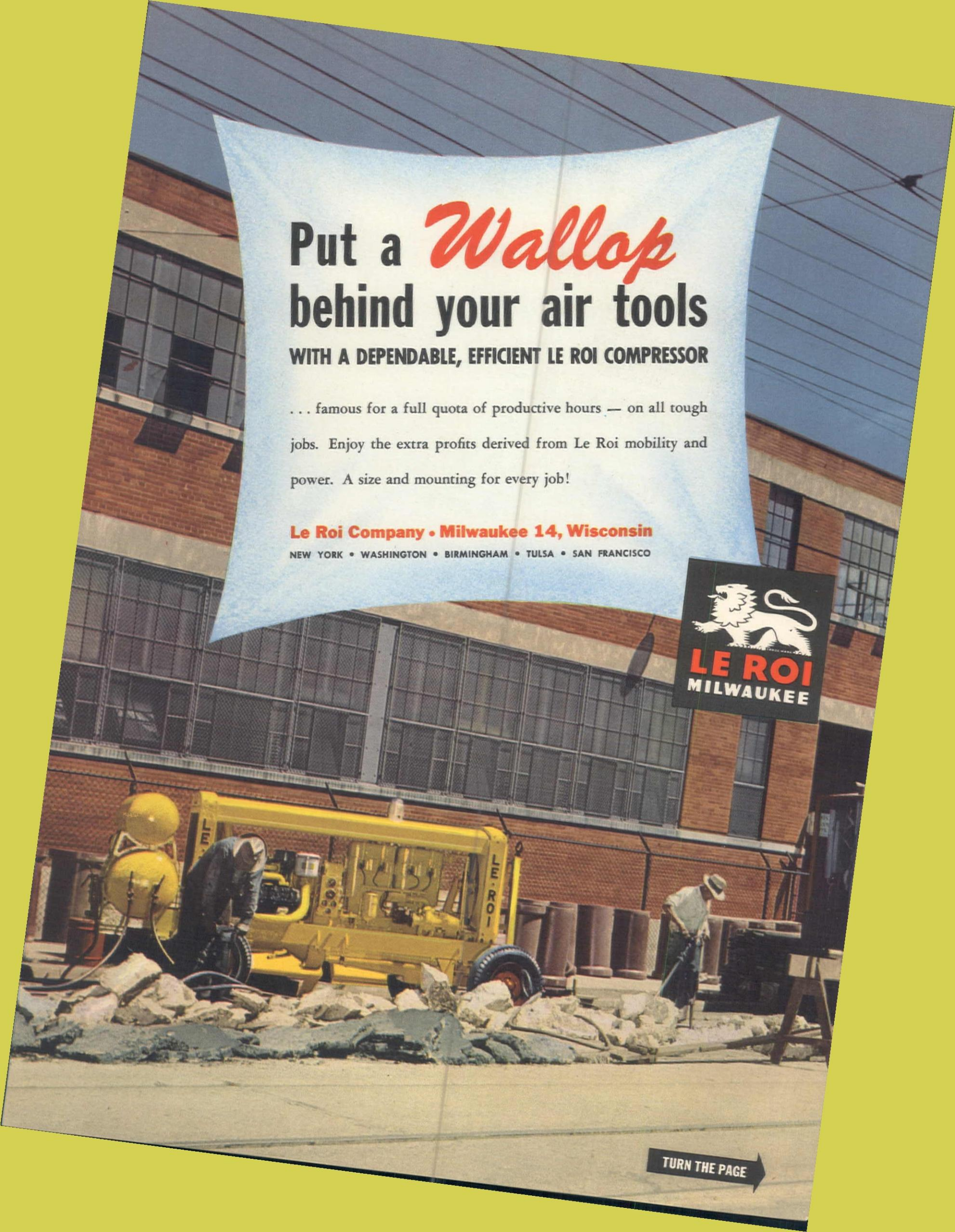
EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS



STEEL GOES UP F-A-S-T-E-R WITH A MICHIGAN MOBILE CRANE....

To "make time" on steel-setting jobs you need a crane that can ease cumbersome girders and structural sections into position with speed, accuracy and safety. . . MICHIGAN Mobile CRANES are outstanding for operating ease, stability for handling heavy loads with maximum safety, truck mobility, and many other profit-earning features . . . . Construction activity is due to greatly increase in the near future — have **you** modern, cost-cutting equipment which will enable you to ***profitably*** handle ***your*** share? It will pay you to seriously consider MICHIGAN Mobile CRANES and SHOVELS — available in 6 to 12 ton and 3/8 and 1/2 yard capacities, convertible to all standard attachments. . . . Get the facts—write for Bulletin W-26.

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN


Put a Wallop
behind your air tools
WITH A DEPENDABLE, EFFICIENT LE ROI COMPRESSOR
. . . famous for a full quota of productive hours — on all tough jobs. Enjoy the extra profits derived from Le Roi mobility and power. A size and mounting for every job!
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AIRMASTER

315-ft. Compressor

. . . field-proven for your heaviest work

Steady . . . dependable . . . economical air power . . . ready to go at an instant's notice . . . ready to take the punishment of day in and day out operation . . . that's the new Le Roi 315 Airmaster.

It's a big, husky unit with all the refinements, precision-machined parts, and modern design that are typical of efficient, economical Le Roi air power. For the complete story of the new streamlined "315 Airmaster," see your nearby Le Roi distributor, or write direct for Bulletin C-5.

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- ★ Full Diesel Economy
- ★ Extreme Mobility
- ★ Ultra-Smooth Performance
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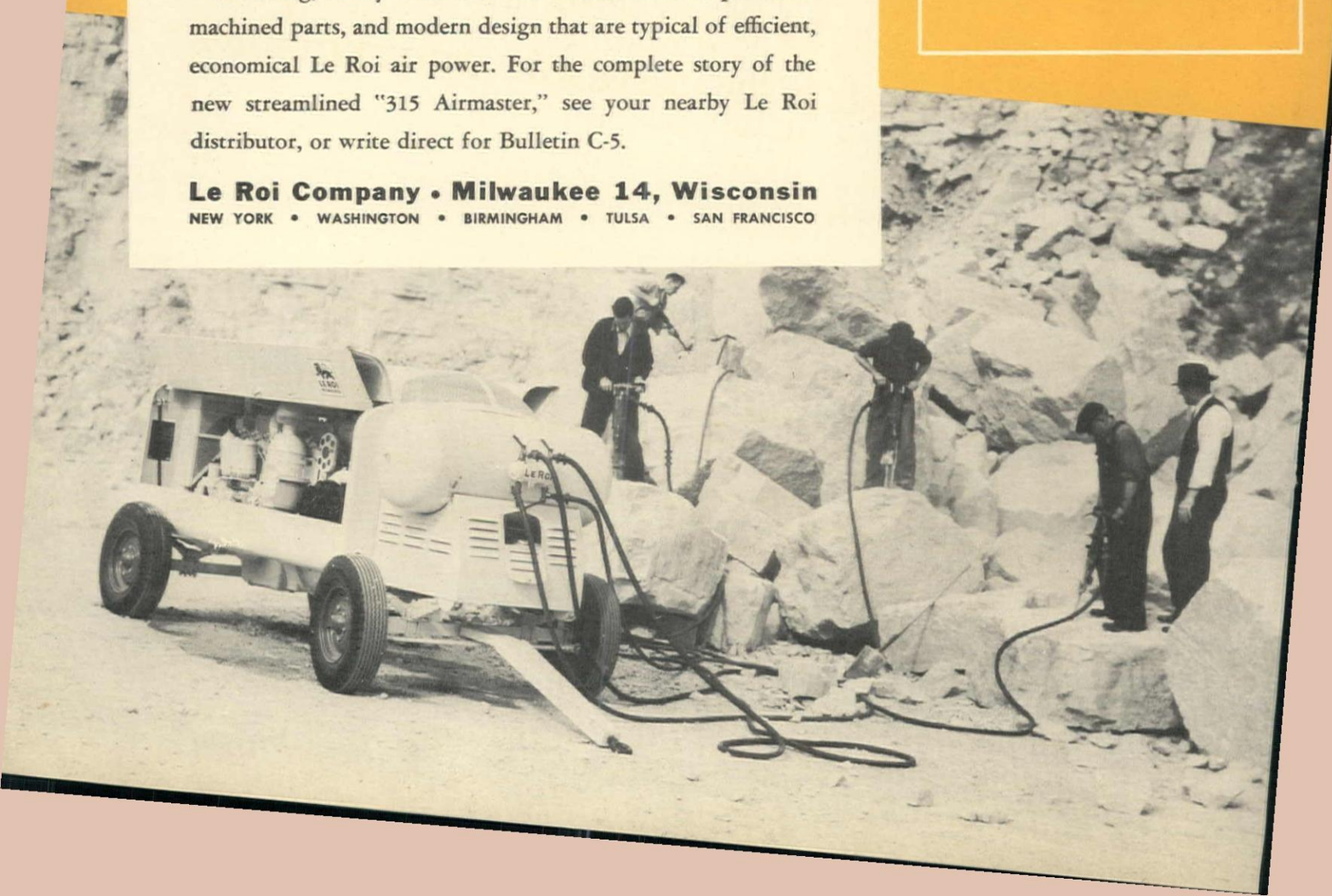
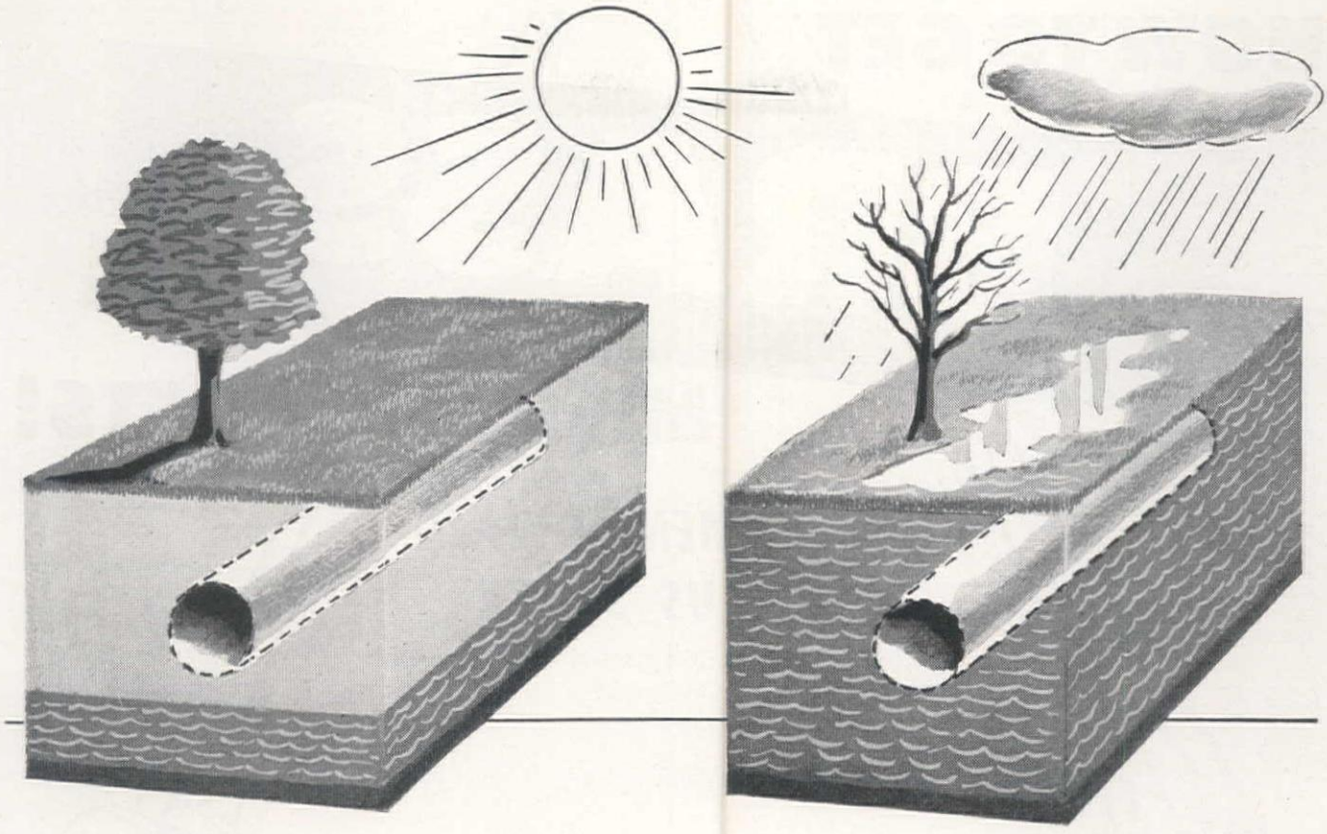
—plus many other features





Stability of Electrical Resistance of Coal-tar Enamel an important factor in THE ECONOMICS OF CATHODIC PROTECTION

Corrosion-proof pipelines demand the use of stable electrical insulation—Coal-tar Enamels—to permit the economical use of Cathodic Protection.

Coal-tar Enamels, because of their ability to resist moisture absorption, provide constant, uniform and long-lasting STABLE insulation. They are not affected by the changing moisture content of soils, due to variation of seasons and weather conditions.

Pipelines—efficiently protected with Coal-tar Enamels—do not require a robot, or any especially designed equipment, to vary automatically the amount of electrical current required with the change in moisture content of soils, to make Cathodic Protection function properly.

Stability of Electrical Resistance of Coal-tar Enamels saves money and helps to reduce the cost of installing Cathodic Protection equipment. Barrett Coal-tar Enamels have demonstrated their effectiveness through years of service in all types of soils and climatic conditions. Applied by modern methods in the field or mills, and electrically inspected, they are your assurance of sound economy.

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

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

Barrett COAL-TAR ENAMEL

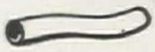
HOW TO GET BRASS MILL PRODUCTS!

BRASS, BRONZE AND COPPER... Rod, Bar, Sheet, Strip, pipe, tubing, and wire in Production Quantities.

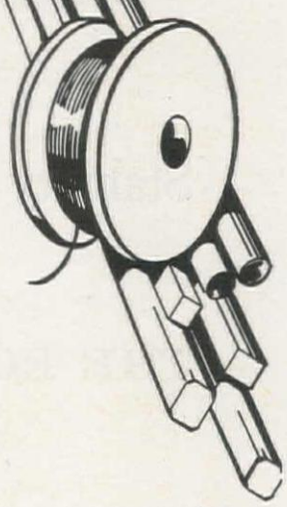
GOVERNMENT-OWNED SURPLUS STOCK

in many standard and non-standard grades, finishes, sizes and specifications AVAILABLE NOW in production quantities

—and new surplus declarations are being made daily.



EASY TO FABRICATE . . . This stock may be fabricated by normal production methods.



HOW TO PURCHASE

1. Estimate, for any convenient period, your production needs in each specification, finish, gauge, etc.
2. Write, wire or phone that information to your nearest War Assets Corporation office* below. We will advise you of the location and condition of the stock you need, estimate possible delivery dates, quote prices and help arrange credit.
3. When satisfactory arrangements have been made, we will start shipments.

***WAR ASSETS CORPORATION** is a Reconstruction Finance Corporation subsidiary. When checking telephone and other directories, simply look up RFC.

VETERANS OF WORLD WAR II: To help you in purchasing surplus property from War Assets Corporation, a veterans' unit has been established in each of our Regional Offices listed below.

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION for Surplus Producers' and Capital Goods, Aircraft and Plants formerly handled by Reconstruction Finance Corporation . . . and for Surplus Consumer Goods formerly handled by United States Department of Commerce.

WAR ASSETS CORPORATION

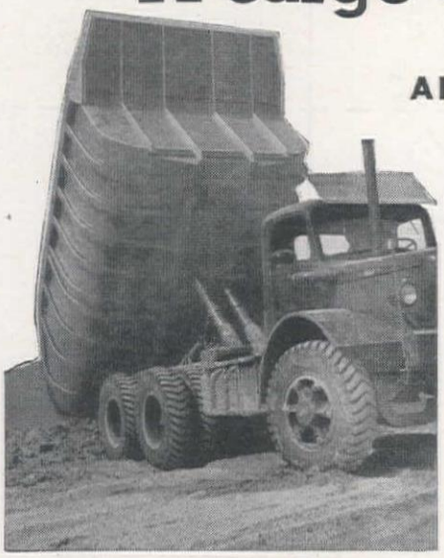
(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)

RFC OFFICES (INCLUDING FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES) LOCATED AT: Atlanta • Boston • Chicago • Denver • Kansas City, Mo. • New York • Philadelphia • San Francisco • Seattle • OTHER RFC SURPLUS PROPERTY OFFICES LOCATED AT: Birmingham • Charlotte • Cleveland • Dallas • Detroit • Helena • Houston • Jacksonville • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • Oklahoma City • Omaha • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • Spokane • OTHER FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES LOCATED AT: Cincinnati and Fort Worth

157-4

A cargo 5 million years old . . .

AND NEW MACK TRUCKS!



When the Pacific waters receded and the California coastline was formed, what had once been the floor of a calm bay was bared to the sun and air . . . and there lay a deposit of diatom, five miles square, 1400 feet thick—located at what is now known as Lompoc, California!

From this diatomaceous earth, now known as Celite, the Johns-Manville Company has been manufacturing everything from match heads to plastics and paints, and the entire gamut of insulation and filtration materials.

These products have added to better living. They were developed through unending research and years of hard work. So also the Macks that transported this Celite are the result of unending engineering research and an honest effort to supply a truck that will make your job easier and more profitable.

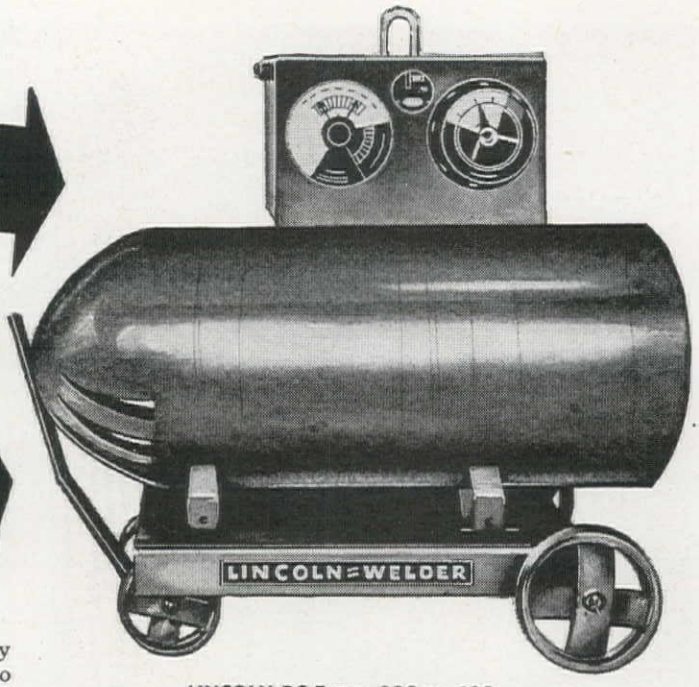
Keep pace with progress . . . make your next truck a Mack—Economical, Efficient; Harder-working with a Longer Life.

Mack-International Motor Truck Corp.—Los Angeles, Portland, San Francisco, Seattle, Sacramento, Salt Lake City.

Mack
TRUCKS
FOR EVERY PURPOSE

Performance Counts!

SURPLUS ARC WELDERS

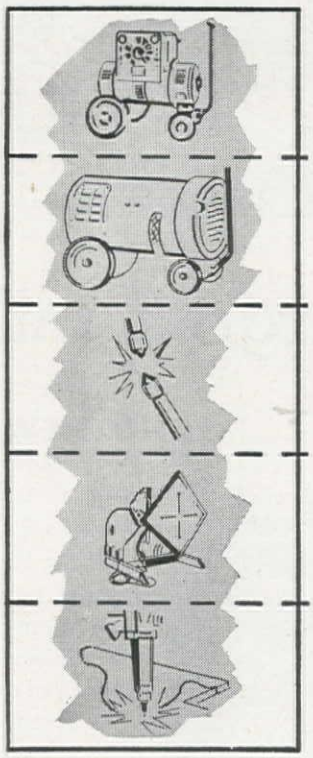


LINCOLN DC Type: 300 to 400 amperes

This and many other types and makes of welding machines and related equipment are available from war surpluses.

Here is a chance to pick up arc welding equipment in any desired quantity at low cost. Large quantities of 300 to 400 ampere MG type welders—primarily of Lincoln and Hobart make—are available for sale. Largest inventories are in the Boston, Detroit, Cleveland, Chicago, Atlanta, Nashville, Houston and Philadelphia offices of War Assets Administration. They may be obtained, however, by contacting any of the War Assets Administration offices listed below. Equipment from 200 to 400 amperes in DC, gasoline-engine driven and AC sets are available in smaller quantities . . . also multiple operator types and related equipment such as electrodes, welding rods, weld positioners and flame cutters. Spot, seam and flash welders are likewise available. The equipment is for both production and construction. Write, wire or phone your War Assets Administration office today.

ALL ITEMS SUBJECT TO PRIOR SALE



HOBART
Standard models of this make available in large quantities and most ratings.

WESTINGHOUSE
Portable models available in limited quantities.

RESISTANCE WELDERS
Spot, seam, butt and flash type welders for production operations—also portable or gun types.

WELD POSITIONERS
Many sizes and capacities, including head and tailstock combinations.

FLAME CUTTERS
Both single and multiple torch types, portable and stationary.

VETERANS OF WORLD WAR II

To help you in purchasing surplus property, veterans' units have been established in each War Assets Administration Regional Office.

FREE FACTS

TO WAR ASSETS ADMINISTRATION:
Please send me information on availability, condition and location of the following types of equipment:

- ☐ *HOBART ARC WELDERS*
- ☐ *LINCOLN ARC WELDERS*
- ☐ *WESTINGHOUSE ARC WELDERS*
- ☐ *.....ARC WELDERS*
- ☐ ..... (other equipment)
- ☐ *RESISTANCE WELDERS (spot) (seam) (flash)*
- ☐ *FLAME CUTTERS*
- ☐ *WELD POSITIONERS (capacity).....*
- ☐ *WELDING ROD OR ELECTRODES*

Name.....

Firm.....

Address.....

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

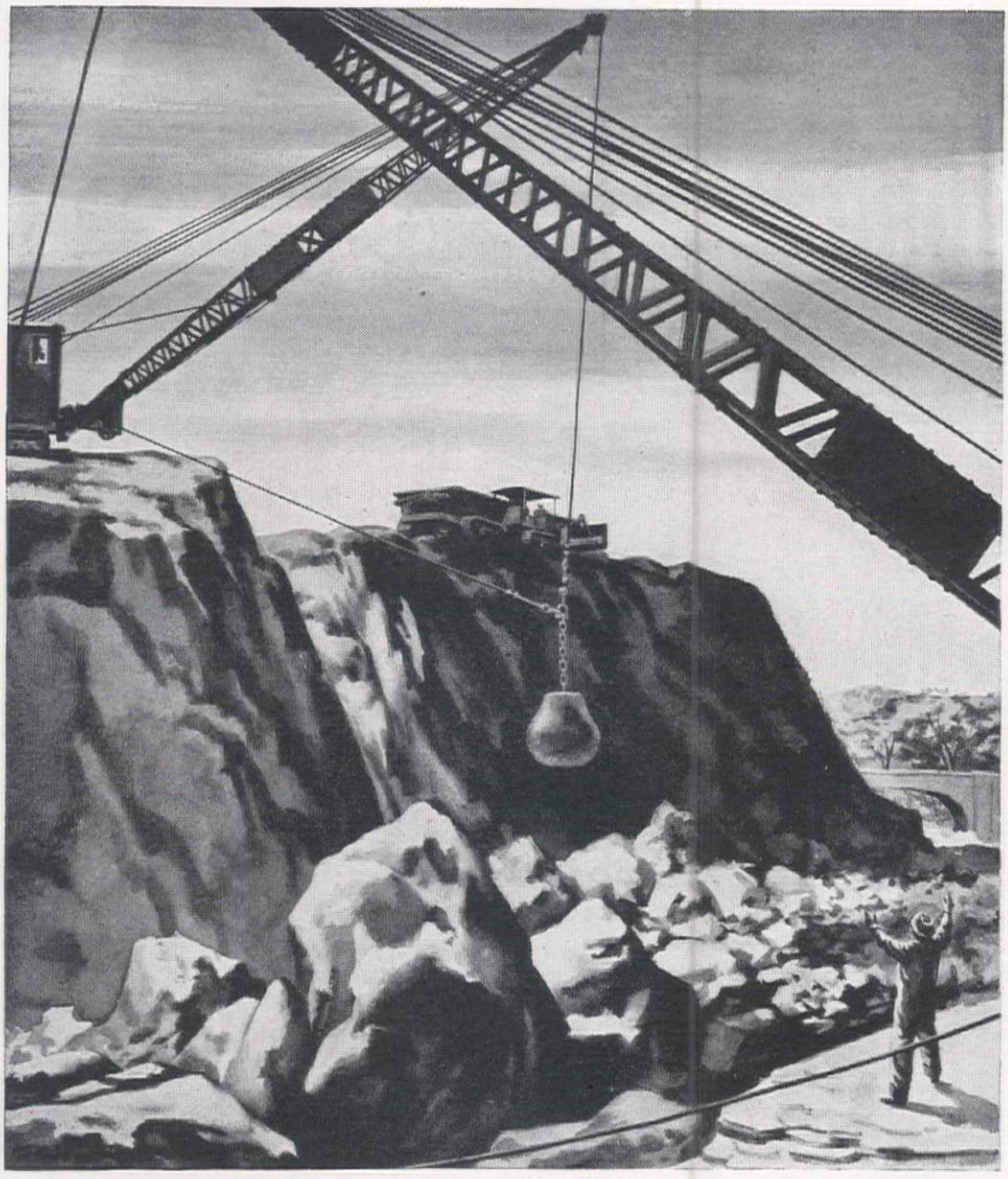
176-1

WAR ASSETS ADMINISTRATION

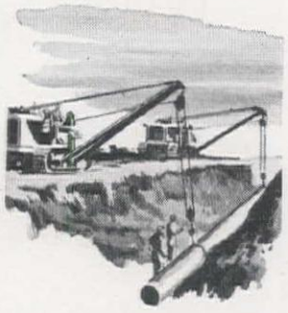
OFFICES LISTED BELOW ARE TEMPORARILY IN RECONSTRUCTION FINANCE CORPORATION AGENCIES

Offices located at: Atlanta · Birmingham · Boston · Charlotte · Chicago · Cleveland · Dallas · Denver Detroit · Helena · Houston · Jacksonville · Kansas City, Mo. · Little Rock · Los Angeles · Louisville Minneapolis · Nashville · New Orleans · New York · Oklahoma City · Omaha · Philadelphia Portland, Ore. · Richmond · St. Louis · Salt Lake City · San Antonio · San Francisco · Seattle · Spokane Cincinnati · Fort Worth (Telephone 3-5381)

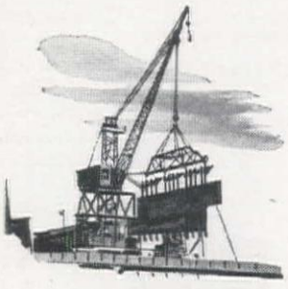
176-1



You'll see more and more jobs like these as the nation's new highway and airport building program gets under way. Skull-crackers and draglines use a lot of Preformed wire rope to get the material out.



Laying pipe lines is a fast job today with machines and Preformed wire rope. Improved methods and improved wire rope make the work easier and faster.



Do you worry when you see great weights lifted by shipyard cranes? The operators don't, for they know the Preformed wire rope will hold.

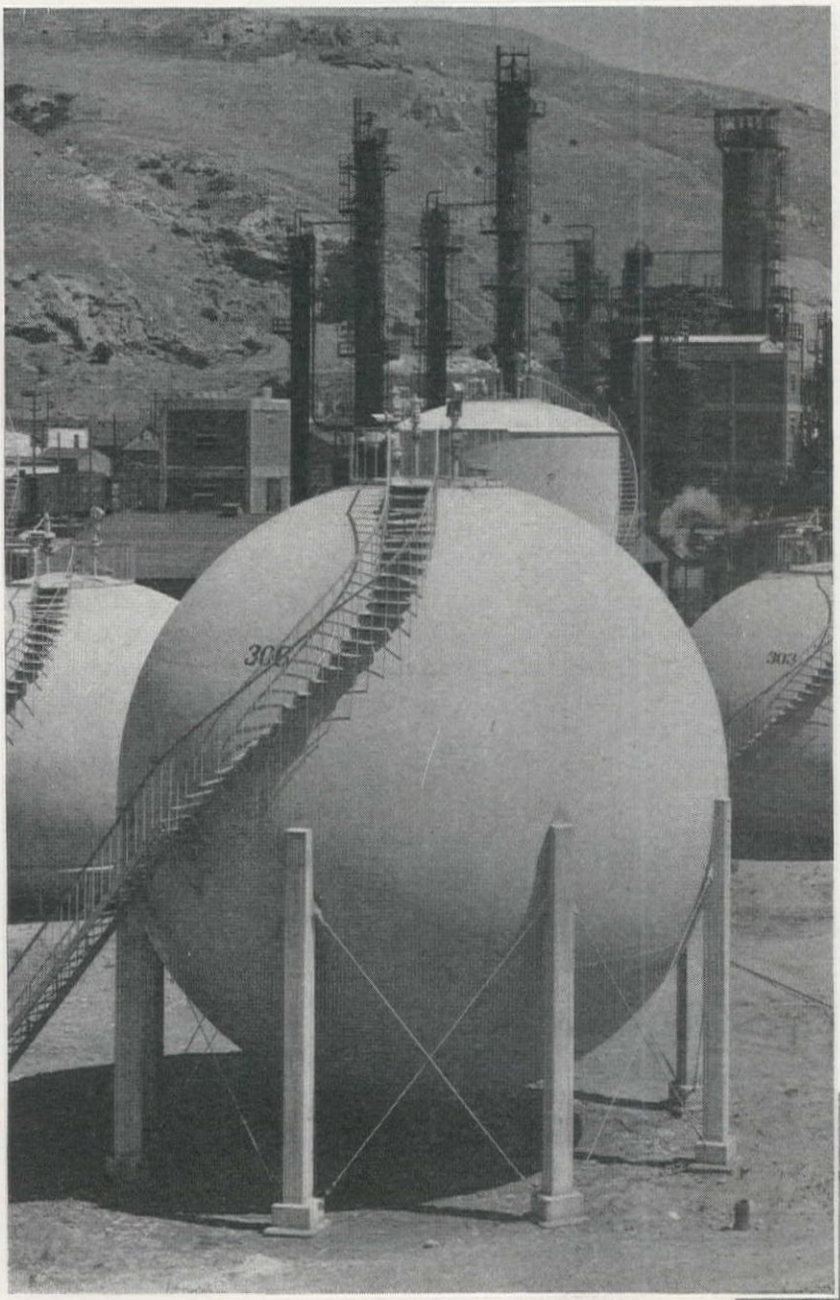
Here you see Post-War Progress in Action...

Wire Rope Makes it Possible

For the busy post-war days ahead, machines are rigged with Preformed wire rope. It lasts longer. It reduces time lost for replacement. It handles easier. It is safer. These operators and the front office agree Preformed is the rope for post-war progress.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

WIRE ROPE HANDLES EASIER - LASTS LONGER

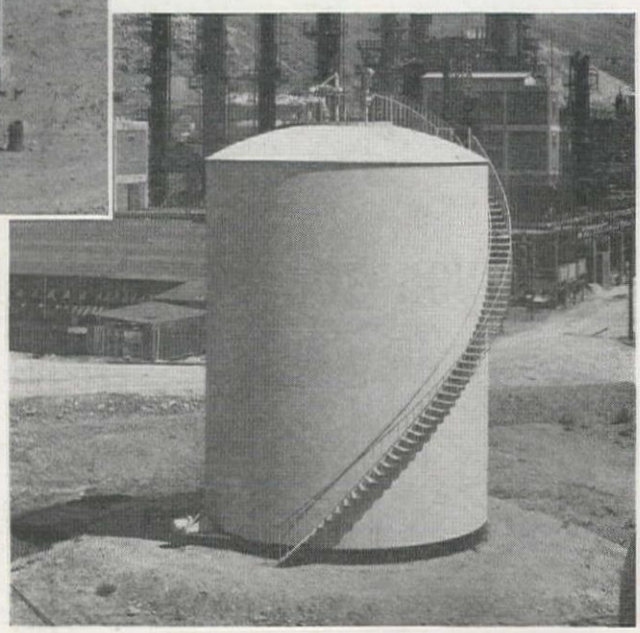


YOU CAN'T "keep" VOLATILE PRODUCTS in ordinary storage tanks

ANYONE who has stored volatile products in ordinary storage tanks and has maintained a careful check of the throughput is aware of the amount of evaporation that can take place during this phase of operation. You simply can't "keep" *all* of the product if you allow evaporation to take place.

The photos on this page were made at a refinery in the West. Here *pressure storage* tanks are used to store the volatile components of the gasoline produced because this type of storage provides maximum protection against evaporation loss. At the left is a Hortonsphere, one of the spherical pressure tanks at this location, which is used to store highly volatile products. It is 38 ft. in diam., holds 5,000 bbls., and is designed for an operating pressure of 75 lbs. per sq. in. The view below shows a Hemispheroid used to store isomate at 5 lbs. per sq. in. pressure.

All of the Hortonspheres and the Hemispheroids at this location were designed, fabricated and erected by our organization. We will be glad to quote you on *your* pressure storage tank requirements.



HORTONSPHERES . . . *(shown above) widely used for the storage of volatile products. Built in capacities of 1,000 to 25,000 bbls. for pressures from 20 to 100 lbs. per sq. in. They are designed to withstand pressures built up in the vapor space at normal temperatures without venting.*

HEMISPHEROIDS . . . *(shown at right) for liquids that are only slightly volatile, requiring operating pressures up to 5 lbs. per sq. in. Hemispheroids are built in standard capacities from 2,500 to 20,000 bbls.*

CHICAGO BRIDGE & IRON COMPANY

SAN FRANCISCO • ATLANTA • BIRMINGHAM • PHILADELPHIA • DETROIT • WASHINGTON
CHICAGO • HOUSTON • NEW YORK • CLEVELAND • TULSA • LOS ANGELES

Plants at **BIRMINGHAM, CHICAGO, and GREENVILLE, PENNSYLVANIA**

WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

April, 1946 Vol. 21, No. 4

Study Reber Plan

THE SAN FRANCISCO Bay area is torn by discussions of the necessity for a second Bay crossing. The San Francisco-Oakland Bay bridge, construction miracle of a few years ago, is now so crowded with traffic that jams during the rush hours delay motorists many minutes, and it is anticipated that with the advent of new model autos, the congestion will become worse. Accordingly, it has become obvious that a second crossing is necessary.

Several plans have been suggested, including another high bridge, a subway, and the Reber plan, first presented in print in *Western Construction News* for March, 1942, and which envisions earth dikes across both arms of the bay, reducing the area of salt water to a small segment of the present bay, and permitting the south and north arms to gradually become great fresh water lakes.

The dike between San Francisco and Oakland would be wide enough to permit passage of vehicles of every kind, the construction of some industrial establishments and much additional wharf space. John Reber, who conceived of the plan, naturally feels that all objections can be answered, and that the proposal is only good. However, residents of Oakland feel that their city would be damaged by the scheme if constructed. Others have raised questions concerning the extensive salt evaporation works on the south arm of the bay, the effect on the salmon run which passes through the bay on its way to the Sacramento river, the effect of reduction of the tidal prism on the bar off the Golden Gate, and other features.

Western Construction News sees great advantages in the plan, but all these objections must be shown to have satisfactory answers. It therefore calls for an extensive fund, probably contributed in part by the State, the Federal government, and the several bay cities, a fund of probably several hundred thousand dollars, to finance a really thorough and detailed investigation of the Reber plan by unbiased engineering consultants, who will consider and evaluate the technical, economic, industrial, and recreational features of the proposal. If such an investigation were to support Reber, this magazine would devote all its energy to sponsoring immediate construction; if not, it would turn to one of the other proposals for a second bay crossing. A decision based only on personal preference or bias is untenable.

Can We Save Tax Money?

HIGH TAXES are nothing new. They've been far too high for a long time, and seem destined to continue rising. It must be borne in mind that there are numerous levels of taxation. The Federal income tax is perhaps the heaviest and most painful on the average citizen.

Federal efficiency (sic!) of course makes this understandable. We recently observed bid specifications, 32 pages in length, covering installation of 266 pairs of window cleaner's safety bolts, and a day or two later received a 10-page document to inform us that it was not desired to renew the subscription of a certain post engineer, that post having been abandoned. It is inevitable that federal taxes should be high, considering the efficient methods employed.

Then there are state taxes, applied through licenses, state income taxes, and otherwise. They always go up, very seldom down.

Then there are county, city, and district taxes. These, too, continually increase, either by raising rates or advancing property assessments.

A particularly flagrant waste of money on the local level is called to mind by receipt a few days ago of the 1946 registered voters tabulation for the State of California. Alpine County has a total registration of 165 voters. From among these are employed in the county organization, five supervisors, a sheriff and tax collector (same person), a constable, a justice of the peace, a district attorney, a clerk, an auditor and recorder (same person), a treasurer, an assessor, a coroner and public administrator (same person), a health officer, a superintendent of schools and teachers, and a superior judge. In addition, there are probably employed persons as assistants in some of the departments.

Adjacent on the south to Alpine County is Mono County, with a registered voter list of 783, and approximately a similar set of officials.

Next southerly is Inyo County, with a total voter registration of 3,747, and naturally, as befits such a populous area, a considerably enlarged staff of public officers, including five constables and five justices of the peace.

It is submitted that this situation is utterly ridiculous and silly. The terrain, climate, industry and population of these three counties is quite sufficiently similar to justify their union into one organization, with considerable tax saving and no loss of service. Intrenched office holders and local jealousies alone prevent this perfectly obvious combination.

In the report, we find 15 counties in California with a voters' registration of less than 5,000, 23 under 10,000, and 35 with fewer than 25,000 voters.

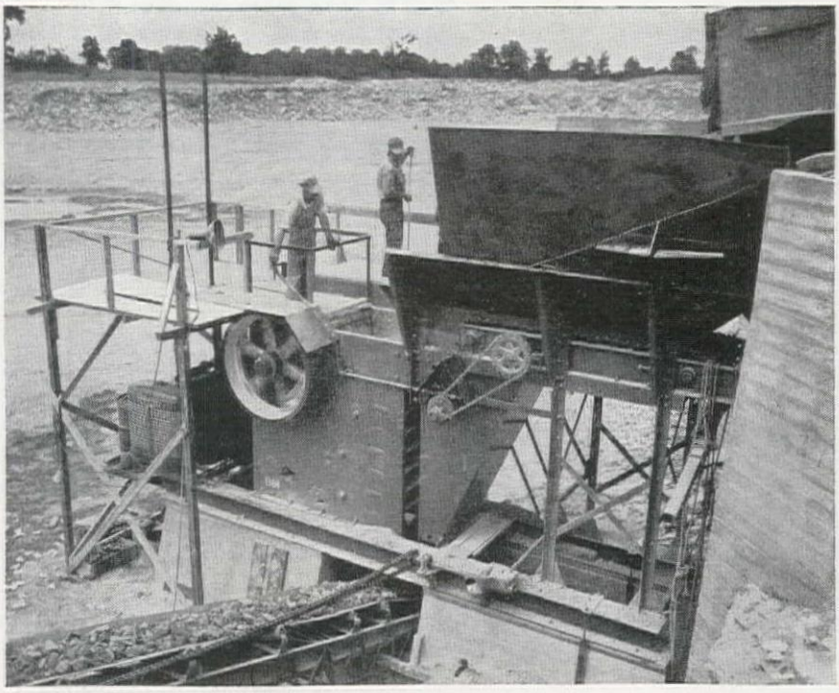
Other perfectly obvious California consolidations to increase efficiency and reduce costs, conditions being essentially similar throughout, are (numbers allude to registered voters): Del Norte (2,091) and Humboldt (23,137); Siskiyou (11,290), Shasta (11,208), and Trinity (1,532); Sierra (1,272), Plumas (4,381), and Nevada (6,511); Modoc (3,007) and Lassen (6,065); El Dorado (5,464), Amador (3,577), and Calaveras (3,696); Tuolumne (4,858) and Mariposa (2,407). We have listed only certain obvious combinations of the smaller counties, and similar consolidations among some of the more populous could also be made with equal good effect, as for instance, Alameda and Contra Costa, Kings and Tulare, Fresno and Madera, etc. We mention specific instances so that we may not be accused of speaking in generalities.

Nor do we wish to be understood as saying that the condition in California is worse than elsewhere. By what stretch of the imagination can 254 counties, many of them embracing territory so similar that it must be difficult for the Creator Himself to keep them separated, be justified in Texas? And it seems difficult to justify nine counties for the broad and beautiful valley of the Platte River in Colorado, or five counties in the broad expanse soon to be irrigated by one great project in the Grand Coulee area of Washington.

Now, why all this, you ask? Just this—taxes are unbearably high. This magazine proposes in forthcoming issues to survey specific and positive ways in which they can be reduced without hurting the service government, at all levels, renders to the citizen. We hope that some thick skins will be pricked; that we receive letters of protest or support; that action results. The drain of tax overhead on industry, production, and the common citizen, is not only alarming, it is absolutely dangerous. It **Must** come down.

Consolidation or elimination of county governments is one step. There are plenty more that could be taken.

This plant, with 25" x 40" Jaw Crusher and Apron Feeder, will produce 50 yards of 2-inch crushed rock per hour.



50 CU. YDS. or 500 CU. YDS.

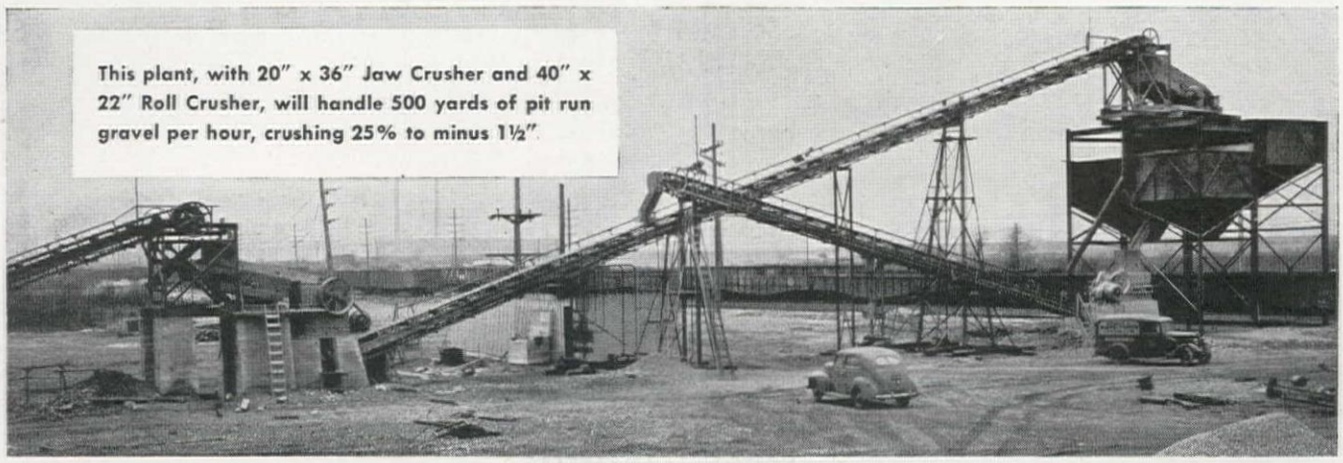
THE AUSTIN-WESTERN LINE OF CRUSHING EQUIPMENT INCLUDES:

Jaw Crushers and Roll Crushers in a wide range of sizes; plus matching screens, elevators, conveyors, and bins.

Semi-portable and portable crushing and screening plants, from the smallest to the magnificent two-unit and three-unit plants which combine maximum output with wide variety of specification; giving the owner flexibility of operation that spells maximum profits.

Your nearby Austin-Western distributor will be glad to recommend the plant or equipment best suited to your needs.

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

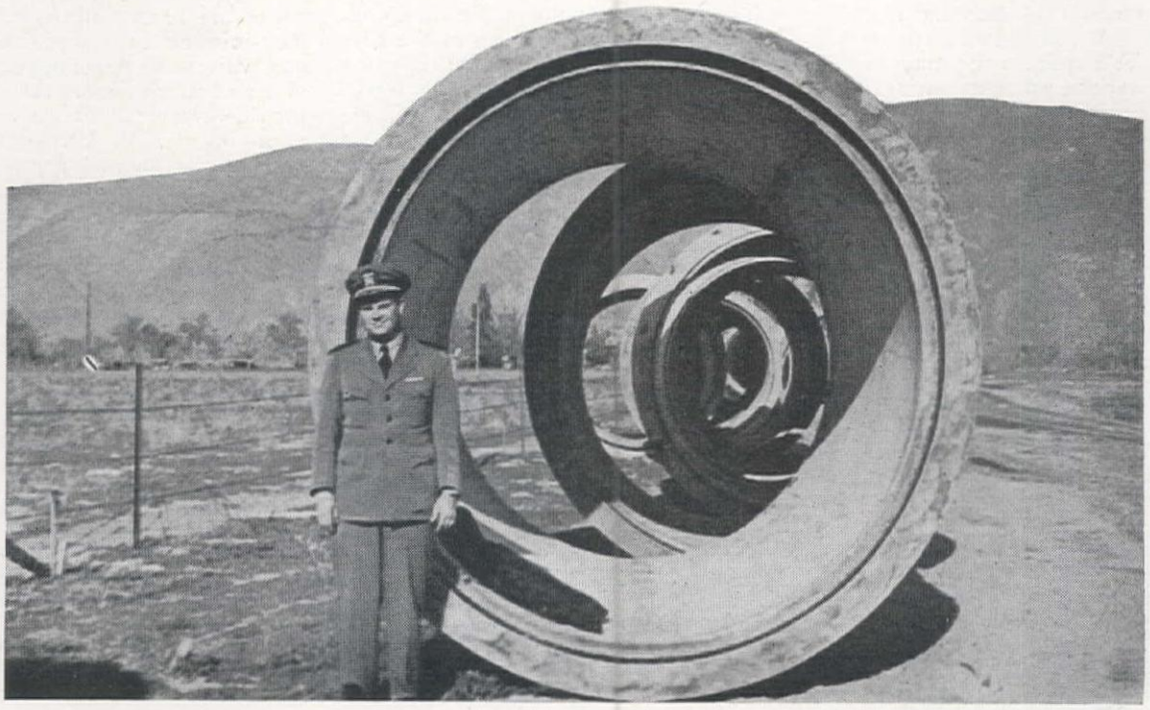


This plant, with 20" x 36" Jaw Crusher and 40" x 22" Roll Crusher, will handle 500 yards of pit run gravel per hour, crushing 25% to minus 1½".

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

WESTERN CONSTRUCTION NEWS
APRIL • 1946

San Diego Aqueduct—
Water Assured From Colorado River



THIS 96-IN. I. D. reinforced concrete pipe will be installed between the diversion structure and the regulatory reservoir. It will carry 208 sec. ft. of water, the full capacity of one set of Metropolitan Water District pumps. Standing by the pipe is Commander R. D. Thorson, resident officer in charge of construction for the Navy's Bureau of Yards and Docks.

A water shortage will be averted by the rapid construction of 71.3 miles of aqueduct which will provide San Diego with 50 Mgd. of Colorado River water—Seven tunnels, a regulating reservoir, three siphons and reinforced concrete and steel pipe compose conduit

THE COMMUNITY facilities of San Diego, Calif., have been seriously strained in recent years by that city's war expansion. Probably the most critically affected is the water supply, which was subjected to a dual crisis, first by the increased demand of a rapid population growth caused by military and industrial expansion in the area, and again at the close of World War II when the routine cancellation of war contracts threatened to halt construction progress on the aqueduct by which an increased supply is to be conveyed to the city.

In 1940 the population of San Diego was slightly over 200,000 and the water supply and other utilities had been planned to meet a normal increase to 350,000 by 1960. With the influx of military personnel and defense workers and their families, the population had far surpassed that figure by early in 1944 when it reached 450,000 and, consequently, the demand on the water supply exceeded the safe yield. It had been anticipated that the present safe yield of 32 million gallons per day from the existing development would in the future require supplemental water from the Colorado River.

Study of routes

To this end an agreement between the City and County of San Diego and the Bureau of Reclamation provided for the Bureau's engineers to investigate the feasibility of two alternate routes by which Colorado River water could be transferred to the San Diego area. The investigations and surveys were begun in 1943 and by late 1944 sufficient data were available to select the more favorable of the two alternate aqueduct routes. As the war progressed the demand for more water by the military and aircraft plants increased until by June, 1944, they were consuming 45 per cent of the total water supply available to San Diego. The over-all demand at that time reached slightly over 46 mgd., an overdraft of approximately 14 mgd. Under this heavy demand it was estimated that the existing supply would run out late in 1947.

With the heaviest strategic interest at stake in the impending water shortage the federal government initiated a plan for the immediate construction of an aqueduct to assure an adequate water supply for the city and military centers situated near San Diego.

The President's Committee, representing the various federal agencies concerned and the San Diego County Water Authority, recommended that the Bu-

reau of Reclamation be authorized to complete its engineering and design studies. The Bureau of Yards and Docks was given responsibility for the administration of construction, due to the Navy's major investment in the area in plant and personnel.

When the studies were completed, the San Jacinto-San Vicente aqueduct (Route I) connecting with the Metropolitan Water District conduit was chosen, in preference over the El Capitan-San Felipe-All American Canal Route.

Route I, while longer (71.3 mi.), was favored because of the comparatively simple engineering problems for a gravity flow route and the fact that it could be completed within a two year period. It would not require large amounts of critical materials, such as pumps and electrical equipment, because the conduit with which it will connect is already equipped with adequate pumps and electrical gear.

Deciding factors against Route II were the necessity to provide pump and electrical equipment to lift water about 3,100 ft. and the long 7.33 mi. San Felipe tunnel. Construction time was estimated at three years.

The initial cost of Route I would be less than Route II and Route I is better situated to supply Camp Pendleton and other military centers in the Santa Margarita area.

Financing

Based on Bureau of Reclamation estimates the $17,500,000 aqueduct was originally to be fully financed by the Government: 70 per cent by the Navy Department, 20 per cent by Federal Works Agency and 10 per cent by the Army. With the cessation of hostilities, however, a new financing plan was adopted.

Under the present plan the Bureau of Yards and Docks will complete the construction of the aqueduct, but the City of San Diego will repay construction cost to the Navy at the rate of $500,000 annually up to a maximum of $16,000,000, without interest charges.

The construction is under the supervision of Capt. Alden K. Fogg, CEC, USN, 11th Naval District, Public Works Officer. To date seven major contracts have been let totaling approximately $12,500,000. The Bureau of Reclamation furnishes consulting service during construction and is represented on the site by R. B. Ward, Senior Engineer.

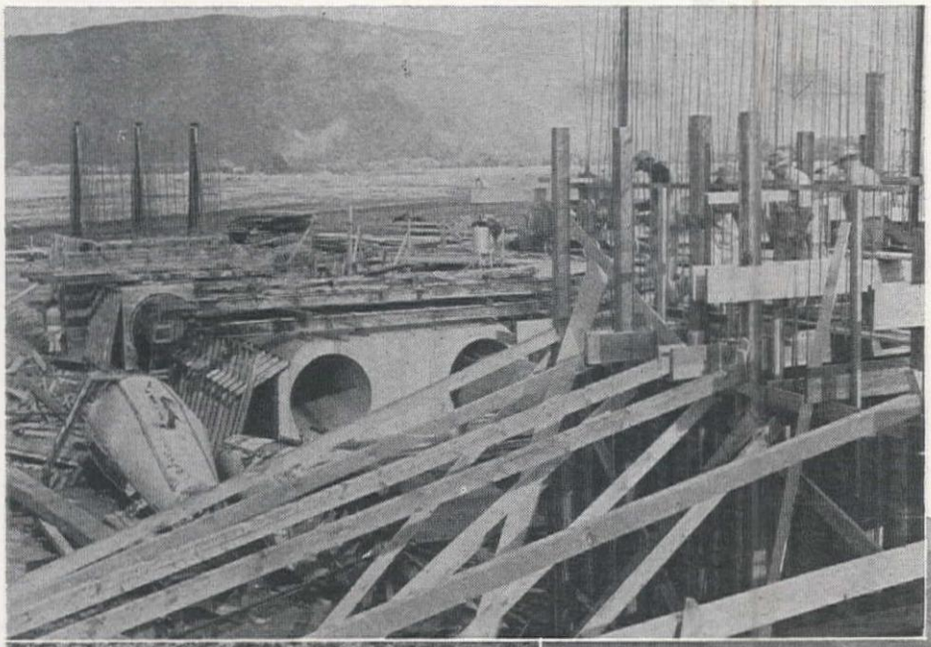
General design

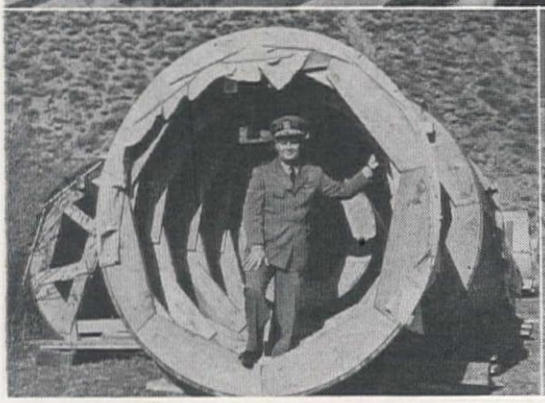
The gravity flow system designed by the Bureau of Reclamation engineers will divert water from the Metropolitan Water District aqueduct at the outlet or west portal of the San Jacinto tunnel and deliver it through a 71.3 mi. conduit to San Diego's San Vicente reservoir.

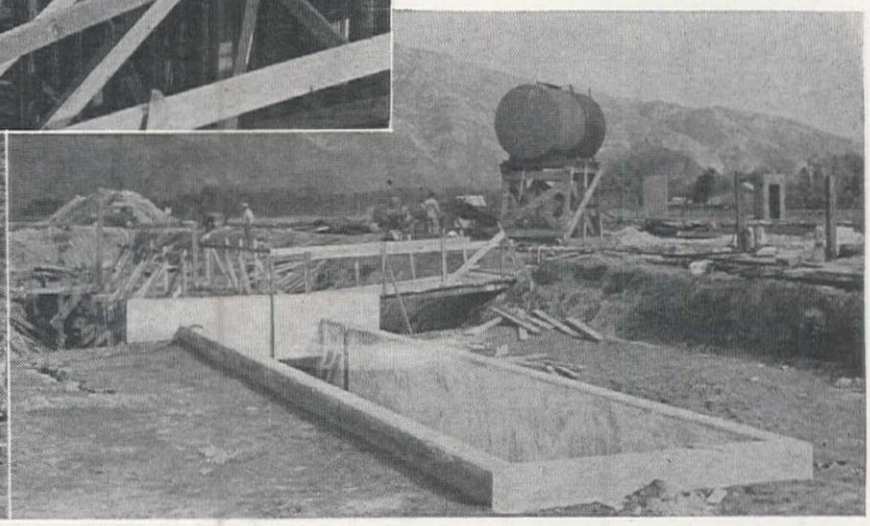
In order to accommodate the full capacity of one set of pumps and due to the relatively flat terrain, the new pipeline between the diversion structure and the regulating reservoir will be 96 in. in diameter.

This portion of the line will be comprised of 12-ft. lengths of reinforced, lock-joint concrete pipe. The regulating reservoir, as its name suggests, will provide a constant flow to the aqueduct and provide greater flexibility in pump operation on the M. W. D. system. The reservoir is located south of the San Jacinto River, a total distance of 2.6 mi. from the diversion structure. It is rectangular in shape, covering about 150 ac., with a maximum capacity of approximately 1,500 ac. ft. Special Venturi sections of reinforced concrete serve as outlet structure, including trash racks and control units.

REGULATORY RESERVOIR under construction. Top, the comparatively flat terrain upon which the reservoir lies. Initial excavation in hard, fine-grained granitic rock at San Vicente tunnel inlet portal, lower left. Below, the grizzly rig used to screen fines from San Jacinto tunnel dump rock. The remaining rock was salvaged to be utilized as riprap protection for the inside walls of the reservoir. Distributing riprap with a dragline, lower right.







TRASH-RACK construction forms for the outlet structure at south end of regulating reservoir, left. Two and one-half miles away, at the base of San Jacinto Mts. is located the diversion structure where the San Diego Aqueduct joins the Metropolitan Water District system. Diversion is at the west or outlet portal of MWD's 12-mi. San Jacinto tunnel. Comdr. R. D. Thorson demonstrates the size of the forms used for the Venturi section of the diversion structure. One of the minor items obstructing the installation of these forms is the removal and proper reinterment of an Indian's remains whose grave is situated near the diversion site. Reservoir inlet structure nearing completion shows crew setting form.

The aqueduct line travels southerly from the reservoir near several communities, including Hemet and Winchester, crosses Temecula valley, thence through the rugged area near Rainbow to the San Luis Rey river crossing 3 mi. southwest of Pala. South of the river, the aqueduct traverses rougher topography over Red Mountain and Oat Hills to Escondido, and crosses the San Dieguito river near the inlet of Lake Hodges. From here the line swings southeast over the range to terminate in San Vicente reservoir, latest of San Diego's storage basins, built and completed in 1942.

Future expansion

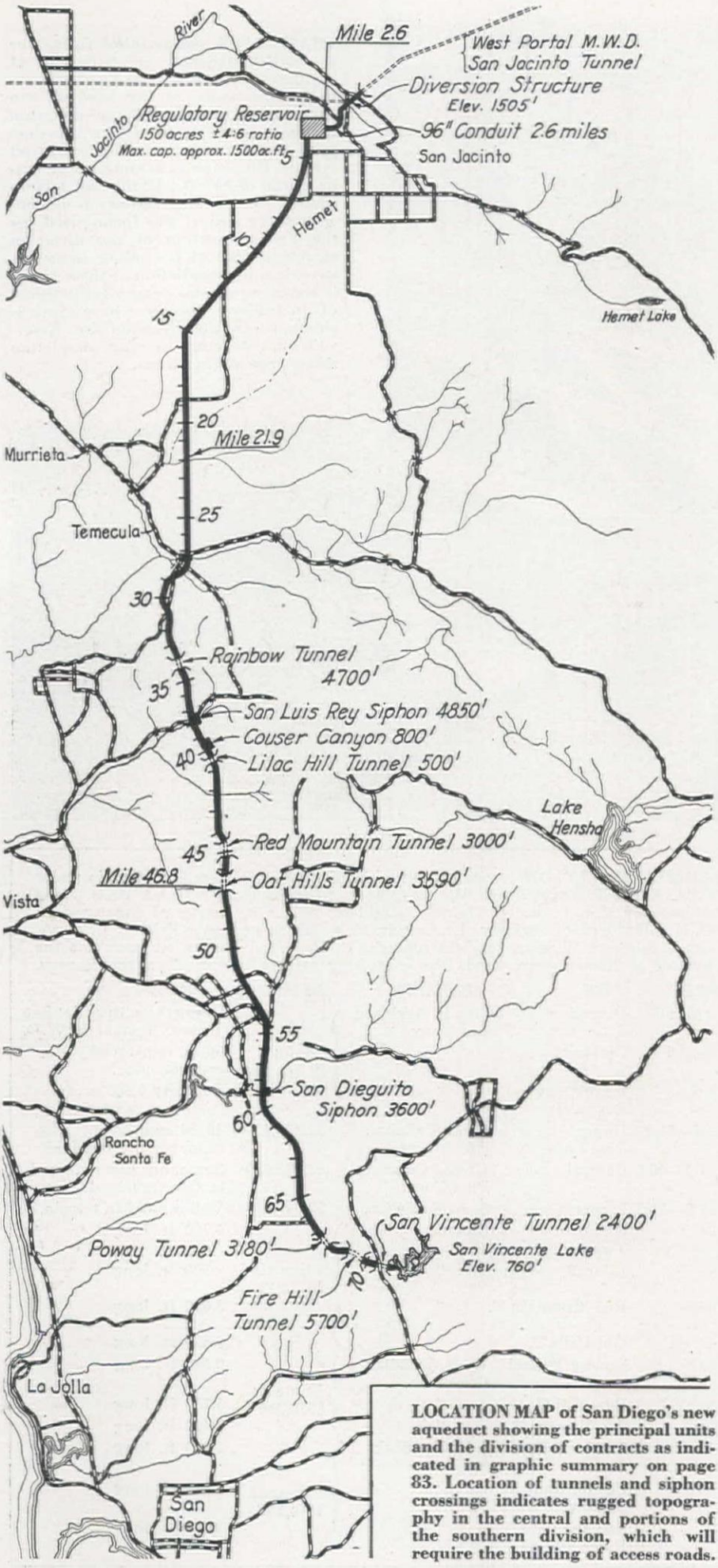
The aqueduct is designed to carry upon completion 50 million gallons per day, with provision for an ultimate 100 mgd. capacity when future growth of the city may require expansion of the system.

To avoid duplication of effort and to facilitate tunnel construction with standard equipment, all tunnels are designed 6-ft. I. D., capable of carrying the ultimate capacity of 100 mgd. In several other locations the conduit will likewise be designed to carry the ultimate capacity where later duplication of arduous construction would be uneconomical.

Provision is made in the right-of-way and in the present structures for a duplicate pipeline to be laid when the

ADMINISTRATION of the construction of the San Diego Aqueduct is under Capt. Alden K. Fogg, Public Works Officer of the Eleventh Naval District. He is assisted by Comdr. R. D. Thorson, Resident Officer in charge of construction; O. H. Lillard, office engineer; Lt. Comdr. F. M. Hines, northern division, Lt. D. A. Gray, southern division resident officers. R. B. Ward, senior engineer for the Bureau of Reclamation, heads the consulting service furnished by the Bureau.

MILE	UNIT	CONTRACTOR	BID PRICE	REMARKS
0 plus 0	Diversion Structure	Guy F. Atkinson Company		Connects with outlet San Jacinto Tunnel M.W.D.
0—2.6	Conduit	"	3 units $1,164,885	96-in. reinforced concrete pipe.
2.6	Regulatory Reservoir	"		Capacity 1,500 ac. ft.
2.6—21.9	Upper Pipe Line	Grafe-Callahan and Others	$2,248,409	48, 54, and 72-in. reinf. conc., Lock Joint
21.9—46.8	Central	United Concrete Pipe Corp.	$3,585,089	Same, but more rugged terrain traversed.
47.5—71.3	Lower	S. A. Healy Co.	$2,597,344	Valley and Mt. terrain.
34	Rainbow Tunnel	S. A. Healy Co.		4,700 ft. long
41	Lilac T.	"	4 tunnels $874,218	500 ft. long
45	Red Mountain T.	"		3,000 ft. long
47	Oat Hills T.	"		3,590 ft. long
68	Poway Tunnel	W. E. Callahan Const. Co.		3,180 ft. long
69	Fire Hill T.	"	3 tunnels $878,736	5,700 ft. long
71	San Vicente T.	"		2,400 ft. long
38	San Luis Rey Siphon	J. E. Haddock-Engineers Ltd.		4,850 ft. long
40	Couser Canyon Siphon	"	3 siphons $640,856	800 ft. long
59	San Dieguito River Siphon	"		3,600 ft. long



LOCATION MAP of San Diego's new aqueduct showing the principal units and the division of contracts as indicated in graphic summary on page 83. Location of tunnels and siphon crossings indicates rugged topography in the central and portions of the southern division, which will require the building of access roads.

city's water demand will require the additional 50 mgd.

Design of conduit

All of the reinforced concrete and steel-lined cylinder pipe will be provided with lock-joint pipe rings, sealed with synthetic rubber gaskets. Two sizes of gaskets are being used, 21/32-in. round section for all 48-in. and 54-in. diameter pipe and 13/16-in. gaskets for 72-in. and 96-in. diameter pipe. In addition both inside and outside seams are grouted with neat cement. The outside seam is further protected by a band of asphalt-impregnated building paper. The backfill will be made in 6-in. layers, compacted with pneumatic tampers until the total depth above the pipe is 3 ft., when heavy equipment and sheepsfoot rollers may be used over the pipe section.

Standard lock-joint sections provide for a maximum inclination of about 1 deg. and 6 min. and special bevels are cast, with angles from 1½ to 5 deg. in 30-min. increments, for use where the curvature requires them.

The spiral reinforced concrete pipe sections in 48 and 54-in. diameters are used for heads up to 100 ft. and cylinder and spiral reinforced pipe from 125 ft. to 550 heads.

Welded steel pipe is used for the three siphons where the head exceeds the safe economic limit for concrete pipe.

These steel siphon pipes are supported on concrete piers, to prevent either thrust or sagging movement.

The seven tunnels in the aqueduct line aggregate a total of 4.35 mi. in length. The longest is Fire Hill tunnel, with a length of 5,700 ft. It requires support for the initial formation exposed in the east or outlet portal. The other shorter tunnels are driven chiefly in compact, fine grained granitic rocks that do not require supporting forms. The support used in the Fire Hill tunnel is half arch sections composed of 13-lb. H beams bolted together at the top center line to form a horseshoe section. They will form reinforcing ribs in the 6-ft. I. D. concrete lining to be poured when the bore is completed. Portal sets are placed 2.5 ft. center-to-center for the first 15 ft. From this point on they are spaced on 5-ft. centers. The bore is lagged tight with 2 x 8-ft. T and G timbers to prevent subsidence of fine material.

To date the seepage encountered in the tunnels has been negligible.

A progress report of the tunnel construction will appear in the May issue of *Western Construction News.*

Construction

Guy F. Atkinson Co., awarded the contract for the diversion structure, regulatory reservoir and the 96-in. pipeline connecting them, is well advanced with the construction.

The reservoir is 95 per cent complete, with a portion of the protecting riprap on the inside slope remaining unfinished. August E. Steiner, project superintendent, is making use of the available dump rock from the San Jacinto tunnel. The dump rock is screened on

a rail grizzly to remove undesirable fines. The over-size for riprap is passed directly into waiting trucks and transported to the top of the reservoir embankment, a distance of 2.5 mi. The rock is distributed on the slope by working a dragline bucket, quartering on the slope from the top of the embankment.

Another innovation observed was the use of a Diesel road patrol supported on the steep outside bank by two wire rope slings attached to a D8 tractor traversing the top of the embankment. Together the tractor and patrol dispatched the slope trimming with efficiency and speed.

Outlet structures, including the Venturi and trashrack towers are nearly complete. Most of the 96-in. diameter pipe has been delivered and installation is under way. The only item not well on its way to completion on the Atkinson contract is the diversion structures, necessarily delayed until final negotiations are completed between the Metropolitan Water District and the San Diego County Water Authority.

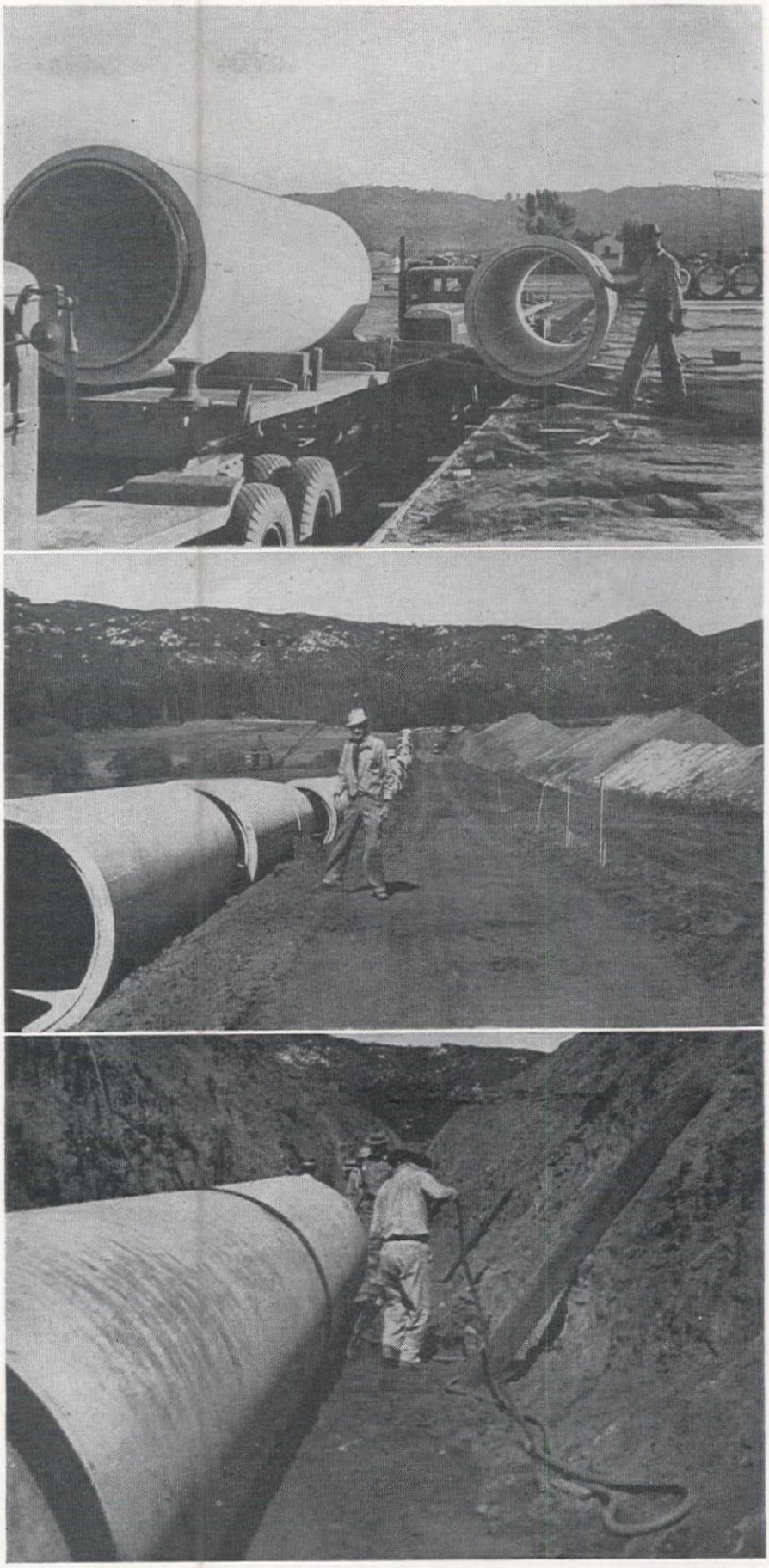
The contract for the upper division pipeline, awarded to Concrete Pipe Constructors, is progressing well. Much new equipment is in evidence, including several 3.5-cu. yd. draglines employed in excavating pipe trenches. This division beginning at mile 2.6, reservoir outlet, to mile 21.9 is situated in comparatively level valley terrain, where the right-of-way is easily accessible.

The production of the concrete pipe for the north division was sub-contracted to United Concrete Pipe Corp. of Los Angeles. Pipe of 54 and 72-in. diameter is being delivered from the company's Baldwin Park casting yard.

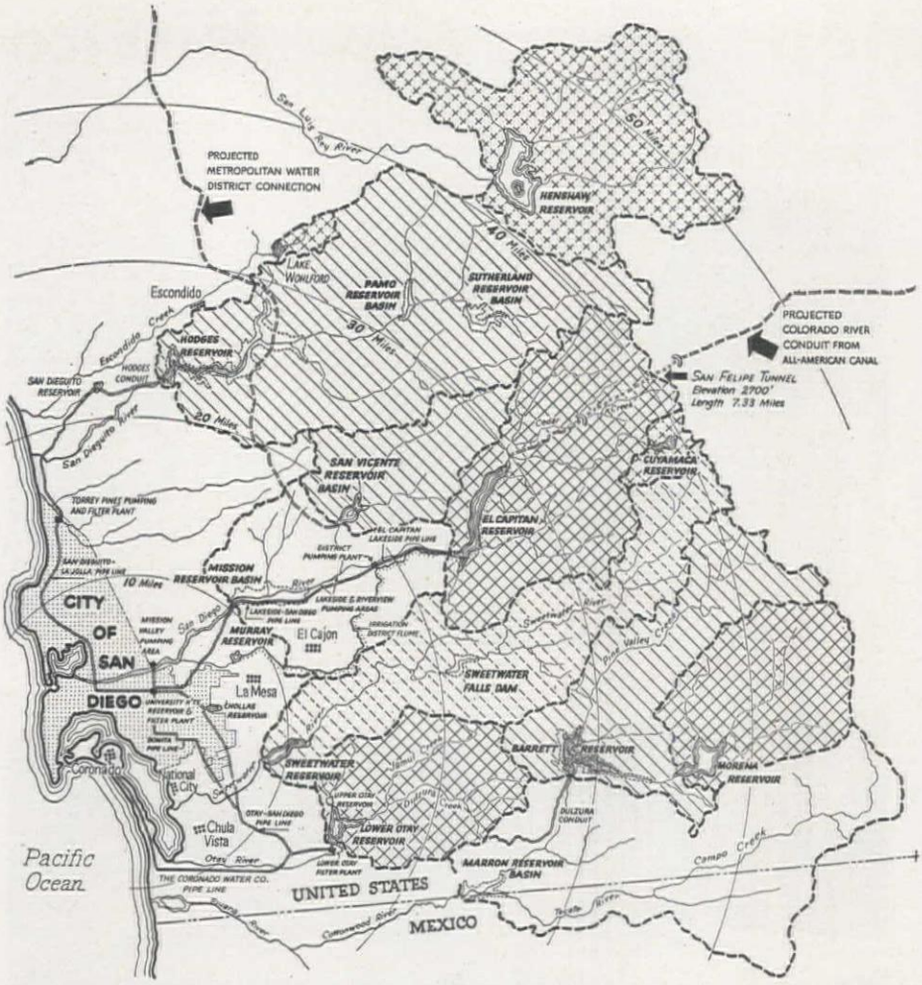
United Concrete Pipe Corp. is the prime contractor on the central division from mile 21.9 to mile 46.8. The central area is decidedly more difficult terrain, requiring special access roads for the delivery of equipment and materials. Field work has not been started on this section.

Construction on the southern division conduit, awarded to S. A. Healy Co., has advanced so that pipe is being laid in the valley area north of Escondido. Pipe casting and delivery for this unit is being handled by American Pipe & Construction Co. Their El Cajon yard casts twenty-five 48-in. x 16-ft. sections per day, five days per week. Pipe transported by truck and trailer units carrying two sections per trip, deliver 20 sections per day, six days per week, to the right-of-way. The casting yard, under the supervision of C. M. Mead, has developed a power form which rapidly winds and then holds the spiral reinforcing rod while it is welded to the lateral bars. The form is equipped with a pneumatic action to expand and control the roll, which facilitates handling the prefabricated reinforcing cage.

American Pipe & Construction Co. is western agent for the Lock Joint Pipe Co. and will furnish approximately 22,000 patented steel joint rings of the specially formed stock to the Navy for $586,893. Rings are formed to approximate size and butt welded. While still hot, any irregularities are trimmed from



ELEVATED STORAGE YARD, at El Cajon casting yard of American Pipe and Construction Co., facilitates loading the heavy section on the transport trucks, top. H. J. Dickison, resident engineer, shows relative size of pipe delivered to J. S. Barrett, sub-contractor on the S. A. Healy Co. project, center. Compacting the earth back-fill around the first sections installed on the southern division of the line.



REGIONAL MAP indicates the development of the watersheds in the vicinity of San Diego and the terminus of the alternate routes considered in the preliminary surveys. The long San Felipe Tunnel in the upper right was one unfavorable factor against the All-American Canal Route.

the weld by pneumatic tools. The bell ring is then placed over a die and expanded to the exact size required.

Three major siphons on the project are under construction by Haddock-Engineers, Ltd. of Los Angeles, Calif. The current construction under way on this contract is rock excavation for the San Luis Rey river crossing. The granitic shoulder on the north bank of the river requires heavy blasting to reduce the surface to grade for the welded steel pipe and its supporting structures.

City plans more work

Fred D. Pyle, hydraulic engineer for the City of San Diego, is planning necessary additions and facilities to receive the new Colorado River water supply.

The major development is a water treatment plant, estimated to cost 6 million dollars. This plant will be located on Murray Lake, just north of La Mesa. The design and engineering studies for the water treatment plant are being conducted by J. M. Montgomery, consulting engineer. Carl Rankin, consulting engineer for the city, is designing the additional pipelines for the distribution of the water from Murray Lake to other storage and distribution systems within the city.

Bonneville Power Revenues Reach Highest Level in 1945

BONNEVILLE Power Administration revenues hit a new peak of $22,990,018 during the fiscal year 1945, with energy deliveries of 8,513,125,169 kw. hr. for the period, Administrator Paul J. Raver discloses in his annual report.

The year's operation brought total revenues since the beginning of the Power Administration's operations as marketing agent for Bonneville and Grand Coulee dam power to $63,577,242 with total energy deliveries of 25,979,057,078 kw. hr.

"On the basis of energy deliveries, the Bonneville-Grand Coulee power system was the third largest power system in the United States," Administrator Raver stated in the report. "Energy production from the Bonneville and Grand Coulee plants exceeded the combined production of all other utility systems in the Pacific Northwest region."

Of total revenues to June 30, 1945, $36,188,589 was derived from sales of power to the light metals industry; $8,299,162 from other industries; $1,057,801 from military establishments; $5,910,277 from publicly owned utilities; $11,904,553 from privately owned utilities; and $216,860 from other sources.

Power from the two Columbia River dams went to market over the Bonneville Power Administration transmission network, which on June 30, 1945, consisted of 2,736.8 circuit miles of lines and 55 substations. The backbone of the system is a basic 230,000-volt loop tying together the Bonneville and Grand Coulee plants with the major load centers in the Portland, Seattle and Spokane areas and inter-connecting with other publicly and privately owned utility systems in the region.

In order to realize the full potentials of Pacific Northwest development during the reconversion and postwar periods, the Administration has recommended a region-wide power development program based upon new multiple-purpose dam projects recently authorized or pending authorization.

These projects are elements of an over-all basic development program which was recommended in 1943 by the Northwest States Development Association composed of the governors of the five Columbia basin states. The principal multiple-purpose physical works included in this program and their present status are as follows:

Hungry Horse dam in western Montana for power, irrigation and flood control; authorized by Congress June 5, 1944; Bureau of Reclamation designated construction agency and Bonneville Power Administration designated marketing agent, by order of the Secretary of the Interior.

Cabinet Gorge project, to be located just above Lake Pend Oreille in northern Idaho, for power and irrigation purposes; project not yet authorized.

Grand Coulee dam; authorized by Rivers and Harbors Act of 1935 and reauthorized by Columbia Basin Project Act; constructed and operated by Bureau of Reclamation; construction of dam and part of powerhouse facilities completed; Bonneville Power Administration named marketing agent by Executive Order of the President.

Foster Creek project, not yet authorized; recommended by the Corps of Engineers (report under review).

Lower Snake river projects, for power and navigation; authorized by the Rivers and Harbors Act of 1945, with the Corps of Engineers as construction agency and the BPA marketing agent under the terms of the Bonneville Act.

McNary (Umatilla) dam project, for navigation, irrigation and power, authorized in Rivers and Harbors Act of 1945 with Corps of Engineers as construction agency and BPA named as marketing agent under the Bonneville Act.

Willamette Valley projects, authorized by the Flood Control Acts of 1938 and 1944, with Corps of Engineers as construction agency and BPA named as marketing agent by the Secretary of the Interior.

Airfield Maintenance in New Mexico

THE PROBLEMS of airport maintenance are numerous and it is the obligation of the engineer to engage in the solution of those in which he is concerned both directly and indirectly. The following is a description of a few of the problems encountered at Kirtland Field which were solved successfully.

Flexible pavements, especially taxiways and parking aprons, develop depressions or "bird baths" which fill with moisture after rain or snow and, if not repaired, cause the base course to soften and in time will destroy the mat. Heavy planes, parked or taxi-ing over the surface, may be one cause of surface moisture seeping through the minute voids, cracks or undetected capillary tubes that exist in all pavements and gradually soften up spots in the base and result in depressions.

Filling depressions

If this condition is not remedied at once it will require expensive treatment later, as the base will have to be removed and re-compacted and a new mat laid over the damaged area.

A surface treatment developed at Kirtland Field was very successful. While the moisture was still on the pavement a trace was made around the "bird baths" with keel or paint to mark them. Then the water was removed by blowing or sweeping and a tack coat of MS-2, emulsified asphalt, was applied immediately, at the rate of .1 to .15 gal. per sq. yd. This was broomed on and allowed to stand for about an hour. Next was applied medium grade asphaltic rock or MC-3 road mix. Uvalde Rock Asphalt, due to its limestone base and affinity for oil, was found to be the best product for this operation.

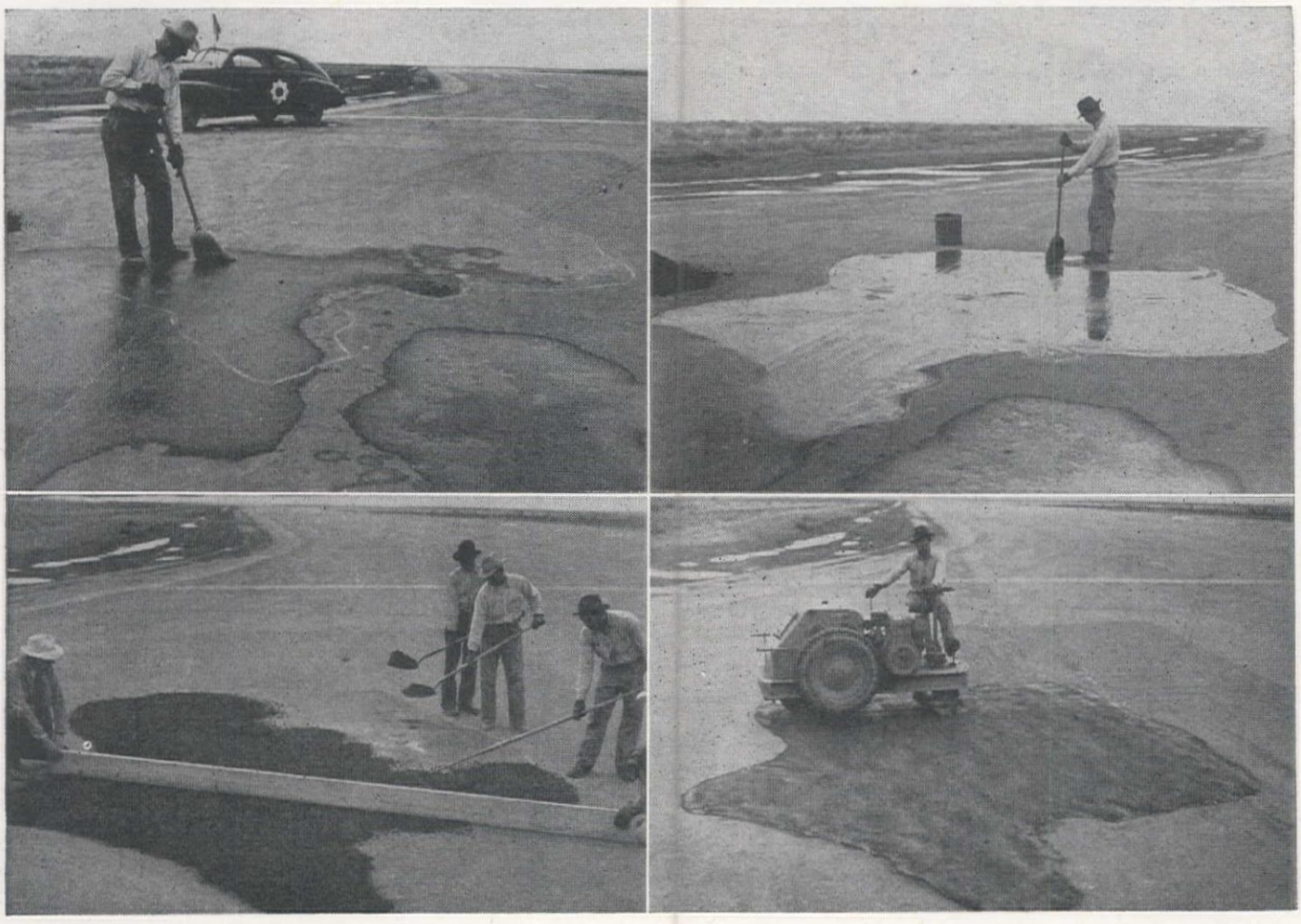
THIS ARTICLE was presented as a paper at the Tenth Annual Highway Engineering Conference conducted by the University of New Mexico, at Albuquerque, last month. As maintenance engineer at a large Army airfield in New Mexico, Mr. James is qualified to speak on caring for the common maintenance problems.

By H. K. JAMES
Maintenance Engineer, Kirtland Field
Albuquerque, New Mexico

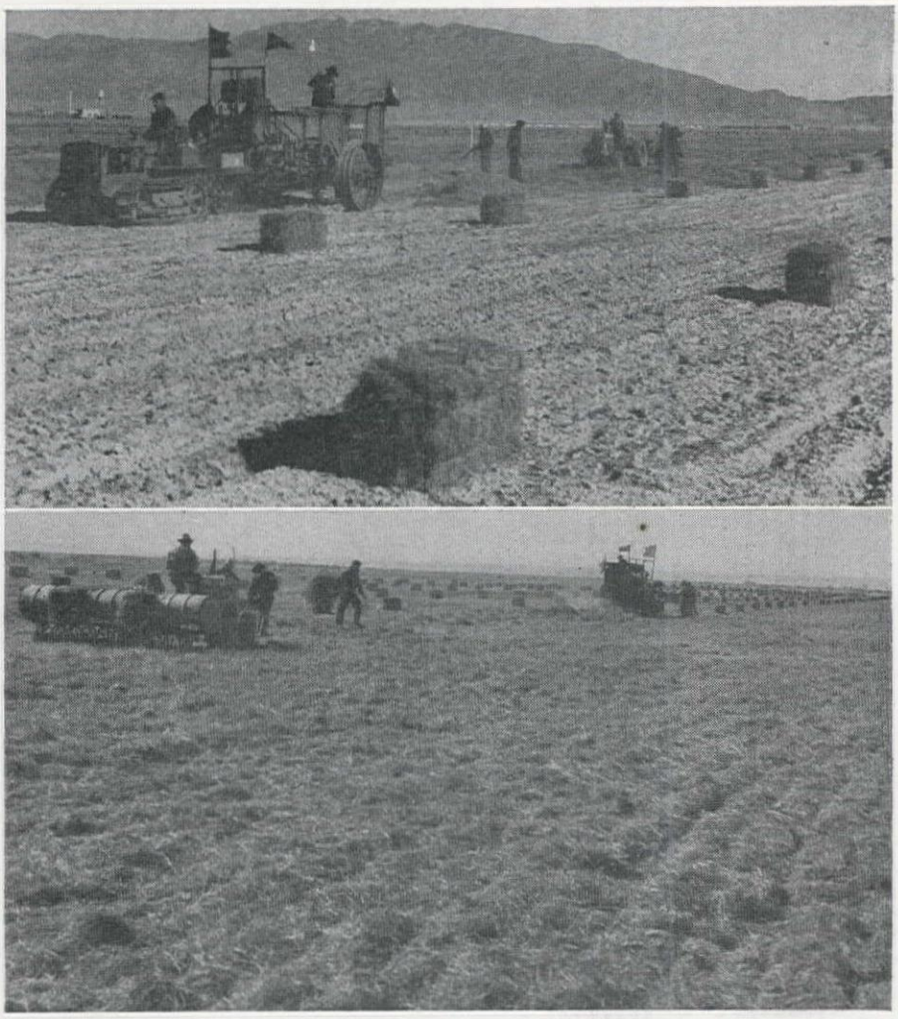
The asphalt was then rotted off, allowing a sufficient amount of material for compaction, and rolled to a feather edge by means of a 1½-ton tandem roller. The asphalt contains about 4 per cent moisture in addition to that on the surface and in the emulsified asphalt tack coat, so it is advisable to leave this type of patch open for several days to allow for evaporation before a seal coat is applied.

Mudjacking is primarily designed to restore the sub base of rigid pavements which have settled due to subterranean channels and erosion which causes voids under the pavement. This is accomplished with a mudjacking machine consisting of a hopper, mud pumps with a valve controlled by the weight of a steel ball, a flexible hose and a tapered nozzle. The ideal material is a sandy loam, about —4 in texture, with sufficient fines to lubricate the mass. This is placed dry in the hopper and water is added to bring it to a consistency of 6 to 11-in. slump, termed as thin or thick mud, depending on the size of the voids and cavities under the slab.

This mud is pumped through the flexible hose into the nozzle which is driven into 1¼-in. holes in the pavement. These holes should be spaced according to the cracks in the pavement and care should be taken not to place them



MAINTENANCE CREW sweeps water from typical airfield surface "bird bath," applies emulsified asphalt, and then an hour later, medium grade asphaltic rock, which is rotted off and rolled down.



MULCHING SOLVED the dust problem at Kirtland Field. After the area is scarified, wild prairie hay is spread evenly over the ground and then pressed into the loosened soil by a land packer.

too close to the edge, as the mud will blow out under pressure. About 8 ft. on center is usually proper spacing for holes. Pressure of the mud in the hose is about 25 to 50 lb. per sq. in. Some concrete pavements at Kirtland Field were raised from 8 to 10 in. by this method, at nominal expense.

Water standing on the edges or shoulders of taxiways, runways and parking aprons will soften up the pavement and cause ravelling of the edges through its capillary action. It has been found that sloping the shoulders for a distance of at least 5 ft. insures a safe dry pavement and cuts down appreciably on maintenance work.

Dust prevention

Dust, which is a definite hazard and a very important problem, has been reduced by the use of a dust palliative treatment and by mulching. MC-1 cut-back oil was used at the rate of .3 to .4 gal. per sq. yd. on a well rolled and compacted surface, as a dust palliative treatment. It will not stand traffic. Certain types of soil can be compacted firmly but when subjected to any appreciable amount of traffic will crack up. It is impossible to keep traffic entirely away from such areas even with rules and posting of signs. There are always emergencies and other occasions when planes are forced to cross these areas and the heavy loads and propeller blasts will tear up the thin sheets of asphalt and dust erosion results in a short time. It was found, therefore, that this method did not justify the expense.

Mulching proved a real cure for dust. Not only is it economical but it is also resistant to emergency traffic and under the cover of the mulch, native grasses can be seeded and a self-supporting grass land eventually developed.

The method at Kirtland Field was to first prepare the area by scarifying and double discing with a disc harrow. Wild prairie hay with good, stiff stems was shipped in bales to the job by carloads. An old farm combine was converted into a hay spreader similar to a manure spreader. Practically all the working parts were removed except a revolving drum and the engine. The bales were laid in rows so they could be picked up and thrown onto a platform as the spreader passed. The bales went into a hopper, were ripped apart by the drum and discharged onto a revolving wheel at the back which spread it on the ground more or less evenly. Two men followed with pitchforks to distribute the hay. About a 12-ft. strip was covered each time.

A land packer, tractor drawn, with 11 wheels, each 14 in. in diameter, 9 in. on center, followed the spreader, pressing the hay into the loosened soil, in hairpin fashion, in rows 9 in. apart. The loose soil, filling around the straws, bound them into the earth. With this operation it was possible to mulch 4 to 5 ac. per day at approximately 2 tons to the acre. The cost for mulching, including seeding of native grass, ranged between $40 and $60 per acre, while the dust palliative, using MC-1, cost around $375 to $475 per acre. There is, therefore, both from the standpoint of economy and for permanence, no question as to the superiority of the mulching process.

Areas adjacent to parking ramps and warming up pads were treated with MC-1 oil. However, the following method was used satisfactorily in lieu of dust palliative. The area, from 50 to 75 ft. back from the pavement was plowed and disced. Then .4 gal. per sq. yd. of MC-1 was applied and the ground re-disced to work the oil into the soil. Another application of MC-1 at .4 gal. was applied and rolled with a pneumatic roller. Areas treated in this manner will stand the propeller blasts and a great deal of traffic. The penetration, depending on the soil, ranges from 1½ to 2½ in.

Livening old surfaces

An expensive and difficult problem of airfield maintenance has been the cracking and shrinking of asphalt surfaces. Climatic extremes of heat or cold, dryness or excessive moisture and other natural causes develop brittleness and result in cracking. Especially is this true of airfield pavements and parking ramps where infrequent applications of loads fail to provide a sufficient kneading action to the surface. The following experiment, which was tried at Kirtland Field to correct this condition, has proved both successful and lasting.

At Kirtland Field there are 75,000 sq. yd. of 6-in., soil-cement sub-base overlaid with 1½-in. of 121-150 penetration, plantmix asphalt pavement. This pavement was covered, throughout its length and breadth, with shrinkage cracks occurring approximately six to eight in every hundred square feet of surface. These cracks varied from a hair line to an eighth of an inch in width.

During the summer of 1944 two taxiways were selected, one subject to a great deal of traffic, the other to a minimum amount. MC-3 oil was applied to the surfaces of both at the rate of .10 gal. to the square yard. The taxiway which carried heavy traffic sealed thoroughly and all the shrinkage cracks disappeared. The greater part of the light substances of the oil penetrated the old surface. The other pavement, similarly treated, had not sealed. These results clearly showed the necessity of the kneading action supplied by planes taxiing over the surface.

When Kirtland Field bombing base was converted from B-24 to B-29 planes with a considerably higher wheel load, the question was raised among the engineers and commanding officers of the area and of the 2nd Air Force headquarters as to whether the existing pavements and parking ramps would

support the weight of the heavier planes. The post engineers were called upon to place all ramps and taxiways in condition for immediate use by B-29 planes and at a minimum expense. Several suggestions were made, among them one to overlay the entire area. This operation would require a great deal of time and the expenditure of several thousand dollars. It was the writer's opinion, however, that the ramps would support the weight of the B-29 planes, provided the surface was sealed and the sub-base kept dry.

MC-3 cutback road oil was, therefore, applied with the aid of a distributor, at the rate of .15 to .20 gal. per sq. yd., at a temperature of 225 to 250 deg. F. A pneumatic roller, tractor drawn, followed behind the distributor. The function of the roller was to knead the oil into the cracks, thereby sealing the surface and adding life to the pavement, as the planes themselves had done in the earlier experiment. This operation was a bit gummy for both the operator and the tractor towing the roller. However, the results were exactly as forecast, and the pavement was sealed and ready for use in two days. The whole operation required about a week and the approximate cost was $3,500 as against about $230,000 for an overlay. The operation was given a 90-day life by pavement engineers, but it has supported the load for the past nine months and is still in good condition.

On the basis of this experience, the writer can, therefore, recommend this method as a good, economical application for old air field pavements, but one which must be applied with caution, if the weather permits and the surface is dry. Surface moisture on the pavement or in the voids is apt to cause a water barrier to the oil and will prevent the oil from penetrating the mat to a sufficient depth.

Practical Earthquake Design

A practical formula, based on the ability of so-called rigid structures to deform slightly and thereby absorb much of the energy in short period earth tremors, is presented for the purpose of clarifying this controversial subject—It is suggested as a rational basis of building design in the West

By MARK FALK, President
State Board of Registration for Civil Engineers
San Francisco, California

THE INCONSISTENCIES of building codes in respect to seismic formulae are apparent to the most casual observer. Many communities—and the City of San Francisco is one of them—have no requirements for design against earthquakes, but other California cities, at any rate, require compliance with the State law known as the Riley Bill. This statute requires that structures be designed to resist 2 per cent of the weight thereof applied horizontally thereto—a modest requirement indeed. From there codes increase by leaps and bounds to the 8 or 10 per cent or more.

The examples cited are only "shotgun" approximations of the detailed requirements of these various codes, but no purpose would be served by setting them forth in greater detail. They will give some idea of the wide divergence of code requirements to those who are not too conversant with the subject.

Now it is true that the structural engineers were consulted in the drafting of these ordinances and that both ends of this somewhat elastic yardstick have vehement, and vociferous, advocates among them. This argument has only tended to confirm the opinion held in some cynical quarters that engineers are engaged in a vast guessing contest—and that most of them aren't even very good guessers. Now it is hoped that this presentation shall not further confound the subject by contending that both schools of thought are correct in their theses.

What intensity earthquake?

Now the 10 per centers contend that a 10 per cent earthquake is nothing more than a moderate shock that you can expect to have anywhere in California any morning before breakfast—that there have been 20 per centers and even 30 per centers—and that anyone who would advocate designing structures against anything less than the lowest of these intensities is a conscienceless monster who ought to be taken into custody for the good of the community. It is pretty hard to quarrel with any of these contentions—except possibly the last one. As for the 2 per centers, they can point out buildings which would hardly figure to withstand a hearty blow by the Big Bad Wolf, but have successfully ridden out a couple of right sharp shakes and they feel that any engineer who would squander his client's money in designing against 10 per cent of gravity should have his license revoked on the grounds of malpractice or fraud. And they have tried to design some of the tall buildings of San Francisco for these higher factors and have found that it is prohibitive to attempt to do so. And so—far into the night.

Now if you can persuade two of these protagonists to sit down together at a table they will nod in acquiescence to the sage observations that the percentages of gravity which they advocate are only figures of speech and that the matter with which we are primarily concerned is the effect of an accelerated movement of the foundations upon the structure in question. Here at last is an area of agreement, but each is convinced that it must be some sort of formula that can be written into an ordinance.

Complex formulae

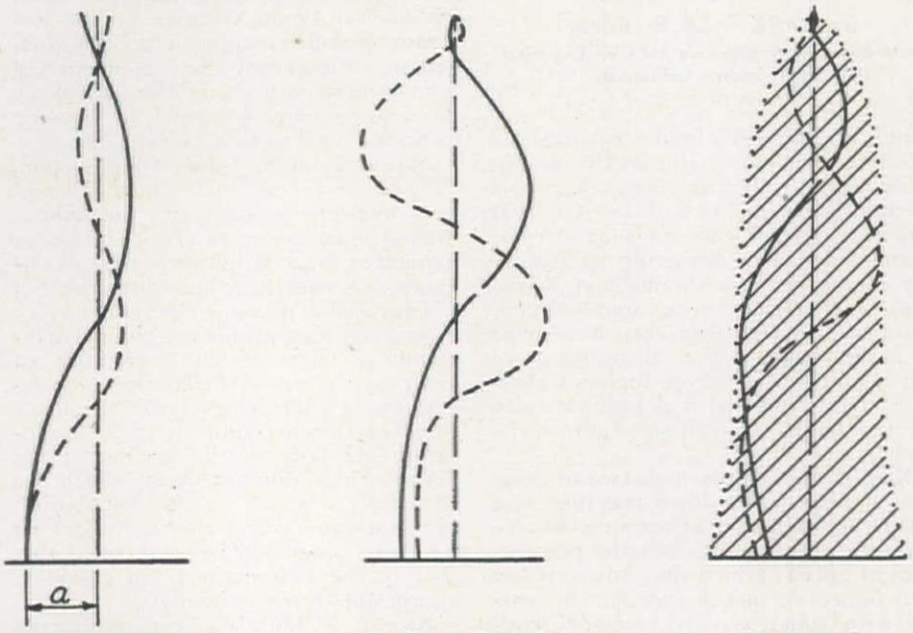
Fair enough! We are old hands at the writing of ordinances and are privy to the fundamental requisites thereof. It would hardly profit us to write in something that could only be resolved by the ministrations of a mathematical physicist. Now, you may smile at the notion but we must be mindful of the fact that these learned gentry have, in times past, fashioned the antecedents of the tools of our professional practice. These tools, through long and intimate association, have become so familiar to our hands that we are prone to forget the arduous labors of the minds which originally conceived them. It is far cry from the cumbersome tool which was the original conception of the slope deflection method to the polished and facile instruments which have been evolved therefrom: the Moment Distribution of Hardy Cross—the Conjugate Point Method of Leon Nishkian or the Restraining Stiffness concept of Earle Russell, to mention only a few—some one of which the structural engineer uses every day and to which his hand has become as accustomed as to a glove.

"True enough," our friends nod. "These are precise methods which will give answers as exact as the fundamental equations themselves. The forces generated on a structure by an earthquake are something else altogether."

That also is more or less true—rather more than less, probably; but notwithstanding, none of these methods of analysis is more valid than the basic assumptions underlying them: the loads to which they are subjected; the modulus of elasticity of the materials; the deformations due to shear, which we cheerfully neglect; or the distribution of the stresses within the section, which we have simplified because we know that in the vast majority of cases no appreciable error is involved.

Now it is doubtless true, insofar as seismic design is concerned, that it is "beyond the ability of any mathematician to develop formulae which would take accurate account of the extremely variable nature of the factors involved"—the complexity of the earthquake waves and the structures which a capricious clientele ask us to design to withstand them. Some simplifications of these factors must be introduced. Ships are designed to sag between standardized waves or to hog over them and there is no loss of virtue in the fact that in a long and vigorous life of going to and fro across the seas our vessel may never have encountered any such ideal-

STORY	Load Kips	% g	H	SHEAR DIAGRAM
Top Story	50	13.33	6660	
1	100	10.90	10900	
2	150	9.23	13850	
3	200	8.00	16000	
4	250	7.06	17650	
5	300	6.32	18960	
6	350	5.71	20000	
7	400	5.22	20880	
8	450	4.80	21600	
9	500	4.44	22220	
10	550	4.13	22715	
11	600	3.87	23220	
12	650	3.63	23600	
13	700	3.43	24100	
14	750	3.24	24300	
15	800	3.07	24560	
16	850	2.92	24800	
17	900	2.79	25100	
18	950	2.66	25250	
19	1000	2.55	25500	
20	1050	2.45	25750	
21	1100	2.35	25850	
22	1150	2.26	26000	
23	1200	2.18	26160	
24	1250	2.10	26250	
25	1300	2.03	26500	
26	1350	2.00	27000	
27	1400	2.00	28000	
28	1450	2.00	29000	
29	1500	2.00	30000	
30	1550	2.00	31000	



LATERAL FORCES for a column computed by this formula are tabulated for a hypothetical building having a dead load of 50,000 lb. per story, and the total shear is plotted at right to form the shear diagram. On the lower floors an arbitrary 2 per cent of gravity is adopted, and conforms to California law.

ized undulations. Suffice it that she survives the duty for which she was designed.

Periods of motion

Now if we substitute simple harmonic motion for the unpredictable jiggling of our earthquake and assign to our structure that period of vibration which most closely coincides with that of similar structures—the free period of structures of all kinds has been determined experimentally by the Coast and Geodetic Survey—we can begin to get somewhere. As an approximation, then, buildings have a free period of from one-tenth to one-twentieth of a second per story—depending upon the type and general dimensions of the structure. It isn't too important for our purposes at the moment. It will change appreciably with amplitude, anyhow, as certain stiffening elements within it come into play or are fractured and so go out of action.

It is pretty well established that earthquakes have periods ranging from one-tenth of a second to possibly as much as two seconds, but the accelerations of these latter are so low that they need cause us little concern. The "omph" in earthquakes is pretty largely supplied by the acceleration, particularly with reference to relatively rigid structures, and high accelerations are invariably associated with short periods. Taken together, of course, these two are a measure of the energy generated by the earthquake—the amplitude of the movement, divided by the time involved, giving the velocity of the movement, and dividing through by "time" again, gives the acceleration—in the familiar terms of feet per second per second.

If a building is infinitely rigid we cannot evade the fact that the full acceleration of the quake will be imparted to it and we will be somewhat at a loss to explain away the fact that very rigid one-story buildings designed for 10 per cent of gravity have come through earthquakes generating 30 or 35 per cent without damage. The answer lies, of course, in the fact that there was some deformation of the structure, however small—some natural period, however brief, so that the full force of the quake was not imparted to the structure—or, probably more correctly, was absorbed in deforming it. Further, there is probably a much greater factor of safety available to resist the instantaneous maximum stresses generated by an earthquake than we are accustomed to think of when considering the long-time loading on which our maximum working stresses are set up. It is my belief that, even after the usually permissible one-third increase in working stresses has been added, we have available at least 100 per cent additional before the elastic limit will be reached.

Let us then consider a one-half "g" quake as a probable maximum against which we can hope to design; divide it by two for this factor of safety and by two again for the deformation of the structure and we come to about 12.5 per cent for the equivalent static load against which it should be designed. Now it will generally be conceded that this is no particular trick; it involves little if any additional cost to the owner and generally to be achieved by the exercise of just a little ingenuity on the part of the structural engineer. All extraneous loads should be forgotten, such as the fictitious live loads on our roofs and the floors of ordinary buildings. Or allowing an additional 5 per cent for them, we will come to the 13.33 per cent set up in the Los Angeles Code for a one-story or the top story of any building. The Los Angeles City Code contains the not-so-well-known factor of

$$H = W \frac{60}{4\frac{1}{2} + n}$$

in which W equals the total dead-load

above the floor under consideration and n is the number of stories above the story being considered.

Formula justified

The accompanying table shows the lateral forces required by this formula on a column having a dead-load of 50,000 lb. per story—the load which would be supported by one column of a 20 x 20-ft. bay carrying 125 lb. per sq. ft. dead-load. On it is shown the percentage of gravity required for each story, working down from the top; the total shear in each story in amount is then plotted to scale, forming the shear curve at the right. Below the 26th floor, the Riley Bill takes effect and we must use 2 per cent of gravity from there on down—which is probably just as well. Also, in passing, it may be well to note that the wind force will also become effective about this time on the broad face of a narrow building—say one 60 ft. wide.

But what about the validity of the proposed formula beyond the limits of the one-story building? This gets a little more difficult. Considering a structure with a given natural period and applying to its base a horizontal movement of a given amplitude and frequency, it is not too difficult to determine its deformed position—the shape of the elastic curve, as it were. This has been done by R. S. Chew, in his monograph "An Approximate Measure of Earthquake Effect on Framed Structures."

Let us assume that, for the given conditions, the structure assumes the shape indicated by the full line shown in the lower left-hand corner of the chart. The moment and shear will be as indicated by the full lines on the other figures. For another mode of vibration, the dotted lines in the figures will show the distorted shape, the moment and the shear. Now superimposed over the shear diagram is drawn the "envelope" of shear which would be given by the formula previously mentioned. It has, of course, been scaled to fit the diagram of the shears in the hypothetical building.

I do not, nor do I believe anyone else can, hold any brief for the magnitude of the shears given by this formula or any other, but I think that a study of the subject will lead to concurrence in the following statements regarding it:

First, that it is of the correct shape to cover as well as any formula can, the variation of shear with height of building.

Second, that it is a sound minimum as well as the practical maximum that can be written into an ordinance to give that reasonable degree of safety to life and limb which is all that the police power of the State can justifiably encompass. When the structural engineer has reason to believe that severer stresses may be occasioned by a given structure or that additional strength or stiffness should be provided to reduce probable damage to equipment, installations, or expensive finish, he should confer with his client as to the advisability of providing for them.

Change of plan

One further condition should be mentioned. I think that where an appreciable change in plan form occurs at any level in a building, that level should be considered the "top story" for the purposes of the formula and should be required to carry 13.33 per cent of its own weight plus that shear given by the formula for the portions above. That's a somewhat involved statement but I'm sure that it could be written into an ordinance, so that its meaning would be unmistakable. The reason for it will, I believe, be quite clear to those who have made a study of, or even thought much about, the stresses set up by horizontal forces in structures which have sudden changes in stiffness at different levels.

It is my opinion that the frame of the building should only be required to carry those shears that may occur during the erection of the frame and that the seismic forces should be distributed to the various permanent structural elements of the building in proportion to their relative stiffnesses. Any other procedure seems absurd. The formula should not be used for tanks and towers or for stacks and similar structures. These always present special problems and require the detailed study of an expert.

It is my hope that this discussion will lead to a more rational seismic formula than any of those now set forth in the vast majority of building codes.

Army Engineers to Continue Pacific Beach Erosion Study

AN IMPORTANT STEP in the solution of California's beach erosion problems was taken on March 26 at a conference in San Francisco between state, federal and local officials. The conference proposed an agreement between the State of California and the Federal Beach Erosion Control Board, whereby the Federal government would undertake a continuing study of California's beach erosion problems along the entire coast line.

The meeting, which was called at the request of Brig. Gen. Warren T. Hannum, State Director of Natural Resources, was presided over by Col. George Mayo, Acting Division Engineer, South Pacific Division, Corps of Engineers.

The Beach Erosion Board, which is an adjunct of the Chief of Engineers, is empowered to contract with State agencies to study erosion problems. The proposed agreement will be submitted to the Chief of Engineers and upon his approval will be entered into by the Board. Necessary field studies will be made by the Army Engineer Districts.

The Division of Beaches and Parks established at the last session of the State Legislature was instrumental in seeking federal cooperation. This agency, of which Col. Edward C. Kelton is engineer, derives its funds through royalties on state-owned tidelands.

The proposed studies, four of which were agreed upon at the conference, are to be conducted at specific localities where critical conditions now exist, the state and federal governments to share the expenses. It is expected that interested communities and municipalities will contribute to the State's share of the cost of the studies undertaken, since they are critically concerned in most cases.

Among those present at the meeting were: Gen. Hannum, Col. Kelton, and E. H. Van Etten, Division of Water Resources, representing the State of California.

Federal officials included Col. Mayo, Col. Robert C. Hunter, Los Angeles District Engineer; M. C. Collins of the South Pacific Division; Dean M. P. O'Brien of Berkeley, member of the Beach Erosion Control Board, and Dr. Martin A. Mason of Washington, D. C., staff engineer of the Board.

Representatives of interested counties and municipalities included the following: Raymond V. Darby, Supervisor; H. E. Hedger, Chief Engineer of the Los Angeles Flood Control District; and Alfred Jones, County Surveyor, representing the County of Los Angeles; Senator H. R. Judah, Santa Cruz County; Neal Cunningham, President, Shoreline Planning Association of San Francisco; Robt. Ryan, Ventura County Surveyor, and Mayor Ray E. Schafer of Santa Monica.

Highway Balks Cheyenne Airport Landing Beam

INSTALLATION of high frequency radio landing equipment by the Civil Aeronautics Authority at the Cheyenne, Wyo., municipal airport is blocked by traffic on U. S. Highway 85-87, which runs adjacent to the field.

Since the new installation would have to be placed in such a position that the beam would be deflected by the cars and trucks traveling along the highway, the CAA will not put in the modern apparatus until highway and city officials have solved the problem. The establishment of the instrument approach and landing system would enable pilots to land under restricted visibility conditions. Cheyenne's airport is one of about 20 in the United States which have been designated for the system and it would ensure the field's maintaining its rating as a Class 5 airport, according to Carl Hempel, airport manager.

Possible solutions which a group of city authorities, state highway department representatives and airport officials are studying lie in the use of stop lights or road barricades on the highway to stop traffic during the approach of aircraft, or the changing of the route of the road to move it away from the field entirely.

Sand Dune Road 20 Years Old

Old, one-way, plank road to Yuma, Ariz., with "turnouts" every 1,000 ft., could be raised or lowered to conform with moving sand dunes, but couldn't meet traffic demands of 1923—Engineers found solution to building permanent, solid road that would not be covered by sand

By E. Q. SULLIVAN
District Engineer, California Division of Highways
San Bernardino, Calif.

PRIOR TO 1923, U. S. Highway 80 was carried across the moving sand hills in the California desert, just west of Yuma, Ariz., on a corrugated plank road 8 ft. wide. At intervals of about 1,000 ft. a short additional 8-ft. width of planking was placed to serve as a "turnout."

The moving sand dunes form a north-south barrier about 40 mi. long and 6½ mi. in width, extending northward from the Mexican border. Highway 80 crosses them at about right angles. The height of the dunes varies from a few feet to over 300 ft.

The number of automobiles crossing the plank road had increased to such an extent by 1923 that cars approaching from opposite directions caused blockades which tied up traffic for hours at a time. The only way to straighten out such a blockade was for the rear cars to back up. Many drivers were unable to stay on the 8-ft. width of planking while doing this. When their wheels ran off into the soft sand there was added delay and confusion.

Permanent solution desired

In 1923 the California Highway Department decided to form Highway District VIII, with headquarters at San Bernardino. As District Engineer, I was advised that the solution to this problem was considered the most pressing matter for the new district. The problem was first attacked by making an exhaustive search of engineering literature in an effort to find some solution to a similar problem in past engineering experience. Nothing was found in this search except examples of roads similar to the existing plank road, designed to be raised or lowered to conform to the surface of the moving sand dunes.

Local people claimed that the large dunes moved at a rapid rate and that any road built on a fixed grade line across the dune barrier would be covered over in a short time. Personal observation, during sand storms, however, indicated that this might not be a correct report and plans were immediately started to make a study of the true movement of the dunes.

Sand movement observations

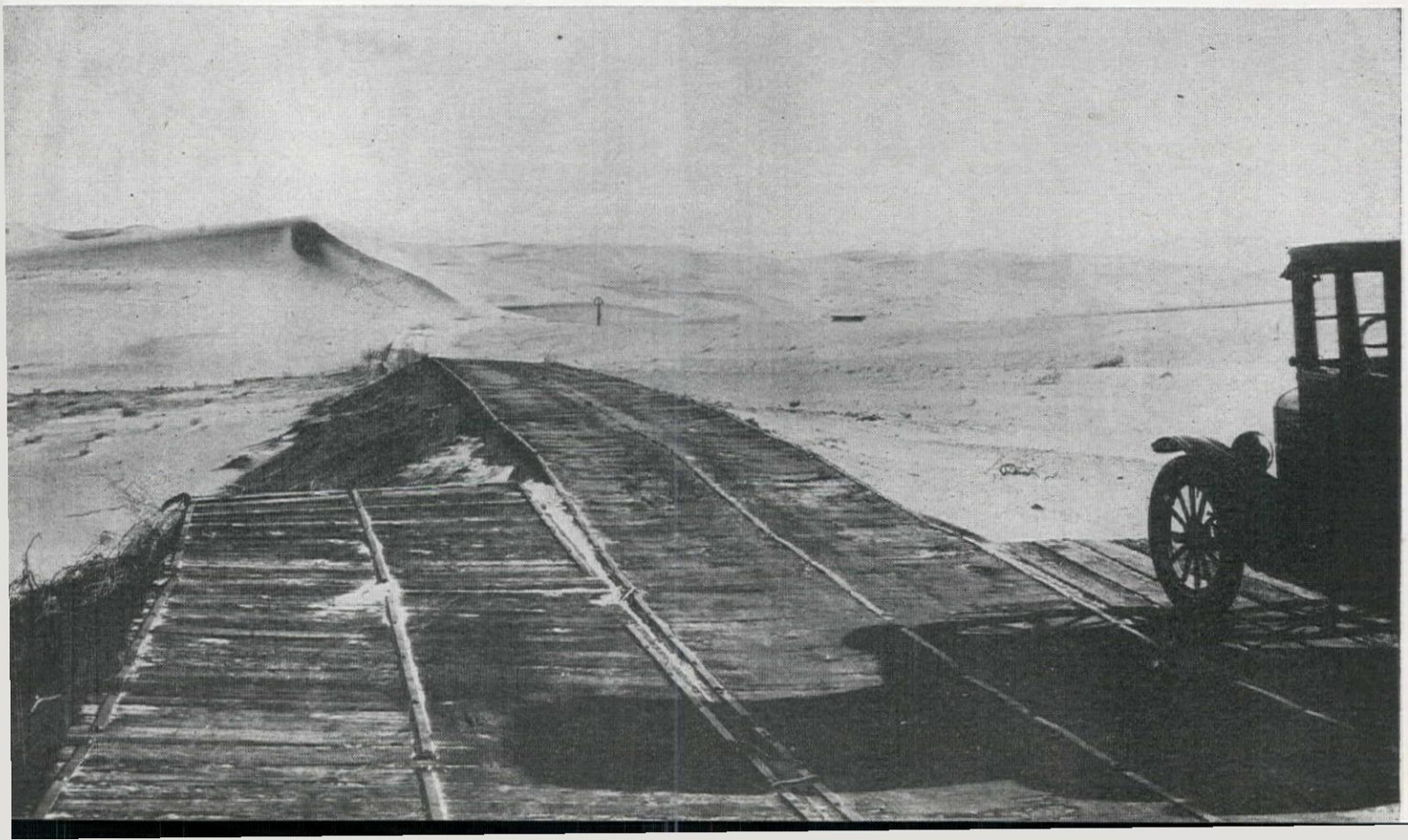
First a wind tunnel was built. Sand was hauled to the district office in San Bernardino. A box of sufficient size and length was constructed so that small dunes could form under the passage of an artificially induced wind.

The air movement was supplied by a number of electric fans. A method was devised for measuring the air velocity through the tunnel and the movement of the sand in the box was measured accurately for various sizes of dunes.

It was found that the movement of the dunes varied inversely as the size. Some difficulty was encountered in arriving at a formula describing the movement of the dunes but finally the engineers succeeded in working one out. Using this formula it was found that large dunes, (for example) 300 ft. high, would move an average of less than one inch per year, while dunes below 10 ft. in height would move several feet per hour in heavy windstorms. Dunes above 35 ft. in height would move only a few feet per year.

The sand dunes in question are in windrows; these windrows are many miles in length. The dunes in each of these windrows are all of about the same height and all follow along in procession, one behind the other. The larger

From Planked Road . . .



the dunes, the farther apart they are spaced in each windrow.

It was observed that where the old plank road crossed a windrow of dunes at right angles, if the planks happened to be at the elevation of the top of the dune windrow, sand did not cover the planks. On the other hand, if the plank road was below the elevation of the top of a windrow of dunes, the planks were covered over with sand as the dunes moved forward.

Location of highway

It was decided that a permanent road on a permanent profile would be safe from engulfment if the road was built higher than the fast moving dunes. Also, the location of the road would have to be made to be as far away as possible from the large, slow moving dunes. Since the large dunes are widely spaced in the windrows, it was possible to locate the new road across each windrow of large dunes just behind a dune that had already crossed over the location. This put the location a considerable distance ahead of the next advancing large dune which, by calculation, would not reach the road for many years.

To check these theoretical findings, three lines of stakes were run across the 6½ mi. width of sand dunes. These stakes were 10 ft. long and were driven 5 ft. into the sand, leaving an exposed portion of 5 ft. above the sand. The change in elevation of the sand was then observed on the stakes and this was the measure of dune movement. During every heavy storm the foreman telegraphed the district office and I personally went to Yuma, walking across the dunes to observe conditions during heavy wind. After each wind a record was made of the movement of the sand relative to the stakes.

It was found that the actual dune movement on the ground checked the theoretical predictions, based on the wind tunnel investigation, to a remarkable degree.

Construction

Alternate bids were called for a 20-ft. pavement of either Portland cement concrete or asphaltic concrete. The asphaltic concrete bids were lower. The section of the proposed highway was a 14-ft. central portion, 6 in. thick, increasing to a 9-in. thickness at the edges. Five-foot sand shoulders were constructed on each side. The shoulders and the slopes of the fill were oiled. There were no cuts, the entire road being a fill. The reason for the oiling was to prevent the sand fill from blowing away.

A well was drilled in the center of the project and an ample supply of water was obtained. Specifications provided for soaking the sand with water to a depth of several feet. This was to obtain greater bearing during construction. No provision was made for permanent strengthening of the sand subgrade other than the effect of the thickened pavement edges tending to retain the sand under the pavement.

The successful bidder was Schmidt & Hitchcock. The contract was dated Dec. 30, 1925, and the total cost was $329,100 for the 6½ mi. The grading was designed to minimize overhaul and practically all of the sand fill was within reach of a long dragline boom.

Schmidt and Hitchcock sublet the pavement to George Suter. Crushed gravel was imported from the old Frink gravel pit on the east side of the Salton Sea and was shipped by Southern Pacific Railroad to within 6 mi. of the end of the job. Two grades of sand were produced at Pilot Knob near the railroad siding.

The asphaltic concrete was hauled in 45 dump trucks, each hauling two tons. To avoid disturbing the subgrade, the trucks were backed over the subgrade a distance equal to one day's run. Planking was laid so that the tires would not cut into the freshly shaped wet sand subgrade. The asphaltic concrete was laid in two courses. Along the thickened edges a still lower course was hand-tamped in place, making a third course along the outside.

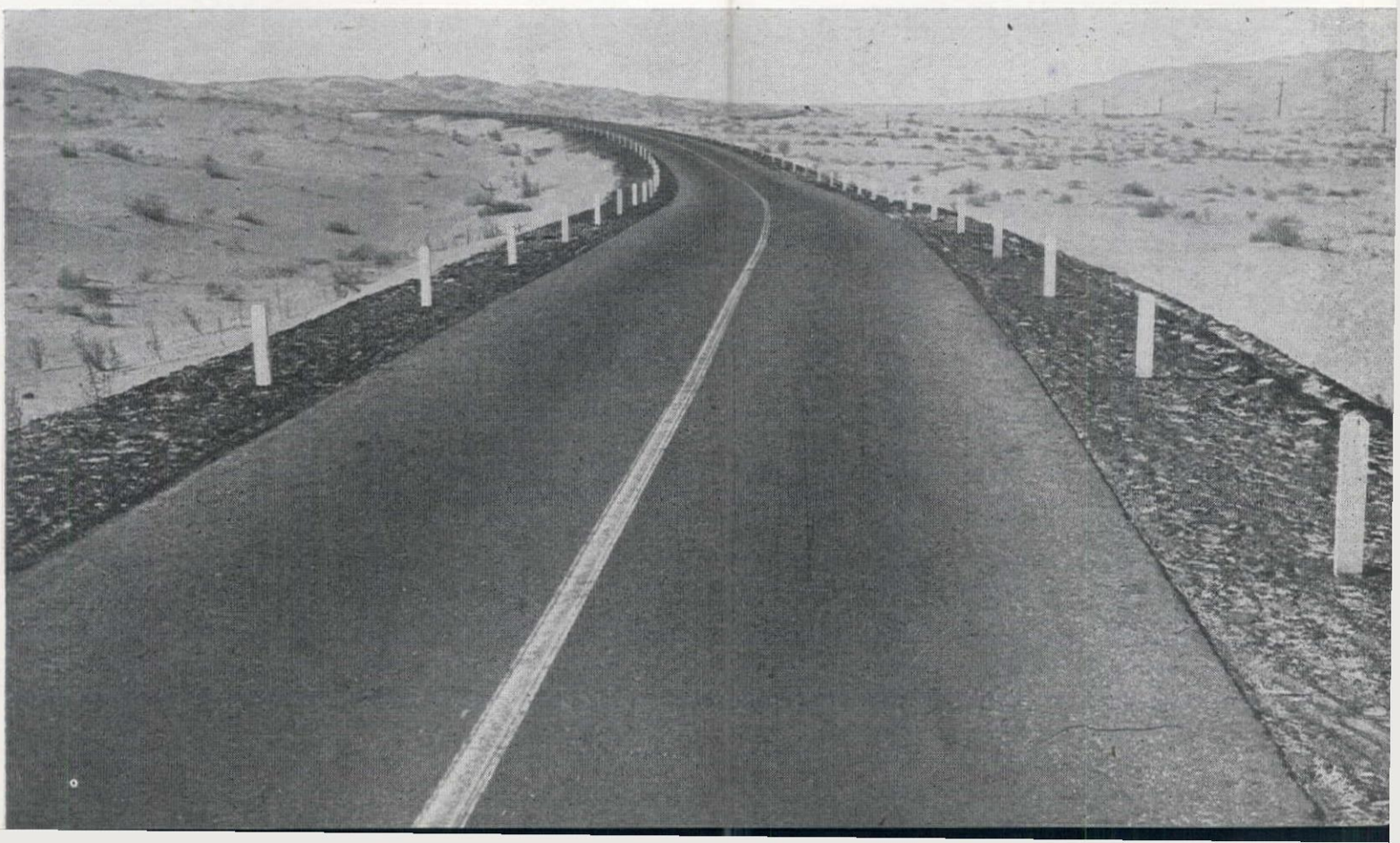
The hauling was worked out by an enterprising Ford dealer in Los Angeles, who sold trucks to individual owners; each man owned his own truck and had a working agreement with the contractor for the hauling.

Maintenance

Previous to the construction of the new road, the maintenance cost had reached a rate of $35,000 per year to keep off the sand and to raise and lower the plank road. After the construction of the new road sand removal practically ceased. Small, fast moving dunes approaching the road stopped at the high fills and were blown across the road as separate particles of sand. A small amount of sand was left on the road surface at some locations, but it was easily removed with a power broom. The volume of sand removed during and following windstorms was negligible compared with the amount removed from the old plank road.

It was predicted, at the time of con-

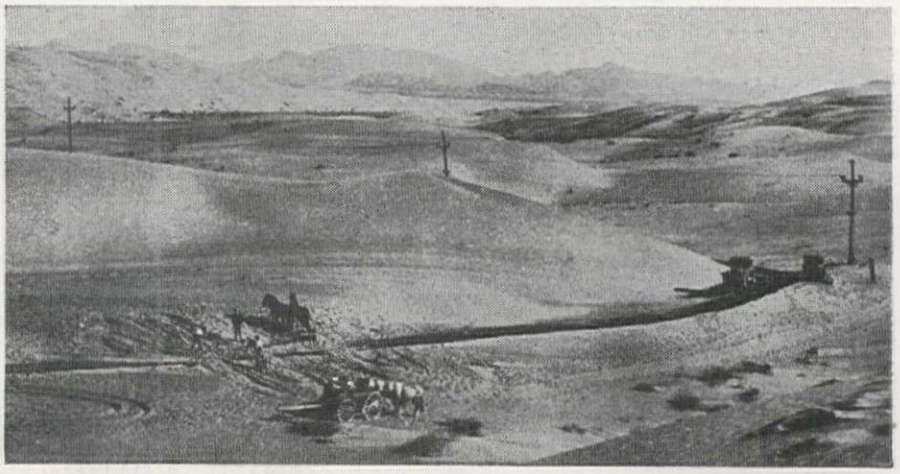
. . . To Asphalt Highway



struction, that the probable life of the road would be about 20 years, before larger dunes would engulf it at some points and force partial relocation as to alinement and profile grade. I recall it was my hope (from the wind tunnel formula) that the life of the highway might be much longer and that the 20-year prediction was on the conservative side.

The success of the road has been far beyond expectations. In the more than twenty years since construction the road has not been changed in grade or alinement. While sand removal is somewhat greater at the present time than twenty years ago it is still within reasonable maintenance cost.

The building of this road was reported in various engineering publications at the time of construction. Because of the lack of engineering literature on the subject many inquiries were received from engineers all over the world. Engineers from Australia, Egypt and Chile actually made trips to San Bernardino to review our study and to see the results of the work. Occasional letters are still received requesting information on the design and the construction of this road. It was thought that the engineering profession might be interested in this report, published at the conclusion of the 20-year period for which the highway was originally designed.



TWO PRE-1923 automobiles wait on "turnout" at far right for horse-drawn maintenance equipment to remove sand from old corrugated plank road before they can proceed along U. S. Highway 80 across southeastern California desert to Yuma, Ariz.

Fort Peck-Glendive Line Now in Use

THE 138-MILE TRANSMISSION line constructed by the Bureau of Reclamation to carry power generated at the Fort Peck plant on the Missouri river to Glendive, Mont., has been placed in service.

The 115,000-volt line was constructed by the Rue Construction Co. of Fargo, N. D., at a cost of $550,000. Construction of the Glendive substation brought the total cost to $775,000.

The primary load carried by the new transmission line will be absorbed by the Montana-Dakota Utilities Co., this firm recently having entered into a contract with the Bureau of Reclamation for the distribution of Fort Peck energy.

Low-priced electrical energy will be provided a number of irrigation pumping units now in operation in the Yellowstone valley. The Bureau of Reclamation is also contemplating the construction of a number of additional Yellowstone valley pumping units as a part of the authorized Missouri river basin developmental plan.

The new line will also permit future service to a number of REA cooperatives in Montana and North Dakota. REA groups adjacent to the Fort Peck-Glendive line will be served directly through the installation of substations at needed points. Negotiations are now in progress to begin delivery of energy to the McCone County Rural Electrification Association.

REA cooperatives adjacent to the facilities of the Montana-Dakota Utilities Co. will be supplied Fort Peck energy as provided by the contract in force between the company and the Bureau of Reclamation. Currently two Yellowstone valley REA groups are securing energy from the company. As soon as contracts are negotiated between these cooperatives and the Bureau of Reclamation they will utilize Fort Peck energy.

The new transmission line was constructed under the Fort Peck Project act of 1938, which established the Bureau of Reclamation as the marketing agency for power produced at Fort Peck, and the Corps of Engineers as the construction, maintenance and operational agency of the reservoir and generating facilities. At the present time a 35,000-kw. generator is in operation at the Fort Peck power plant.

A STRETCH of the old planked road winds through the desert, at top, and will be covered in the next windstorm by the sand dune at left. Below, an embankment for the new asphaltic concrete highway is being constructed to the left of the plank road, which is shown with one of its vital "turnouts" in foreground.

Mountain State Highway Conferences

Utah

TALKS STRESSING the need for safer highways through utilization of more modern construction methods highlighted the seventh annual highway engineering conference at the University of Utah in Salt Lake City, March 4, 5 and 6.

Engineers and construction men can do their part in the campaign to reduce accidents by building divided highways, wider and firmer shoulders and by improved design and construction on highway curves, W. E. Reed of Ogden, Utah, Public Roads Administration engineer, said in his address to the conference.

Donald S. Berry, director of the traffic and transportation division of the National Safety Council, presented a nine-point speed control program recently adopted by 14 highway and safety organizations. Points stressed in the program are legislation, highway design, speed zoning, posting of limits, police administration, police training, driver's license administration, driver training and public education.

Roy W. McLeese, chief engineer of the Utah State Road Commission, pointed out the need for improved urban roads.

"The congested urban areas are costing the traveling public millions of dollars every year in time and fuel to say nothing of frayed nerves and exasperation, so although the cost of urban construction has soared to tremendous heights, we must face the facts, that regardless of cost, provisions must be made for safe, swift and uninterrupted traffic throughout urban areas, as well as through our rural sections," McLeese declared.

M. A. Ver Brugge, materials engineer of the Wyoming State Highway Department, discussed highway materials and emphasized the need for more careful testing and closer control of construction materials than has been practiced in the past.

Procedure of asphalt subsealing of rigid pavement, a process which was developed during the war, was explained to the conference by Maj. N. H. Truax, office of the engineer headquarters, Ninth Service Command.

T. E. Stanton, materials and research engineer of the California Department of Public Works, told of experiments with an intermediate type of bituminous surfaced highway on a base treated with Portland cement.

Utah safety projects which had proved effective in reducing traffic accidents on various sections of Utah highways were outlined by Harry S. Wright, traffic and safety engineer of the Utah State Road Commission.

Use of aerial photography in highway planning was explained by W. L. Anderson, assistant chief engineer of the Utah Highway Department. He stated that aerial photography had proved faster and more economical than regulation land surveys in highway planning.

Other speakers during the three-day session included:

George P. Egan, Nevada Highway Department, who discussed "Routes Into and Around Cities and Towns in Our Western States."

John H. Hale, National Safety Council, who talked on "Accident Records"; John M. Neff, Salt Lake County planning engineer, who explained that planning agencies needed state cooperation in establishing zoning programs; Vernon P. Bridge, Utah state right-of-way engineer, who discussed "Safety Features of Controlled Access Highways," and H. N. Raymond, General Electric Company sales engineer, who talked on "Street and Highway Lighting for Safety."

Approximately 200 contractors and engineers, largest registration in the conference's history, attended the sessions, sponsored by the University of Utah department of civil engineering and the Utah State Engineering Commission. Professor A. Diefendorf was in charge of arrangements.

New Mexico

THE TENTH ANNUAL Highway Engineering Conference sponsored by the University of New Mexico was held March 8-9 at Albuquerque, with W. C. Wagner, head of the civil engineering department of the university, in charge.

One of the principal subjects considered was collective bargaining for engineers and their standing as professional men in the community. Among the speakers on this subject were Walter E. Jessup, western representative of the American Society of Civil Engineers, Dr. H. L. Jones, director of the New Mexico Society of Engineers, and Dr. Carl L. Spensen, secretary of the Texas Board of Registration for Professional Engineers.

The economic aspects of highway location and design were discussed by Jesse E. Williams of the Public Roads Administration and in connection with this discussion A. J. Ryan, consulting engineer of Denver, Colo., outlined the location and design of a valley highway through the city of Denver.

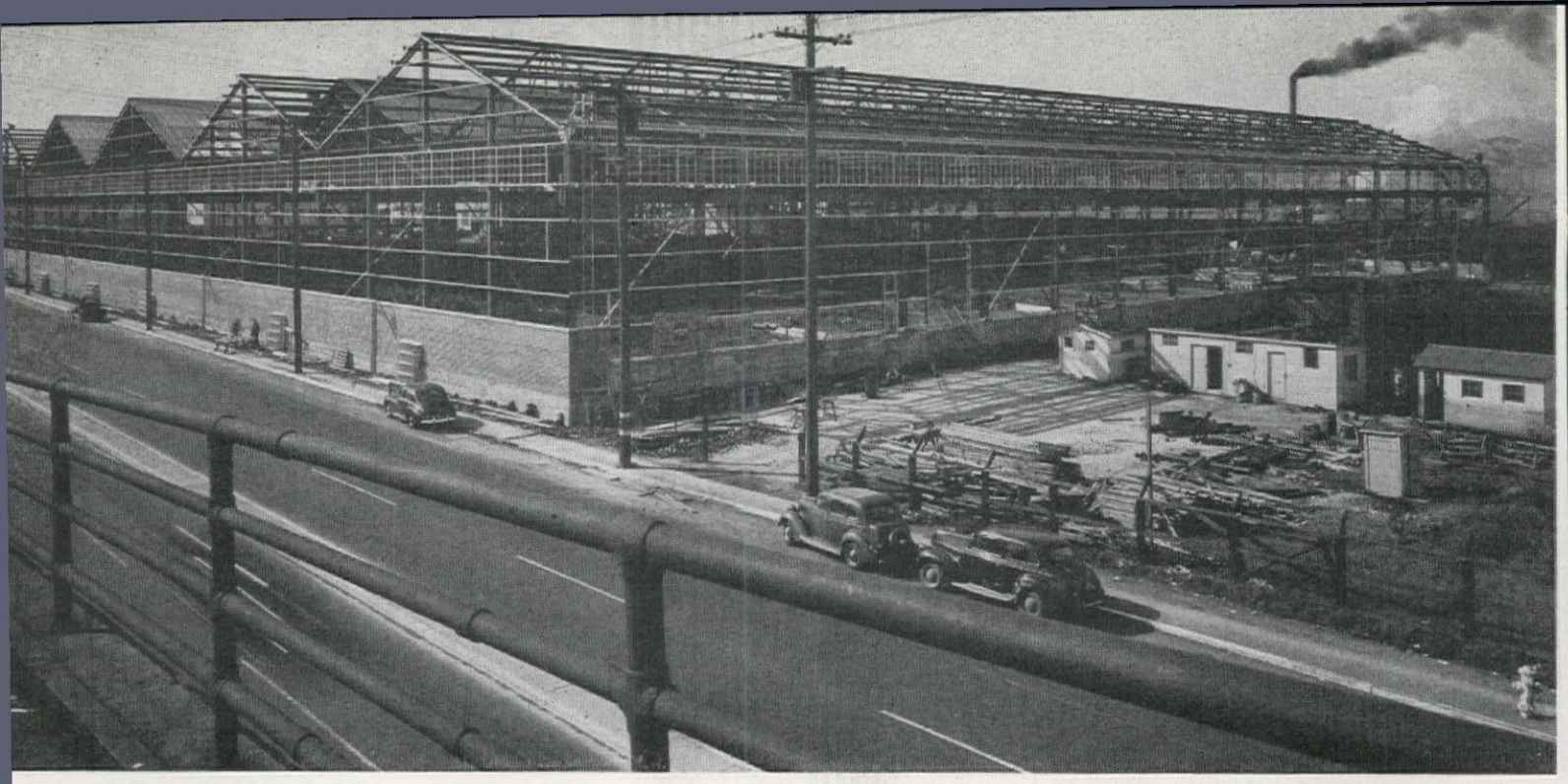
Water resources of the state were discussed by John L. Mutz of the Bureau of Reclamation and Lt. Col. R. E. Cole, district engineer at Albuquerque, presented the flood and silt control program on the Rio Grande.

A number of addresses were given on the subject of materials, among these being one on soil asphalt by F. S. Gilmore of the Asphalt Institute; The Flexural and Compressive Strength of Concrete by Kenneth M. Coen, chief laboratory engineer of the U. S. Engineer Office in Albuquerque; Concrete in Specifications and Building Codes by W. K. Wagner of the State Highway Department; and Additives to Promote Adhesion of Bituminous Materials by Robert G. Clark of the State Highway Department.

Building Codes of the state were discussed by G. Perry Steen of Southwestern Engineering Co., and H. K. James, maintenance engineer at Kirtland Field, discussed some of the important factors in airport runway maintenance. Mr. James' paper is presented elsewhere in this issue.

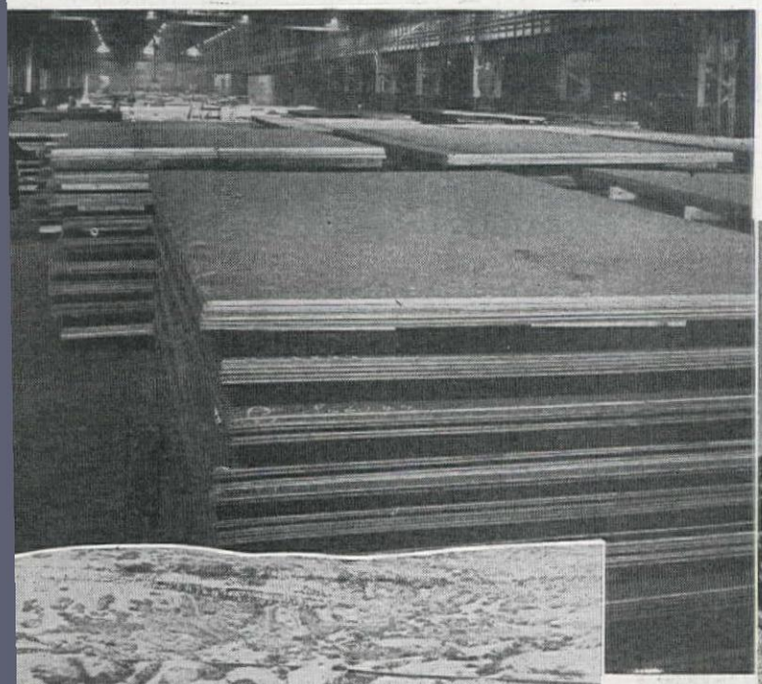
About three hundred engineers, contractors and material men attended the sessions. In connection with the meeting, the new officers of the New Mexico Society of Engineers were elected.

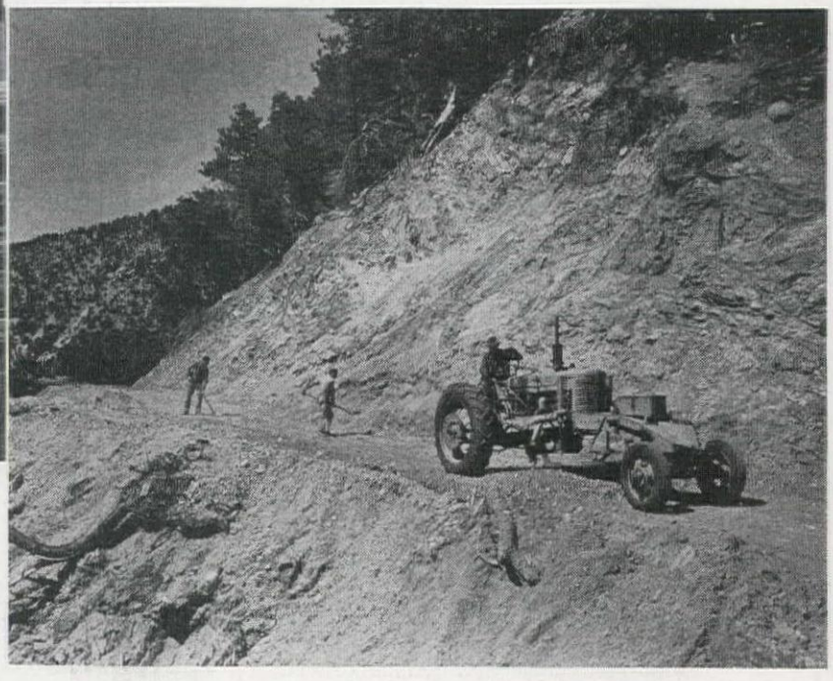
SPEAKERS AT THE New Mexico Highway Conference included, l. to r.: THOMAS McCLURE, State Engineer; A. J. RYAN, consulting engineer, Denver, Colo.; LT. COL. R. E. COLE, U. S. District Engineer, Albuquerque; J. E. WILLIAMS, Public Roads Administration, Santa Fe; W. C. WAGNER, head of the civil engineering department, University of New Mexico, and JOHN L. MUTZ, Bureau of Reclamation.

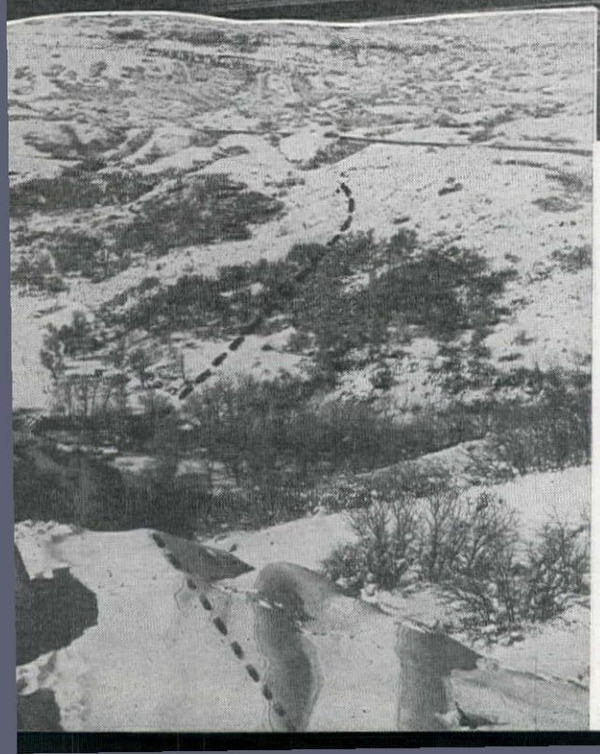


WESTERN CONSTRUCTION NEWS

In Pix

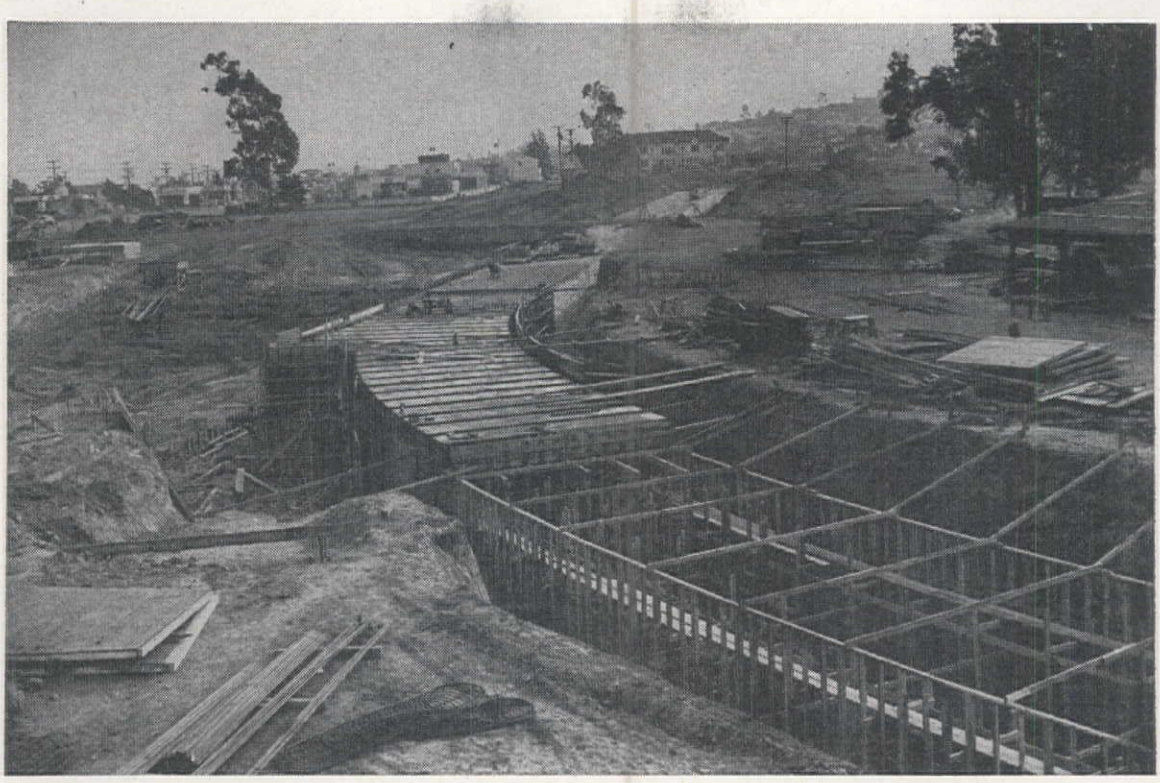






CONSTRUCTION IS MOVING forward rapidly in the Western states, with the cessation of the war and commencement of the "Postwar period." Some of the new activity is portrayed on these pages. Bottom left, a marked photo of the line of a steel siphon to be constructed on the Salt Lake aqueduct, for which a contract was awarded a few days ago to Carl B. Warren, Spokane, Wash., for $442,751. In the photo above is a pile of steel sheets for the pipe at the Geneva steel plant at Provo, Utah. Right, Forest Service crews rehabilitate fire trails in Angeles National Forest, California.

Truck Subway Serves Stores



CONSTRUCTION OF THE Broadway service tunnel proceeded rapidly—Forms for walls, beams and roof were framed in 180-ft. sections, which required their re-use about 10 times to build the whole length. While one section was poured, another was set for the next pour.

C. L. Peck of Los Angeles builds sub-street artery, 2,000 ft. long, and wide enough for two large trucks, beneath ultra-modern Broadway-Crenshaw shopping center so merchandise to the stores will be delivered directly into the basements, eliminating unsightly loading and much handling

A 2,000-FOOT vehicular subway, large enough to accommodate two large trucks abreast, is a unique feature of an ultra-modern new commercial center at Los Angeles in which all loading docks, alleys and other unsightly facilities will be completely eliminated from view.

Through this underground approach all trucks receiving or delivering merchandise to the group of stores now being erected, at an estimated cost of $12,000,000, will approach from a level below the streets and will unload or load their cargoes directly at the basements of the buildings, with a minimum of handling.

Construction of the unusual sub-street artery was completed successfully by C. L. Peck, Los Angeles contractor, and at a cost of only $260,000, in the face of rather difficult water seepage and foundation problems, since underlying the area is a peat formation through which passes a shallow water-bearing stratum higher than the bottom of both tunnel and building basements.

Location

The project is located upon a newly-developed tract of 35 acres near the Baldwin Hills in southwest Los Angeles, where the Broadway Department Store has undertaken a new shopping center to serve a high-class residential area of recent growth. Architect Albert B. Gardner, who based the design upon the theory that 90 per cent of today's business comes by automobile, laid out a plan centering upon a paved plaza of approximately 10 ac., with capacity for parking 2,000 cars.

Surrounding this parking area will be grouped various business establishments —each having two frontages and all connected by a stainless steel marquee extending around both street and parking lot sides of the building. In the group with the Broadway's $2,000,000 structure will be other well-known houses including F. W. Woolworth's and Lerner Shops, all of whom will share the tunnel facilities for all movements of merchandise by truck. Adjoining the parking lot will be banking facilities, a recreation and amusement center, florists, nursery, super-service station and shops supplying all items of food and clothing.

With the movement of trucks completely separated from the flow of passenger cars and pedestrian traffic, shoppers thus will be able to drive to a single spot, park and transact all ordinary household business at one trip, with a minimum of hazard and delay.

Subway constructed first

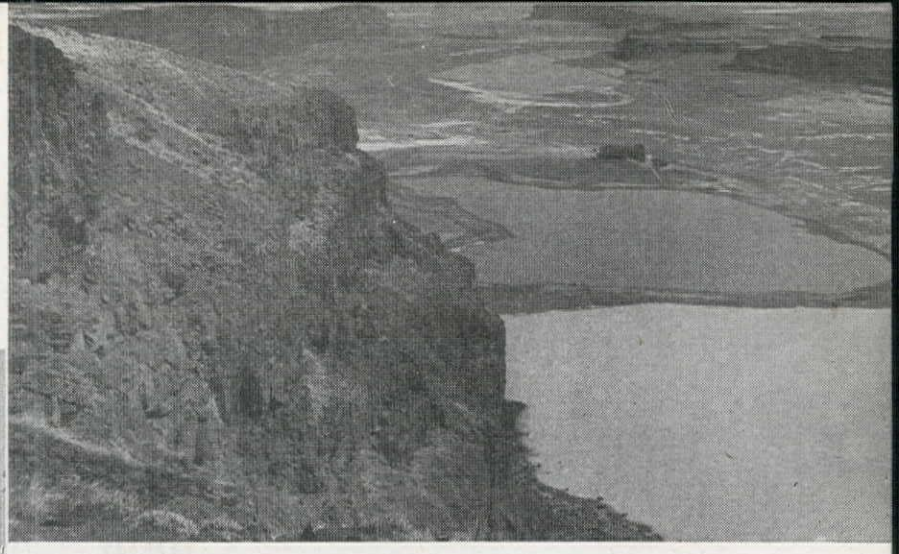
Construction of the subway was nearly completed before the first store unit, the Broadway building, was carried beyond the preliminary excavation stage. Some concern was felt regarding the spongy underlying formations and the threat of percolation of surface waters at shallow levels. The ground has a 4 per cent slope to the north. Subsurface formations include layers and lenses of sandy material, interspersed with beds of clay, impervious to water. At about 15-ft. depth is a broad water-bearing lens, with impervious material just below. At 20 to 25 ft. lies an approximately level bed of clean sand and gravel, extending to below ground water. Indications are that ground water is at a depth of approximately 80 ft.

The basement floor level is some 17 ft. below the surface, bringing it below the water-bearing stratum. Holmes and Narver, engineers for the project, were faced with the difficulty of disposing of the perched water so that it would not create a hydrostatic pressure under the basement floor, as well as on the walls, a condition that would be expensive to take care of.

Designing against ground water

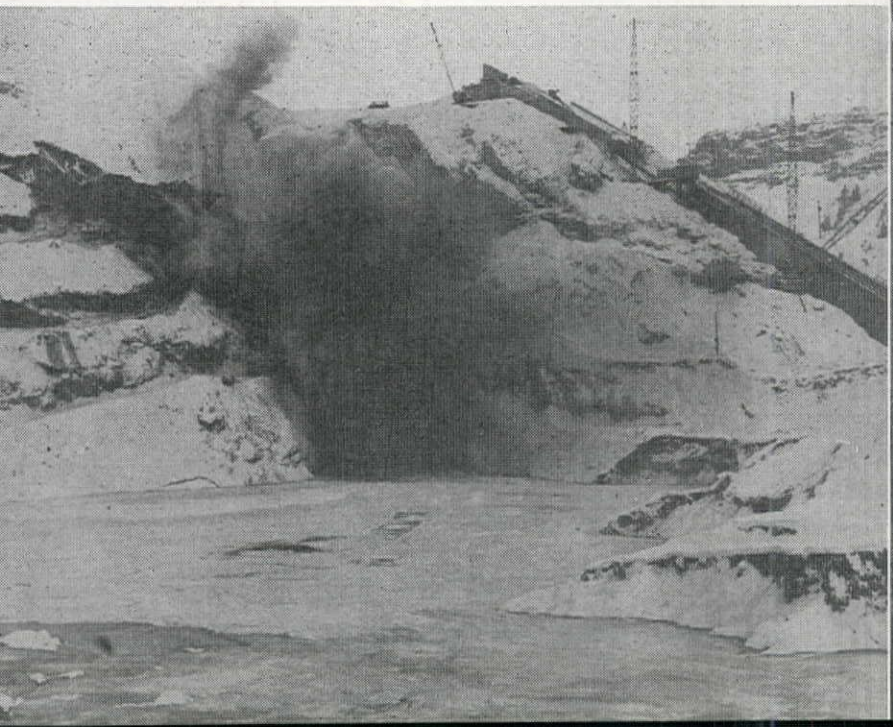
An economic analysis of various methods that suggested themselves resulted

PREPARING FOR expanded business in the coming years are Bethlehem Pacific Coast Steel Co., whose new mill depot in San Francisco is shown on top of opposite page (steel was erected in 17 days) and "M-K," with president **HARRY W. MORRISON** pointing, below, to new headquarters sign. Others are **M. C. KENNEDY**, in charge of Brazil operations; **J. A. KELLIHER**, Hercules Powder Co.



LARGEST IRRIGATION system in the United States is the Columbia Basin project planned for eastern Washington, to use water from Grand Coulee dam. In the upper Grand Coulee, an ancient bed of the Columbia river, pictured above, two dams will be built to form a regulating reservoir. The dams will be earthfill, each about 100 ft. high, and 27 mi. apart. They will store a million acre feet of water. The picture below shows a fleet of Tournapulls during construction of Camp Pendleton, Marine Corps base near Oceanside, California.

IN ORDER TO PLUG the old diversion tunnel at Anderson Ranch dam, Bureau of Reclamation structure being built on the Boise river in Idaho (see cover), a heavy flap gate was placed at the inlet portal. As soon as men and equipment could be withdrawn, a large deposit of earth was blasted into the channel to help in making the seal watertight. The gate structure for the permanent outlet works is visible on the incline above the blast. In the picture at the lower right, workmen are joining two sections of 24-in. water pipe in a ditch in Greeley, Colo. The city is extending and improving its water system.



in the decision to put footings down to good bearing in the gravel in all cases, although it meant putting footings 10 ft. below the basement floor at some points. Then, to cut off the water at the exterior walls, the depth from the gravel to the basement floor was used to accommodate a footing-beam to spread the load from columns to gravel. In effect, this became a running footing wall, which not only carried the building load, but also served as a cut-off wall against any water reaching the wall. Result is dual economy in the use of concrete for the double purpose of carrying weight and creating a cut-off wall.

Backfill outside the wall is of sand and other pervious material to a level above the water-bearing stratum. Thus, any water that might reach the wall by percolation would flow down through the pervious material until it reached the gravel, thence down to ground water. This arrangement relieves all potential hydrostatic pressure on basement walls and floor slab.

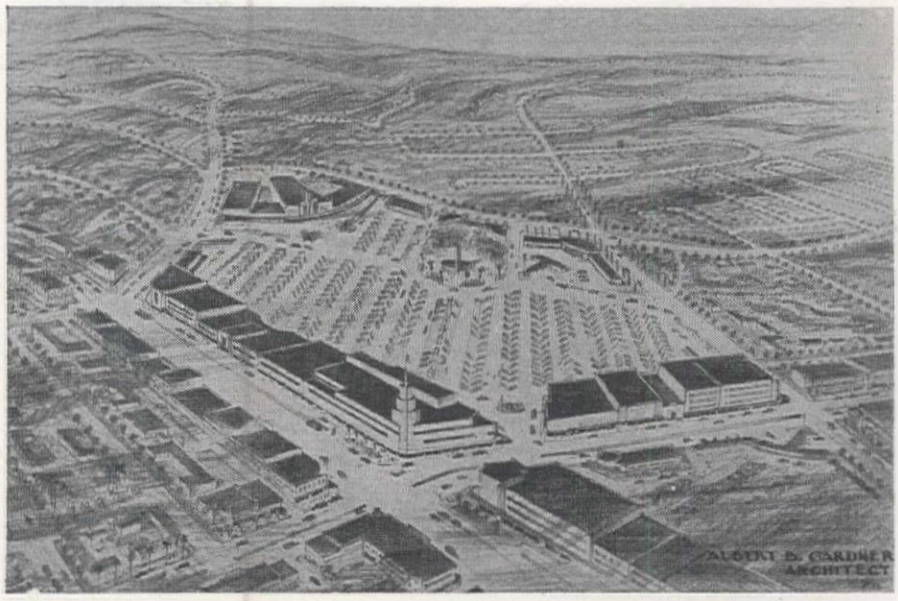
Backfill under the floor around the footings is made with the same clay-type soil that gives water seal to the floor. A sub-slab and membrane is placed under the basement floor slab for damp-proofing.

The tunnel floor is somewhat lower than the basement, providing a truck-height platform for convenient cargo loading and unloading. Thus it was unnecessary to carry the cut-off walls so far for the tunnel. This arrangement worked well for the north portion of the tunnel; but a short distance south of the end of the Broadway building it was found that the depth of the peaty area from the tunnel floor, which follows the slope of the ground, was getting past the economic point for the wall footing. Therefore the north portion underlying the tunnel was sealed off by a cut-off wall running across the tunnel, down to gravel, and the balance of the tunnel is carried on piles.

Since the new building is situated upon what formerly was a fairway of the Sunset Fields golf course, excavation and site clearance included mainly the demolition of an expensive green and several sand traps, together with the removal of many ancient and beautiful eucalyptus trees. Inasmuch as there were no space limitations, the problem of plant layout was greatly simplified. The field office, various sheds and construction shacks, and the sawmill were organized in a systematic arrangement to aid in the efficient control of material, equipment and labor.

Subway construction

Excavation for the tunnel entailed removal of 49,000 cu. yd. of soil and for the building, 38,000 cu. yd. This was accomplished with two cranes, both equipped with dragline apparatus. Similar equipment was later rigged with bottom-dump buckets and was used to place concrete in the continuous footings, the Raymond pile jackets and the floor slab of the tunnel. This operation was carried out on a continuous daily schedule to reduce costs to a minimum commensurate with the problems involved.

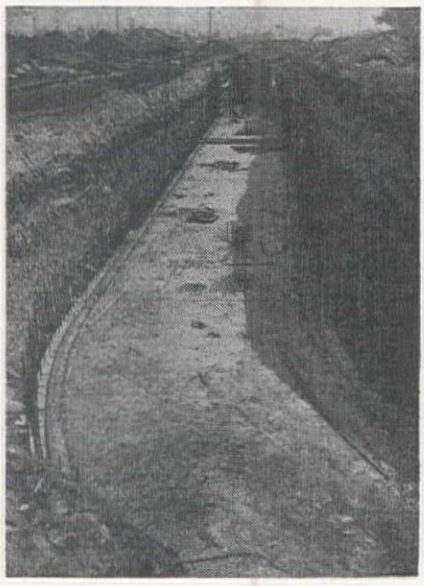


ARTIST'S CONCEPTION of the Broadway Department Store and other stores, plus a parking lot, super service station, recreation area and the surrounding neighborhood.

The structural design of the subway itself includes walls 12 in. thick, reinforced with ¾-in. bars, 5¾ in. O. C. vertically and 12 in. O. C. horizontally; a roof slab 6 in. thick, covered with a 4-in. layer of asphaltic concrete wearing surface, and supported on beams 24 in. deep and 14 in. thick, on 5-ft. centers, reinforced with six 1-in. bars on the tension side and stirrups of ½-in. steel, 14 in. O. C.; and a floor slab 6 in. thick, reinforced with mesh and with bent bars of ⅜-in. steel 10 in. O. C. as ties to the walls, the slab being set into recesses ¾ in. deep in the walls. The walls are protected from abrasion by curves constructed in the intersection of wall and floor slab.

Forms for the walls, beams and roof of the tunnel were framed in sections 180 ft. long, which required use of the forms about 10 times to construct the entire length of the artery. Exterior forms were built up in large plywood panels, while the interior forms consisted of panels sheathed with 1 x 6-in. lumber.

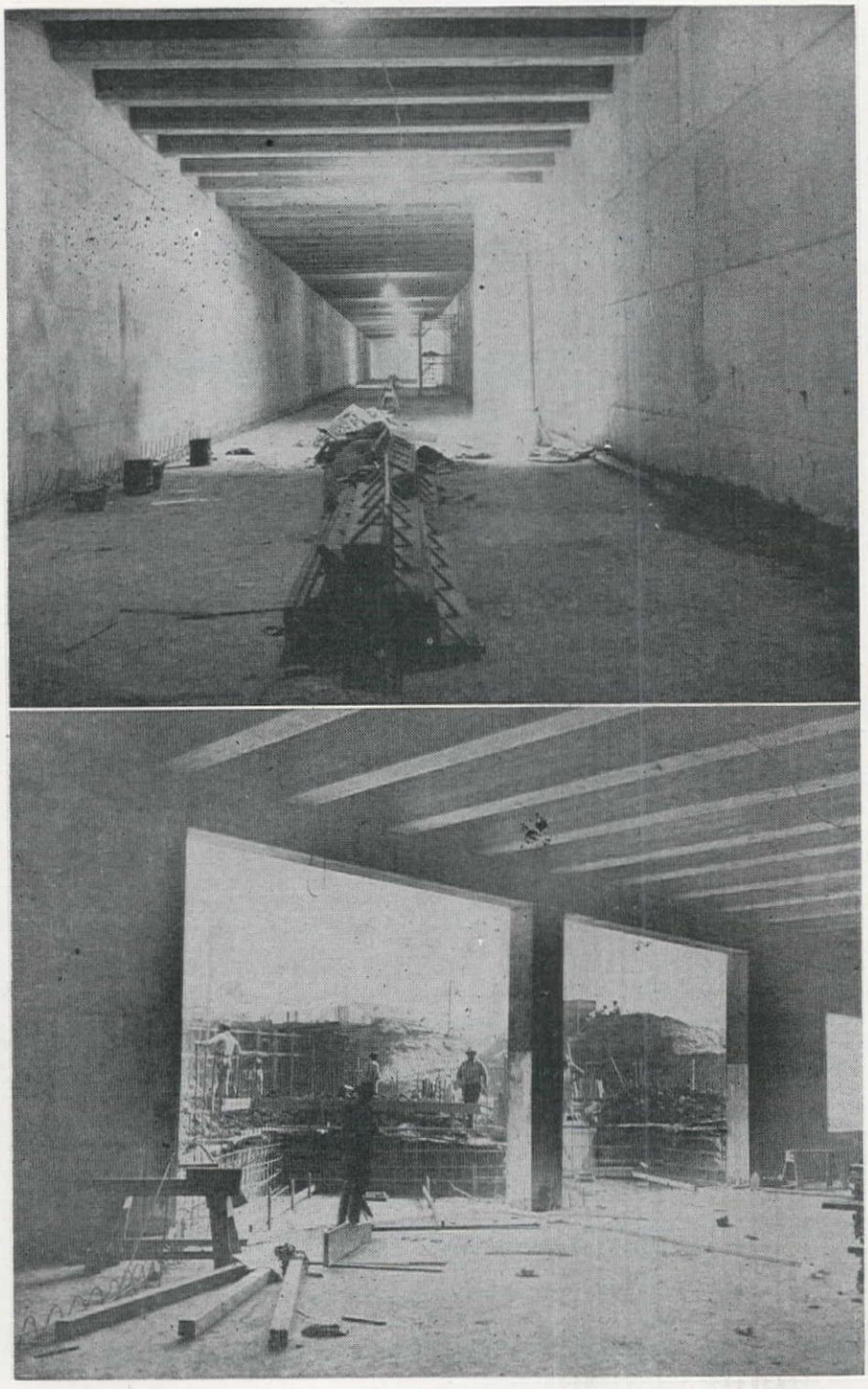
THE 6-IN. FLOOR slab, laid first, was set into recesses ¾ in. deep in the walls, and was reinforced with mesh and bent bars. Wall reinforcement in place.



Although lumber was used for forming the roof beams, sectional steel forms were used for the roof slab of the tunnel. While one entire section of the form work was being filled with concrete, another section was being stripped, re-erected, set with steel and prepared for the next pour. The entire procedure was executed on a production-line schedule to benefit by the economies of a trained crew, re-use of material and rapid, organized construction.

The tunnel was so designed as to accommodate freight entrances to the basements of any future buildings constructed along its length. During the construction, entrances for the Broadway-Crenshaw and a proposed supermarket were actually constructed, while future openings can be provided by demolition of sections of the exterior tunnel bulkhead at the proper points, allowing for piers between openings.

Construction of the building has proceeded along with the tunnel. A gigantic hole was opened and cleared for the erection of the piers, wall footings and water curtain, and depositing of the concrete leveling bed, the waterproof membrane and finally the finished basement floor slab. Before the footings were undertaken, the series of standard soil tests and examinations were made by Dames & Moore, foundation engineers, to determine the load resistance characteristics of the soil in the immediate area. These tests were used as a basis for the actual design for all foundations. The floor slab was then laid to provide a solid working platform upon which the exterior wall forms and first-floor slab forms were framed. Furthermore, the completion of the basement



THE HEAVY BEAMS which support the roof are seen as the tunnel nears completion. Entrances to the Broadway and a super-market were constructed in the wall sides, and future openings can be provided by demolition of sections of the exterior tunnel bulkhead at the proper points, allowing for piers between openings.

walls and slabs eliminated any hindrance of construction by inclement weather which might arise during the winter months.

Special features

The Broadway store will include 200,000 sq. ft. on its four floors, the lower of which will be finished in Tennessee marble, while the upper floors will be carpeted. The building will be completely air-conditioned and zoned to provide even temperatures, although exposures and temperature conditions may vary widely, particularly during special sales which attract large crowds whose body heat introduces wide variations in room heating or cooling load at different points.

In order to remove all material which might possibly soil or discolor merchandise, all air, both incoming outside air and recirculated air, will be filtered through electronic filters of the self-cleaning type. The store is protected from top to bottom with automatic sprinklers.

Subway ventilation is dependent, mainly, on an exhaust system with large fans located below the Broadway building, which is about the center of the tunnel. At loading docks there will be additional mechanical exhaust provisions to carry away fumes.

The huge parking lot will be floodlighted from four towers, one at each end of the passenger island which runs through the center of the lot, and two others to be located in the parking lot, covering a 360-deg. angle. Store illumination is of the flush type, with controlled lenses, plus fixture lights and concealed spotlights for special displays.

Personnel

Charles F. Stafford is job superintendent for the contractor, C. L. Peck, on both store and subway, and his assistant is D. A. Asher. C. L. Peck, Jr., is project manager. Lee Wilson is mill foreman. Contractor's engineer is E. McCleneghan, and H. E. Cunningham represents the architect, Albert D. Gardner.

Reclamation Surveyors Begin Klamath Research

SURVEY PARTIES of the Bureau of Reclamation have begun field work in the 12,000-sq. mi. Klamath River Basin on a comprehensive investigation of its land and water resources.

Inauguration of the reclamation study was announced by Regional Director Richard L. Boke, Sacramento, who said it will include a complete mountains-to-the-sea inventory of potential irrigation, power, flood control, fishing and related recreational possibilities of the entire basin. Headquarters for the investigation will be established in Klamath Falls, Ore., in conjunction with the existing Klamath reclamation project, which has been in operation since 1907.

The basin includes parts of Klamath, Lake and Jackson counties in Oregon and Siskiyou, Modoc, Trinity and Del Norte counties in California. Besides the main river, the survey will cover the Sprague, Williamson, Wood and Sycan rivers in the upper basin, the Klamath marsh areas and the Shasta, Scott, Salmon and Trinity rivers which are tributary to the Klamath River in the lower basin. Special attention will be given the irrigation possibilities of the Butte and Shasta valleys in Siskiyou County.

The long-range Klamath study was charted at a recent conference of Bureau officials in Klamath Falls, where it was decided that a full-fledged investigation staff will be set up in the basin before June 30. The field work and the preparation of the Bureau's comprehensive report will be the responsibility of Regional Planning Engineer S. A. Kerr, with the cooperation and assistance of Operation and Maintenance Superintendent E. L. Stephens. Engineer C. W. Burningham of the Bureau's Redding office will head the new investigation staff in Klamath Falls.

Western Projects Advanced FWA Funds to Help Planning

Cities and other agencies planning community construction are able to prepare engineering plans with the aid of Federal funds which are repaid without interest when construction begins

ANNOUNCEMENTS FROM the Federal Works Agency, Bureau of Community Facilities, in recent weeks, list numerous Western projects for which funds have been advanced to assist in preparing engineering plans. These federal funds are to be repaid, without interest, when construction is begun. By advancing these planning funds, the cities or other agencies are enabled to proceed with planning work before bonds are voted or other fiscal arrangements are completed for financing actual construction.

Western communities and the projects for which funds are advanced include:

Alaska

Anchorage has been advanced $9,000 to assist in planning two ten-classroom grade schools, estimated to cost $275,000. Fairbanks was granted $20,000 to finance preparation of plans and specifications for a senior high school and civic center, estimated to cost $883,000.

Sitka was advanced $13,750 to prepare plans and specifications for a hydroelectric plant and transmission lines, estimated to cost $518,698. Included are a dam, 5,800 ft. of tunnel, a powerhouse with two 1,000-kw. generators, and one mile of transmission line.

Arizona

Casa Grande was advanced $1,500 to design a swimming pool and bath house estimated to cost $32,300; Duncan Union High School received an allotment of $5,680 for planning a new school building, estimated at $151,000; Maricopa County School District was granted $3,400 to plan an addition to Dunbar School in Phoenix.

Williams received five advances, totaling $10,550, for laying out curb, paving and gutter projects in various parts of the city, estimated to cost altogether $290,944.

California

Alameda Board of Education was allotted two advances totaling $11,640 for a high school building to cost $316,640 and an administration building to cost $68,500; Alhambra received four advances totaling $20,250 for designing a jail, city hall and other civic buildings, which will cost in all $491,900; Berkeley received four advances totaling $2,000 for planning sanitary sewer additions costing $175,000.

Burbank has been given three allotments: $1,000 for designing a storm drain in Olive Ave., to cost $38,000; $2,000 for engineering on sanitary sewer extensions costing $73,100; and $23,885 for planning water main extensions and a public service building, estimated to cost $694,635. Brawley High School District received $9,000 for planning a school addition to cost $260,000, Chula Vista was awarded $4,800 to design a new city hall which will cost $208,000, and Compton School District three advances totaling $16,000 for planning several schools and an administrative building, to cost in all $377,500.

Clovis School District received $4,200 to plan elementary school classrooms to cost $75,000; Corning was given $6,000 for designing sewer extensions and a treatment plant which will cost $117,700.

Dixon was allotted $4,000 to design sanitary sewer extensions, estimated to cost $89,000; Corcoran received $3,600 to plan a 20-bed municipal hospital valued at $91,000; Encinitas High School District was given $5,600 for planning a school addition, which will cost $132,960; Kern County was advanced $4,250 to design a school building in Bakersfield, which is estimated to cost $100,000; and Garvey School District received an advance of $3,600 for preparing plans for facilities at Wilmar and Monterey Park, to cost $82,000.

Gridley High School District received $4,500 to plan construction of a high school estimated to cost $165,379; Guadelupe School District received two advances totaling $7,850 for school additions costing $179,250.

Hayward High School District was loaned $27,000 for planning school additions costing $630,000; Long Beach was advanced $58,750 for a fire station, garbage incinerator, and numerous other city department buildings, estimated to cost in all $1,312,300; Los Gatos has received $2,250 for planning sewer extensions, which will probably cost $186,000; La Mesa-Spring Valley School District has been allotted $16,900 for designing a school addition in each of the two towns, costing together $370,000; and Los Angeles was advanced a total of $80,240 for planning sewer extensions and an art school, which it is estimated will cost a total of $2,063,200.

Los Gatos received the following advances: $9,000, street improvements costing $168,000, and $6,600, sanitary sewer system costing $130,000; Lindsay School District was granted $12,200 for a gymnasium which will cost $223,228; Long Beach was allotted $4,650 for a building in Bixby Park to cost $109,000; Manhattan Beach School District, $8,600 for additions to the Center Street School costing $217,960, and $2,200 for additions at the Manhattan High School costing $66,920.

Merced School District received an advance of $9,000 for designing two schools, which will cost $184,000; Monterey has received $5,000 to assist in planning a new library, costing $151,557; Napa County was advanced a total of $20,000 for engineering in connection with an administration building, shops and hangar at the airport, which will cost $328,000; Nordhoff School District has been loaned $9,020 for preparing plans for two schools and alterations at Ojai, to cost $250,000; and the Oro Loma Sanitary District was advanced $17,500 for plan preparation on storm sewerage at Hayward, to cost $618,500.

Other California advances were: Paso Robles High School District, $2,750 for buildings and alterations costing $70,000; Paso Robles Elementary School District, $2,330 for various additions to cost $53,800; Rialto, $1,500 for sanitary sewer outfall, estimated at $61,000; Salinas School District, $12,800 for school additions, costing $274,830; and San Bernardino, three advances, totaling $4,800 for comfort station, health clinic, and pedestrian underpass, at a total estimated cost of $135,000.

Further California allotments were: Santa Barbara, $12,000 for a city hall addition, costing $477,000; Santa Maria School District, $8,550 for a school and a school addition, to cost $194,000; South Pasadena - San Marino High School District, $12,500 for addition to South Pasadena High School, to cost $300,000; and Tuolumne Sanitary District, $2,250 for sanitary sewers and treatment plant at Tuolumne.

Walnut School District, $2,220 for school additions to cost $55,000; Westwood School District, $910 for an elementary school auditorium costing $33,630 and $1,625 for a gymnasium costing $64,750.

Colorado

Arapahoe County School District has been advanced $22,500 to prepare plans for school construction at Englewood, estimated to cost $535,500; and Moffat County School District received $18,000 for planning a high school building at Craig, estimated to cost $465,000.

Idaho

Bellevue was advanced $600 planning extensions to the water system, estimated to cost $25,000; Pocatello received an allotment of $5,750 for additions to the sewer system and a treatment plant, to cost in all $375,000; and Salmon was loaned $4,500 for planning a reservoir and extensions to the water system, estimated to cost $147,000.

Hailey was allotted $4,250 to plan a complete sanitary sewer system which will cost $140,000; and Mountain Home was awarded $1,100 to design sewer extensions estimated to cost $31,000.

Kansas

Goodland received an allotment of $900 for sanitary sewer extensions estimated to cost $19,800 and Winona received $1,600 for a sewer system and treatment plant which will cost $45,000.

Sheridan County High School at Hoxie was advanced $6,400 for drafting plans for an auditorium, gymnasium and other additions, estimated to cost in all $171,700.

Montana

Cascade School District was awarded $12,000 to design a 22-classroom school at Great Falls, estimated to cost $583,050, and $3,213 for a high school at Simms, estimated at $90,445; Deer Lodge was granted $2,500 for a water main replacement program to cost $78,700; Helena School District received $15,000 for a junior high school plant, estimated to cost $688,600; and Plentywood received three advances: $1,814 for sewer system costing $42,487, $8,575 for street work costing $192,220, and $3,075 for water mains and storage tank to cost $71,000.

Nebraska

Cambridge received an allotment of $5,184 to prepare plans for a complete sanitary sewer system estimated to cost $114,980.

Nevada

The state of Nevada has received two advances, one of $2,000 for planning a third story to the Supreme Court building in Carson City, estimated to cost $48,940 and the other of $800 to lay out a restoration of the historical fort and stockade at Genoa; and Lander County was allotted $3,000 to design a sewer system and treatment plant at Battle Mountain, to cost $54,000.

New Mexico

Belen was given $2,500 to plan a sewage treatment plant estimated to cost $100,000; the Tingley Children's Hospital at Hot Springs was awarded $7,240 to plan various buildings which will cost $193,670; Lovington School District was advanced $3,811 for preparing plans for a gymnasium to cost $120,344, and $3,272 for an auditorium to cost $127,754; Raton received $3,200 to plan a sewage disposal plant which will cost $83,200; Santa Fe Board of Education received an allotment of $5,265 to plan a school addition to cost $125,000; and Santa Rosa received $4,000 to assist in planning a paving program to cost $110,000.

North Dakota

Minot Board of Education received a Federal allotment of $19,125 to finance planning of an elementary and high school building estimated to cost $454,875.

Oklahoma

Eldorado School District was allotted $1,560 for planning a gymnasium estimated to cost $41,640; Cameron Agricultural School at Lawton received $2,250 for a physical education building which will cost $75,000; and Elk City Board of Education received three advances totaling $2,876 for school improvements to cost $77,052.

Elk City received two advances. One of $5,103 is for planning additional water supply wells and appurtenances estimated to cost $131,190, the other of $6,349 is to plan a municipal airport, which will cost $174,043. Goodwell has received $600 to plan a $15,925 sanitary sewer system.

Oregon

Union High School District No. 11 was advanced $8,800 for preparation of plans for a second unit addition to the high school at Beaverton. A like advance was approved earlier for planning the first unit. The total cost will be $250,000.

Deschutes County School Districts received planning allotments of $6,750 for alterations to the Redmond High School, estimated to cost $160,000, and $6,280 for a grade school at Redmond which will cost $167,120; Douglas County School District received $7,100 for a high school at Myrtle Creek to cost $160,000; Malheur County School District was awarded $2,853 to plan alterations to the high school at Vale which will cost $85,000; Milwaukie was granted $4,355 for the extension of sanitary sewers which will cost $163,379; and Reedsport High School District received $5,366 for a new high school estimated to cost $165,000.

South Dakota

Faith has been allotted $2,500 to assist in designing a water supply which will cost $55,000; and the city of Wall was given $1,500 for use in designing a complete sewage collection system expected to cost $32,900.

Midland has been advanced $1,050 for plans and specifications on a new sanitary sewer system and disposal plant, estimated to cost $22,680; and Hill City received an advance of $1,750 to plan a water supply system which will cost $48,800.

Texas

Advances in Texas include: Benjamin, $3,200 for water supply line and storage tank, to cost $75,950; Crosbyton, two advances, $575 for sanitary sewer extensions to cost $25,000, and $505 for water distribution extensions to cost $22,000; Friona, $2,030 for complete sanitary sewer system and treatment plant, costing $54,600; Kingsville School District, $6,600 for new school and repairs to Austin and Lamar schools, estimated at $243,451; and Odessa, $3,620 for asphalt street paving, probably costing $108,120.

Brazos River Conservation and Reclamation District received four advances for planning a huge water resources program: $15,000 for a dam and powerhouse at Inspiration Point, estimated to cost $3,700,000; $15,000 for a dam and powerhouse at Turkey Creek, estimated to cost $3,650,000; $15,000 for similar project at Leon River, which will cost $7,910,000 and $15,000 for a dam and power plant at Lampasas River, which will cost $7,450,000.

Amarillo received $23,500 to plan a sanitary sewer outfall line which will probably cost $1,088,500; Commerce received three advances totaling $6,756 for water supply improvements which will cost $155,365; Ballinger was awarded $11,475 to design water supply extensions, estimated to cost $398,000; and Kermit received $6,943 for a street surfacing program which will cost $187,664.

Fort Worth School District received four advances totaling $13,615 for various school improvements, valued in all at $529,224; the city of Fort Worth was allotted $4,000 to design water supply improvements valued at $143,500; Mesquite, with advances of $2,135, will plan storm sewers and water storage facilities, at a total value of $46,500; Texas Technological College at Lubbock was granted $69,825 for planning men's and women's dormitories to cost a total of $2,159,975; and Three Rivers School District was allotted a total of $4,928 for a variety of school buildings costing altogether $163,698.

Other Texas planning awards were: Raymondville, two advances, $5,400 for water system improvements costing $180,243, and $2,750 for sanitary sewer improvements estimated at $86,396; Seymour, four advances totaling $8,850 for sanitary sewer extensions, storm sewer improvements and water system extensions, to cost in all $321,500; Sul Ross Teachers' College at Alpine, two advances totaling $3,450 for additions estimated to cost $136,250; and Whitewright, two advances, $759 for water system extensions probably costing $20,594, and $987 for swimming pool, estimated at $23,697.

Washington

Bellingham was granted an allotment of $5,940 to plan South Side sewer extensions estimated to cost $160,443; Cathlamet was advanced $1,600 for preparing plans for streets, curbs and drainage facilities costing $25,296; Shelton School District has received $8,407 for planning a 12-classroom school and facilities, probably costing $377,382; and Vancouver has been granted a loan of $12,500 to finance preparation of plans and specifications on storm relief sewers on the West Side, estimated to cost $711,000.

Enumclaw received an apportionment of $5,100 to design sewers and treatment plant estimated to cost $141,000; Moclips-Aloha School District was awarded $15,225 to assist in planning a grade and high school at Moclips at an estimated cost of $318,000; Seattle School District received $16,128 for an addition to its vocational school, to cost $395,499; Sedro-Woolley was granted $6,300 for a sewer system and treatment plant which will cost $204,900; and Westport was given $2,500 to extend its water distribution system, a $77,000 project.

Wyoming

Greybull has been granted an advance of $1,700 to design an earthfill waterworks dam estimated to cost $46,000, and another $8,705 for preparing plans for street improvements, estimated to cost $241,572; and Laramie was granted $7,600 to design street improvements which are estimated to cost $209,000.

What Is a Consulting Engineer?

Too many private engineers adopt the adjective "consulting" when not qualified for it, and too often engineering staffs, and employers using them, resent the retention of a consultant, not realizing the special need for him

By DONALD M. BAKER
Ruscardon Engineers
Los Angeles, California

THE CHINESE have a quaint custom of paying their doctors to keep them well. In this country we follow the same practice with our attorneys, retaining them to keep us out of trouble as well as to get us out of it. To a certain extent we are beginning to follow the Chinese custom with our doctors, but do not seem to have adopted it to any degree as regards our consulting engineers.

The term "consulting engineer" is much used and also much abused. Engineering registration statutes now existing in most states have fairly well limited the use of the term "engineer" to those properly qualified. The addition of the adjective "consulting," however, which tends to give an aura of dignity and prestige, is adopted by too many engineers in private practice whose primary activities deal with design and supervision of construction and operation, when their background and experience do not qualify them to serve in a consulting capacity.

The "consulting" engineer

The consulting engineer, from the very definition of the term, acts in an advisory capacity. This type of service may be in a specialized field where his past experience and training have given him particular knowledge, or may be of a character which calls for broad general experience, maturity of judgment, perspective, knowledge of business and a large amount of common sense.

Essentially the consulting engineer specializes in the solution of problems. He uses the engineering approach and method in arriving at their solution. He assembles and collects factual information and data, compiles, analyzes and interprets it and combining the result with the intangibles which exist in every situation, adapts the knowledge so gained to the solution. He approaches the problem on a broad front and brings to the task experience and information acquired in other situations and other places.

Too often engineering staffs resent the retention of a consultant as a reflection upon their knowledge and engineering ability, unless he be a specialist and the problem at hand calls for specialized experience outside of that possessed by the regular staff. Likewise many employers, having a regular engineering staff, consider the cost of consulting services as a needless expenditure, believing their own staff to be fully capable to handle and solve all types of problems arising in their business.

It is to be expected of human nature that individuals or members of an organization continually working on a problem will develop a sincere belief that they know more about it than some one brought in from outside. They have been living with it and devoting all of their energy and intelligence to it over a long period. Because human nature is what it is, however, it can also be expected that such individuals or organizations will over the years develop a strong tendency to "get into a groove."

Differences of opinion are compromised and, because aggressive personalities do not always have the soundest views or ideas, such compromises often fail to provide the best results. Precedents and policies become firmly established, practices and operations are followed long after they should have been modified or changed. Pressure of work or inertia prevents contact with similar activities in other places, and new developments or economies do not receive deserved attention. Situations of this character develop in efficient as well as inefficient organizations and their existence is seldom perceptible until matters become acute and the circumstances are disclosed in the profit and loss statement.

No consultant can be expected to have as complete a grasp or as full a knowledge of the business or operations of a client as does the latter or his technical staff, but it is this fact which most frequently makes the services of a consultant of greatest value. He brings perspective to the situation, he looks through the large end of the telescope and sees the forest rather than the trees. Details, customs, precedents or personalities fail to awe him and all take their proper place in the entire picture.

Securing maximum consulting value

Few clients have an adequate conception as to the proper method of utilizing the services of a consulting engineer, and for this reason seldom secure the maximum benefit from these services. The customary practice is to call in a consultant after a problem becomes acute, or to have him review plans and designs of the projects, facilities or operations after they have been made. This is better than not utilizing consulting services at all, and usually results in a fairly moderate cash outlay, but it is seldom more economical in the long run than is a more complete use of such services.

In most instances where consulting services are advisable, matters of other than technical character are involved. These usually include general organization policies, personalities, finance and economics, and historical background. Intelligent opinions and recommendations can seldom be made without a complete knowledge and grasp of these features, and it may require as much time for the consultant to familiarize himself with these as he devotes to technical matters. If he does not acquire an adequate knowledge of them, his recommendations or opinions, while technically correct, may not be completely applicable. Furthermore, changes or modifications may be indicated as a result of his investigations which are too expensive to make, which would cause undue delay in operations, or which if adopted might subject to criticism those who were responsible for the plans or operations. A couple of examples will illustrate these situations.

In a newly constructed industrial plant production was slow, and costs were high when compared with those of competitors. A consultant was called in and his recommendations involved either a rearrangement of the production line, which would have required more floor space if existing equipment were to be retained (this additional

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space being very expensive) or the installation of a different type of equipment, which could have been purchased at the outset for about the same cost as that in use.

A board of consulting engineers was appointed to review plans for the extension of a municipal water system, utilizing a new source of water for an increased supply. The project was the subject of great public interest, the increased supply was very badly needed, and a bond issue was to be submitted to the electors. The board's investigation showed that although the plans and designs for the new development had been made in accordance with good engineering practice, additional water could have been secured from the present source which would have served the community for 15 years at much less cost. Because of the delay occasioned by a complete change in plans, the urgent need for additional water, and the lack of confidence on the part of the electorate which such a change in plans would have engendered, the board decided to approve the original plans and designs submitted. In both of these instances the retention of consultants at the outset, while probably involving a greater cash outlay, would undoubtedly have proven to be the economical procedure.

A worthwhile investment

No one expects that consulting engineers should be employed unless they produce dividends upon the investment made in their services. These dividends must be substantial, closer to 600 or 6,000 per cent than to 6 per cent. They must be tangible in character, in order that the client may know that his investment has been worthwhile.

Every consulting engineer knows of many instances where his services or those of other consultants have paid handsome dividends. Following are a few instances which have come to the attention of the writer. Some have involved brief studies or investigations, while others have required much time and substantial expenditures.

A few simple changes in parking facilities and in the regulation of motor vehicle traffic saved from 20 to 30 minutes of working time for each of several thousand employees in a war plant. These employees had been starting to close down their work well ahead of quitting time in order to get to their automobiles immediately after the shift change, and thus escape being caught in the congestion then occurring.

A water company instituted a program of well and streamflow measurements and carried these on for a number of years. In an important piece of litigation the company was able to substantiate all of its claims to water, while its opponents, because of a lack of such data, which could have been readily and economically secured, lost the case.

A contractor preparing to submit a bid on the construction of a large dam employed a consulting geologist to examine the damsite. His examination disclosed a series of faults not readily apparent and not indicated in the plans. The contractor took the existence of these faults into consideration when submitting his bid. He did not secure the contract, but the successful bidder sustained a large loss on the job.

A bus transit company was having difficulty in maintaining schedules with available equipment. A consultant found that much of the delay was due to time lost in loading and unloading passengers. A few structural changes in design of doors and steps greatly speeded up schedules.

A large mining company had spent, without success, over half a million dollars in attempting to develop a process of treating certain ores. A consulting metallurgist started a research program based upon his experience in other places, and after spending half of the above sum, developed a very successful and economical process of treatment.

An investment house was negotiating a loan with a large company which was, from its statement, in excellent financial condition. An investigation of company affairs and operations by a consulting engineer, retained by the investment house, brought to light certain operating and management practices, then considered unimportant by the company, which over a period of time much shorter than the life of the loan would have placed the company in an embarrassing financial position. The trust indenture was modified, calling for a correction of these practices, saving the company future trouble and greatly increasing the soundness of the loan.

Cost of a consultant

Consultants customarily operate on a per diem fee, which may range from $100 upwards, depending upon the type of work, the money involved, the general reputation of the consultant and similar considerations, although sometimes a flat fee or a monthly or annual retainer is arranged. The per diem fee, or the flat fee for a specific piece of work, is usually less expensive from the standpoint of actual cash outlay, but a client does not get as much for his money as he does if the consultant is placed on a nominal monthly or annual retainer basis, where he can be called upon for a certain maximum time each month or year, plus a per diem rate for excess time.

When the consultant is retained for each job, either on a per diem or fixed fee basis, there is a natural tendency to postpone use of his services. The client hopes that his problem will solve itself. Approval of higher authority as well as a special appropriation must usually be secured, in order to retain the consultant. If the time required is longer than at first estimated, additional payments must be approved, and sometimes services are terminated before the job is completed. Unless the consultant has done previous work for the client, time is required for him to secure background information. Few clients realize the importance of such information, or the time needed to secure it.

If the consultant is placed on a monthly or annual retainer, usually at a rate which will involve a few days of his time each month, the fullest use of his services can and will be made. A telephone call, a short conference in his office, a trip over a plant or project, or a short time spent in the design department will always pay dividends. Frequently a day or two spent in the plant or on the job, where the consultant does nothing more than ask leading questions as to why this is done, what that is done for, etc., etc., will start the client or his staff thinking along different lines, head off problems before they arise, or cause changes to be made in designs or operations which result in economies.

Increased economy needed now

During the depression of the 1930's the major objective of most public works programs was the creation of employment, while during the war and immediate prewar period the primary objective in both public and private operations was production. In both cases efficiency and economy were secondary.

Today most engineers in private practice are busy, although their work primarily involves planning, designing and supervising construction of engineering projects or facilities. The accumulation of work which piled up during the war years is demanding their attention. Many engineers who formerly operated almost solely in a consulting capacity are now engaged in this type of activity.

We are now entering an era where the tax burden will be very heavy, and the tax paying public will demand sounder economy in public works projects. Likewise, competition will force efficiency and economy to assume a paramount position in private activities.

These conditions should revive the demand for the services of consulting engineers. They have a great field of opportunity ahead of them, and a product of unquestionable worth. Their greatest immediate problem is that of convincing potential clients of the need for and the value of what they have to sell.

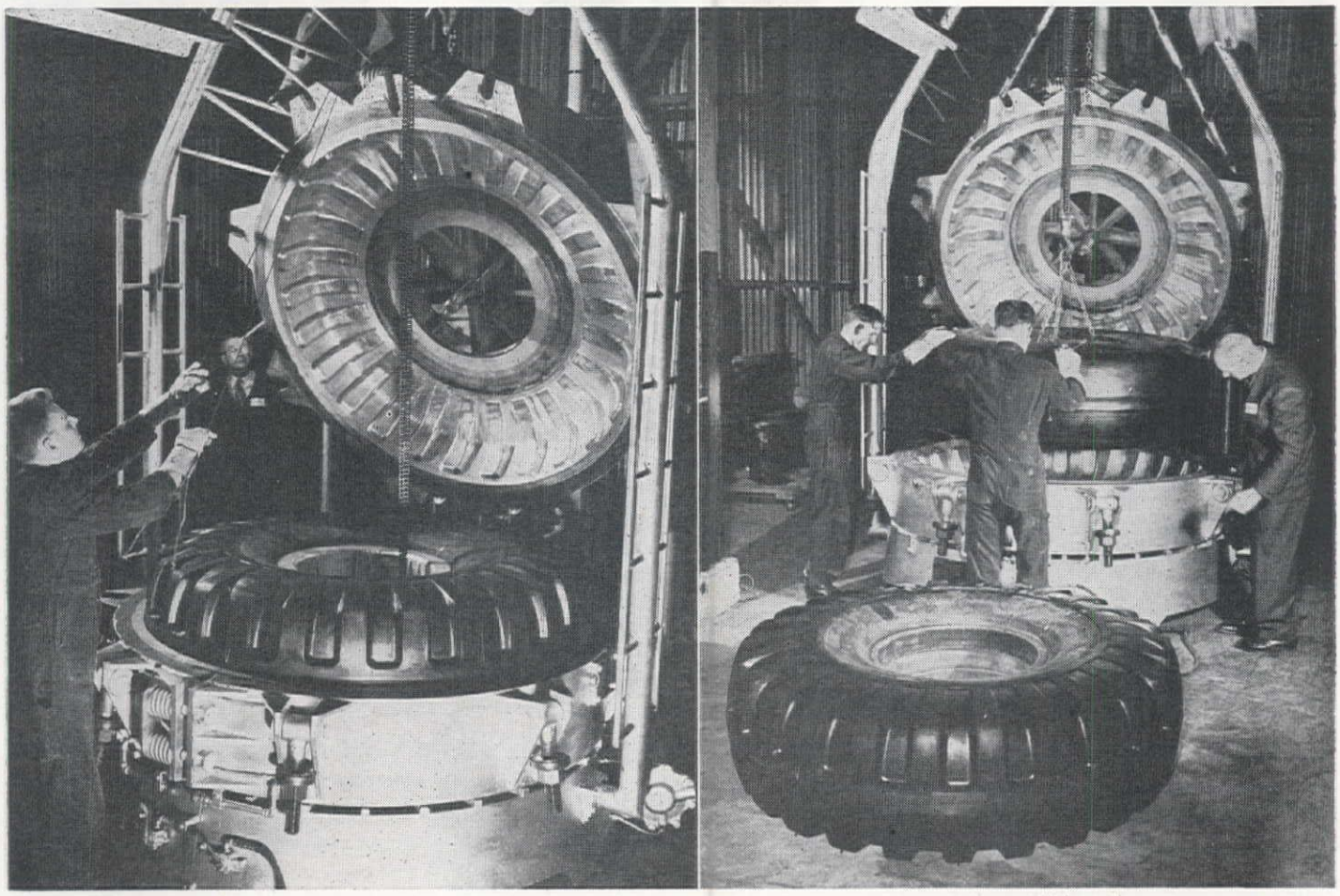
Wyoming Highways Will Get Yellow Striped Center Lines

NEW YELLOW CENTER stripes on all the main highways of Wyoming will be painted on early this summer, according to highway superintendent J. R. Bromley, who said that he expects the paint and equipment to become available soon.

During the last four years the department lined roads only at the most critical spots, using the scant material on hand, since paint and striping machines were not available during wartime. Bromley estimated that it will require 20,000 gal. of paint to restripe the 4,200 mi. of the state highway system.

Yellow paint is used in Wyoming instead of white because it shows up better in snowstorms and ground blizzards, in contrast to the state's black and near-black roads.

California Firm Retreads Huge Tire



MORE SUCCESSFUL than factory remolding, this new inexpensive method of retreading extra large tires for heavy equipment provides a tread design which is non-directional, and which is applied under the same precision standards as aircraft tires.

THE LARGEST TIRE ever retreaded in the United States, size 21.00x24, was cured in a mammoth new mold at Thompson Aircraft Tire Corporation in San Francisco early in March, inaugurating a new service for operators of off-highway equipment. This 24-ply tire, weighing approximately 1,000 lb., measures 5 ft. 7 in. in diameter and has a cross section of 21¾ in.

Prior to the installation of this equipment, operators of large earthmoving, logging, pipelaying and roadbuilding equipment shipped their larger tires back to the factory, where they were remolded. Since the original molds do not compensate for the natural growth of the tire in service, factory remolding has never been completely successful. In addition, freight costs and the necessity of having tires out of service for months discouraged equipment operators from having their tires remolded.

Plans to offer the newly announced service to contractors, engineers and municipal and industrial operators of off-highway equipment were initiated several months ago by the Thompson firm.

A new tread design was established —which is non-directional—providing great traction through mud, snow, sand, gravel or rocks, yet permitting the tire to be reversed for more uniform wear and longer service. The profile is designed to give satisfactory service on earthmover, flotation type tires.

Incoming tires are carefully examined and all injuries to the casings are located, marked and analyzed. The tire is then dried under controlled conditions, after which it is buffed and repairs made. Because the majority of repairs are later covered by the full tread, and cured at the same time as the new tread, these repairs are less costly than individually cured spots and result in a stronger tire.

A staff of 60 tire experts see that every tire coming into the plant is given special care and handling. After all repairs are made, and the new rubber is applied, treads are balanced on specially designed machines to the same precision standards as aircraft tires. This prevents pounding and rapid tread wear.

This new service is available through all tire suppliers west of the Mississippi who will ship casings to the Thompson plant, located at 18th and Minnesota Streets in San Francisco.

Group Surveys Snake River Mouth

AFTER MORE THAN five months' work along the Snake River with headquarters at Lewiston, Idaho, the U. S. Coast and Geodetic Survey party headed by Lt. Comdr. J. T. Jarman has set up new headquarters at Pasco, Wash., where the men will continue survey work up from the mouth of the river.

The precise survey, covering four and one-half miles on either side of the Snake, is being done at the behest of the U. S. Engineer Department, and is closely interwoven with projected river developments along navigation and irrigation lines.

Survey from the Pasco headquarters is expected to be completed within two months.

Lt. Comdr. Jarman said that about 65 triangulation stations were established along 70 mi. of the river course during activities centered in Lewiston. Data are to be used later by aerial mappers who are to map the course and much of the watershed of the Snake.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

Peaceful Mission of Buffalo Aids Colorado River Control

BELIEVED TO BE the first peacetime use of "Water Buffalos," Naval amphibious tanks like those that stormed the beaches of the southwest Pacific, is the adaptation of them by the Bureau of Reclamation for use in traversing swampy areas in the lower Colorado River basin. E. A. Moritz, Director of the Bureau's Region III office at Boulder City, Nevada, initiated the giant man-made amphibians into the service for river control surveys between Topock, Ariz., and Needles, Calif. This area in particular is becoming increasingly difficult to reach because of the rank tule and willow growth in the silt deposits accumulating in the upper reaches of the water impounded by Parker Dam. The deposits in this area have raised the river's level, causing the stream to spread out beyond its channel in certain places. Portions of Needles are being inundated by the encroachment of the river, for example the round table pit in the Santa Fe Railway yard and other facilities were flooded by the rising water table.

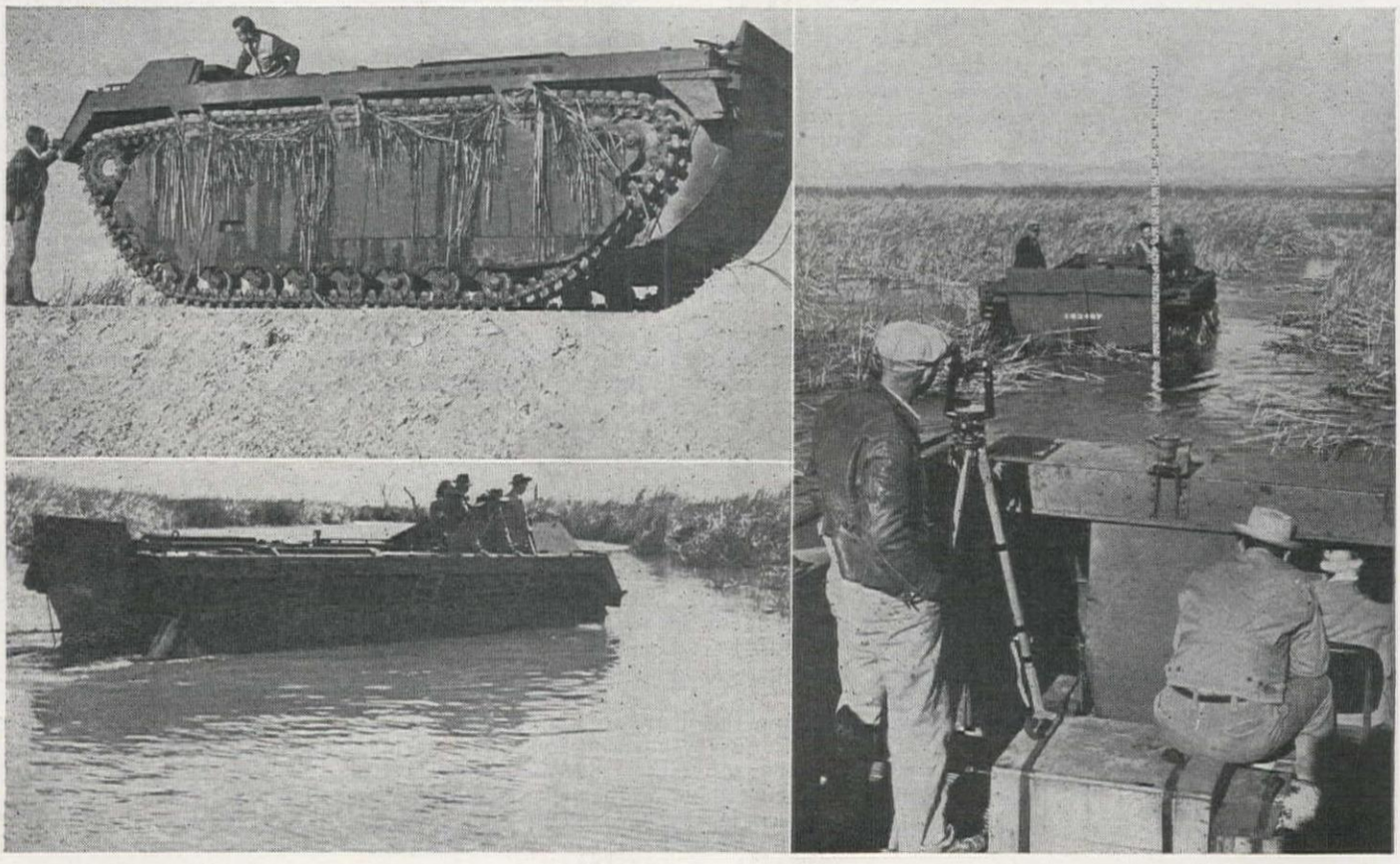
The vehicles will be used principally by survey crews to penetrate the heavy growth of vegetation over the many silt bars in the river channel. Engineer C. P. Vetter, in charge of the Bureau of Reclamation's river control work along the lower Colorado River basin, believes that the vehicles will speed up the survey work considerably. The amphibians now will carry crews to places on the river that formerly were either inaccessible or required days to reach by paths cut through the heavy vegetation.

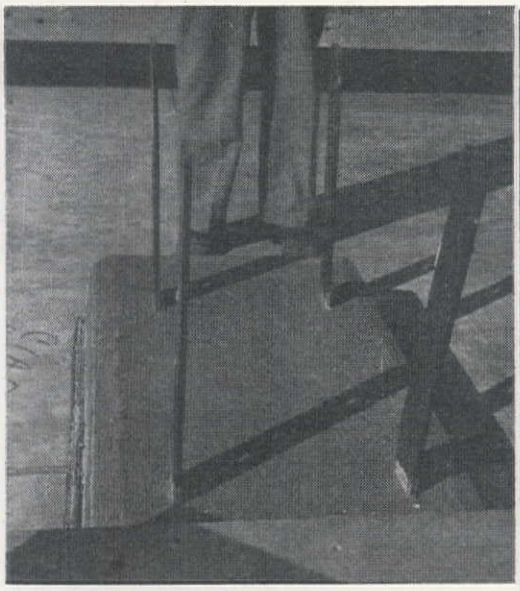
In the accompanying photographs are shown some of the Bureau's survey crews determining the extent of silt deposition and charting the course of new channels developed as a result of the silt choking the original waterways. The crews on the "Buffalos," during trips through the river's jungle when it is not always possible for them to remain in sight of each other, will keep in contact by means of Walkie-Talkie two-way radio sets. Bureau engineers pointed out that the radio communication would greatly assist the survey work. They would prove especially useful to enable the chief-of-party to direct rodmen and check observations.

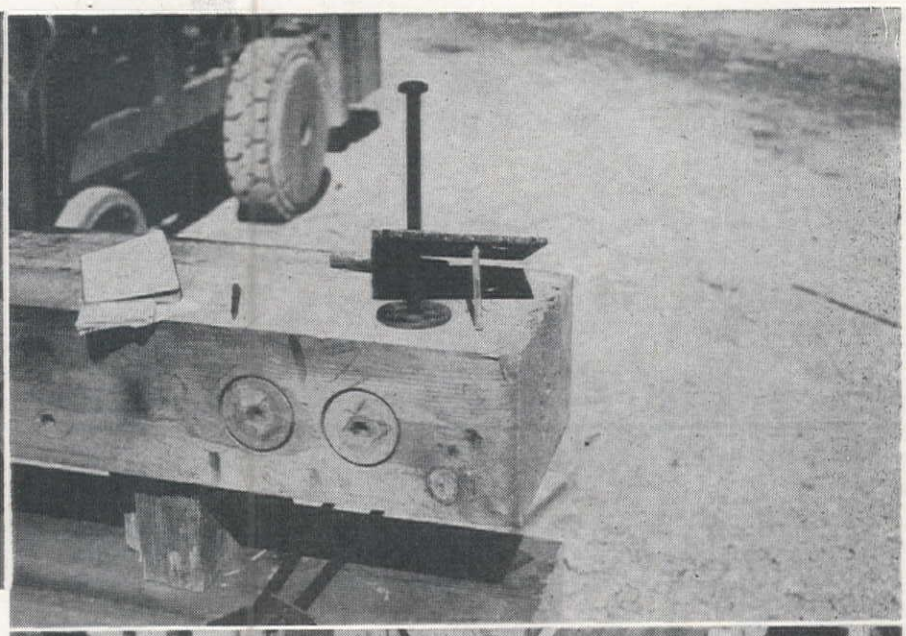
The tanks are 25 ft. long, 9 ft. wide and about 8 ft. high and can carry a cargo capacity of 8,000 lbs., which is more than ample to carry a large survey party and will allow the tanks to be ballasted to increase their stability. Powered by two 130-hp. V-8 Cadillac engines, the tanks are operated by a single driver situated in the forward cab. They can travel at speeds up to a maximum of 35 miles per hour on land and from 4 to 6 miles per hour in water. The operating controls consist of hand levers that determine the speed of the engines and steer the tank by means of controlling the motion of the two crawler type tracks.

The LVT-III, "Water Buffalos," were selected from the several amphibious types of naval craft because of the adaptability for traversing the swamp areas and heavy silt deposits.

ENGINEER C. P. VETTER, left, Chief of the Office of River Control for the Bureau of Reclamation's Region III, inspects a Water Buffalo after its trial run in the tule-choked Colorado River channel, upper left. A survey crew uses a Buffalo to penetrate the hitherto inaccessible swamp, lower left. Using two vessels, the survey crew can take field observations anywhere.







New Methods Used To Secure Columns

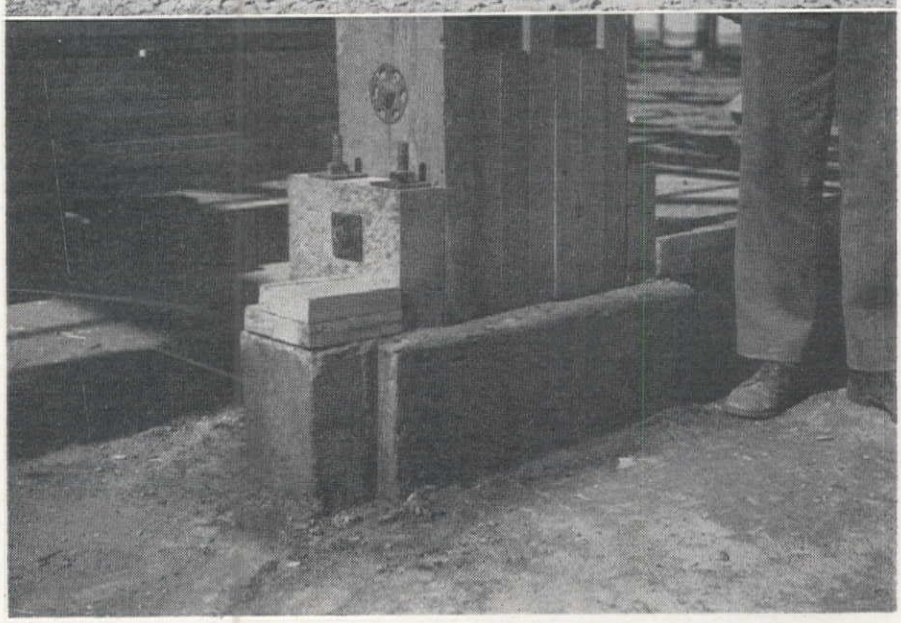
ORIGINALLY DESIGNED for use in Naval construction in the Pacific Northwest, the 3/8 x 3 x 40 in. strap iron anchors shown in the photograph, above, caused considerable time delay in erecting the timber structures used in the various Naval Depots. They were frequently bent out of shape by being struck by column members during erection, thus necessitating extra time and labor to realine them and match the holes in the timbers and metal straps.

This idea was most impractical as it is almost impossible to hold such plates in alinement in all directions and at the same time maintain correct elevation of the prebored holes which are supposed to match similar holes in the timbers.

One of the improved methods developed by the contractors operating on the several contracts was to drill and fit a steel plate to the prefabricated timber columns with "Teco" fittings and through bolts. Then, when the timbers were hoisted into position it was a minor labor to weld the plate to short sturdy anchor rods already imbedded in the concrete footing. With this method in use, construction time was cut appreciably and both the Officer in Charge of Construction and the Contractors are positive the new method of attachment is superior to the original design and eliminates much lost time and inconvenience for the erection crews. This system was used by H. B. Olson, construction superintendent for Morrison-Knudsen on their contract at the gun relining plant near Pocatello, Idaho.

An alternate method developed by W. A. Hearst, superintendent for Henry George, Spokane contractor, and used on his contract at the Spokane, Wash. Naval Supply Depot, used longer anchor bolts to secure a timber block to the concrete footing. The block was in turn secured to the columns by timber fasteners and through bolts.

Both new methods simplified the forming work by avoiding the long straps.



OLD METHOD of securing timber columns to their footings by using unwieldy strap iron anchors set in concrete, upper left. One member has been deflected, a common occurrence during erection progress. Upper right, prefabricated timber column showing timber connectors and the steel plate used for weld attachment. Completed column with plate welded to the anchor bolts, center. Alternate method used, bottom.

NEWS OF WESTERN CONSTRUCTION

APRIL, 1946

Freeze Order Applies Rigid Limits to All Construction

THE CONSTRUCTION FREEZE order issued on March 26 in response to the President's program for supplying veterans' housing is summarized as follows:

The action is designed to curtail nonessential building. The rigid restrictions apply to all structures. The government promised to speedily approve all applications for veterans to build homes. An order issued by Wilson Wyatt bans the following unless approved by the government:

1. Construction or repair work in excess of $400 on houses, including farm houses or other structures or residential buildings designed for occupancy by five families or less.

2. Construction or repair jobs costing more than $1,000 on hotels, resorts, apartment houses or other residential buildings designed for occupancy by more than five families.

3. Work in excess of $1,000 on commercial or service establishments.

4. Jobs costing more than $1,000 on farm buildings except farm houses.

5. Work in excess of $1,000 on churches, hospitals, factories, public buildings and charitable institutions.

6. Jobs costing more than $15,000 on virtually all commercial or industrial buildings, plants, or factories.

7. Work in excess of $200 on virtually any other type of structure.

Commercial or industrial structures specifically prohibited by the government include factories, plants, or other structures used for manufacturing, processing, or assembling, logging camp, pier structures, commercial airport or carrier terminal, railroad or street railway building, research laboratory, pilot plant, motion picture set, utility structures.

The order does not forbid or require authorization for the continuance of construction work already begun. It provides materials for the structure must be incorporated in it on the site or work must be going on before a project is considered to be under way.

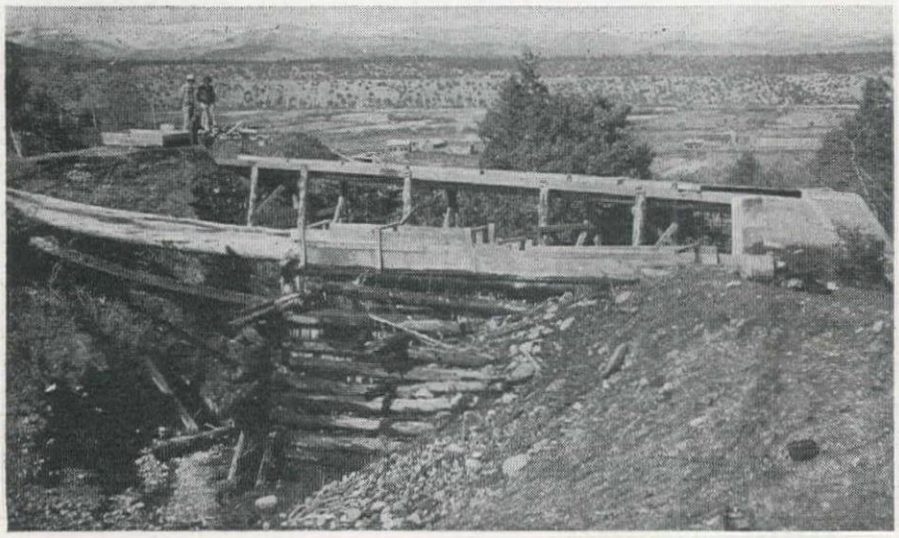
Applicants for building or repair work may appeal the decision to the Civilian Production Administration or Federal Housing Administration. The order stipulates dealers may not sell or deliver materials which he knows will be used in work prohibited by the order. No person may participate in work banned by the order.

It does not apply to painting or repapering, or to greasing or repair or installing repair or replacement parts in existing equipment where no change is made in the structure itself. Work done on roads, streets, sidewalks, railroads, or interurban or plant railway tracks or operating facilities, warehouses, silos, bridges, tunnels, subways, pipelines, power lines, sewers, service or underground mines, wells, dams, or canals is excepted from the order.

This regulation does not apply to military construction or projects of the Veterans Administration or to minimum work in disasters necessary to prevent more damage to a structure.

DECADES-OLD HOLLOWED LOG IS SUPERSEDED BY NEW METAL FLUME

NECESSARY FOR irrigation of Ojito Valley in New Mexico, water from ditches must be carried across the many arroyos and gullies. Taos Indian farmers used to hollow out trees by hand and use them as flumes, or "canoas" (foreground)—But now the trees are gone and the canoas collapse as the banks erode, so the Soil Conservation Service is building many new metal and concrete flumes to serve water to the farmers of Taos County.



Judge Decides in Favor Of General Contractor

JUDGE RALPH O. OLSON of the Superior Court of the State of Washington for Whatcom Co. recently decided in favor of general contractors that a few payments to a bank by the contractor as part of a sum due a sub-contractor, do not make the subcontract one calling for periodic payments to the subcontractor.

In the case of the National Bank of Commerce of Seattle versus Gaasland Construction Co. of Bellingham, the bank claimed that since Gaasland paid the bank $3,800 in two payments to apply on an assignment with a painter subcontractor, the company admitted that payments should be made from time to time as the work progressed, making the subcontract, in effect, one requiring periodic payments.

The painter gave 15 or 16 promissory notes to the National Bank of Commerce amounting to approximately $9,000, un-

til the bank cut off his credit and he walked off the job, leaving Gaasland to finish the painting at a total loss to the company of $8,100. Then the bank brought action against Gaasland Construction Co. for the money it had forwarded the painter.

The inference from Judge Olson's decision and the cases he cited is that if the subcontract had called for periodic payments Gaasland would have been liable to the bank for such periodic payments as were due, but the court was uninfluenced by the bank's contention that the payments on the assignment made the contract one for periodic payments. He brought out the fact that the contract was for a sum payable upon completion of the work.

House, Senate Committeemen Agree on Seven-year $500,000,000 Airport Bill

AFTER DEADLOCKING for three months, the House - Senate conferees have agreed on $500,000,000 Federal expenditure for airports. The authorization will be effective for appropriation July 1, 1946, and will remain available for seven years, the life of the Act. Not more than $100,000,000 may be appropriated in any one year. Funds will be channeled direct to local sponsors except where State laws prohibit. For immediate engineering, planning, and survey services, $3,000,000 will be provided by emergency appropriation as soon as the bill is enacted.

Public land states have a preference when more than 5 per cent of the land is Federally owned; they may receive up to 62½ per cent maximum in Federal funds. This includes larger airports. Other States share on 50-50 basis in Class I, II and III airports. The CAA Administrator may use his discretion on allocations up to 50 per cent on Class IV and V airports. Congress, however, may veto allocations when it deems they are too large. Federal money may pay up to 25 per cent for land acquisition and condemnation costs, the Administrator having authority to determine what is reasonable. Administrative buildings are included, but not hangars. No costs incurred before the enactment of the law will be defrayed.

Alaska gets $10,000,000, Hawaii, $5,000,000, and there is discretionary power to use more than 50 per cent on a Territorial airport. Government may sponsor airports in National Parks, National Forests, and National Monuments, the government to furnish land without cost. No convict labor is permitted. Veterans have labor preference, except in executive, administrative, supervisory and technical classifications.

The bill is expected to pass quickly. A fight is threatened by Sen. Owen Brewster, of Maine, who wishes the agreement to go back to Committee for further study. But his fight on the floor is not expected to have any effect.

Erection of Quonset Huts Continues At Park Despite Suit of Donor's Heir

TO COOPERATE in the emergency housing program of the Federal Public Housing Administration to furnish returning veterans with at least temporary shelters until sufficient better class homes can be constructed, the city of Los Angeles opened 640 ac. of land in Griffith Park for erection of Quonset hut type buildings. A contract was awarded by FPHA to the Baruch Corp., construction contractors of Los Angeles, to move 1,500 of the units from the abandoned Navy Seabee base at Port Hueneme and their re-erection on the ground of the old National Guard airport in Griffith Park. This is believed to be the largest single project in the FPHA's nation-wide emergency program.

When site grading was partially completed and erection of the first huts had just begun, the heirs of the original donor of the park instituted suit to stop the work on the basis that the land had been granted for park purposes only, and if used for other purposes, it should revert to the original holders. Work proceeded while the legal processes were under way, and it is expected that an amicable basis of settlement will be arrived at. At the present time, 264 units are ready for occupancy, each consisting of two bedrooms, a bath, kitchen and living room.

John F. Hickey is project manager for the Baruch Corp. and C. A. Burrell is general superintendent. Harold Davis is field engineer, Bertram Nielson is office manager, and C. O. Wilson is assistant to Burrell. Other Baruch personnel includes: Sam C. Harris, Jr., purchasing agent; James Ford, steel erection superintendent; Frank Doorly, labor foreman; Cecil Vesy, cost control engineer; Richard Bawd, assistant cost control engineer, and Chris Quigley, architect-draftsman. George Gretzinger, mill superintendent, using a converted hangar, has 10 power saws and jigs set up, and is making all partitions on a mass production basis.

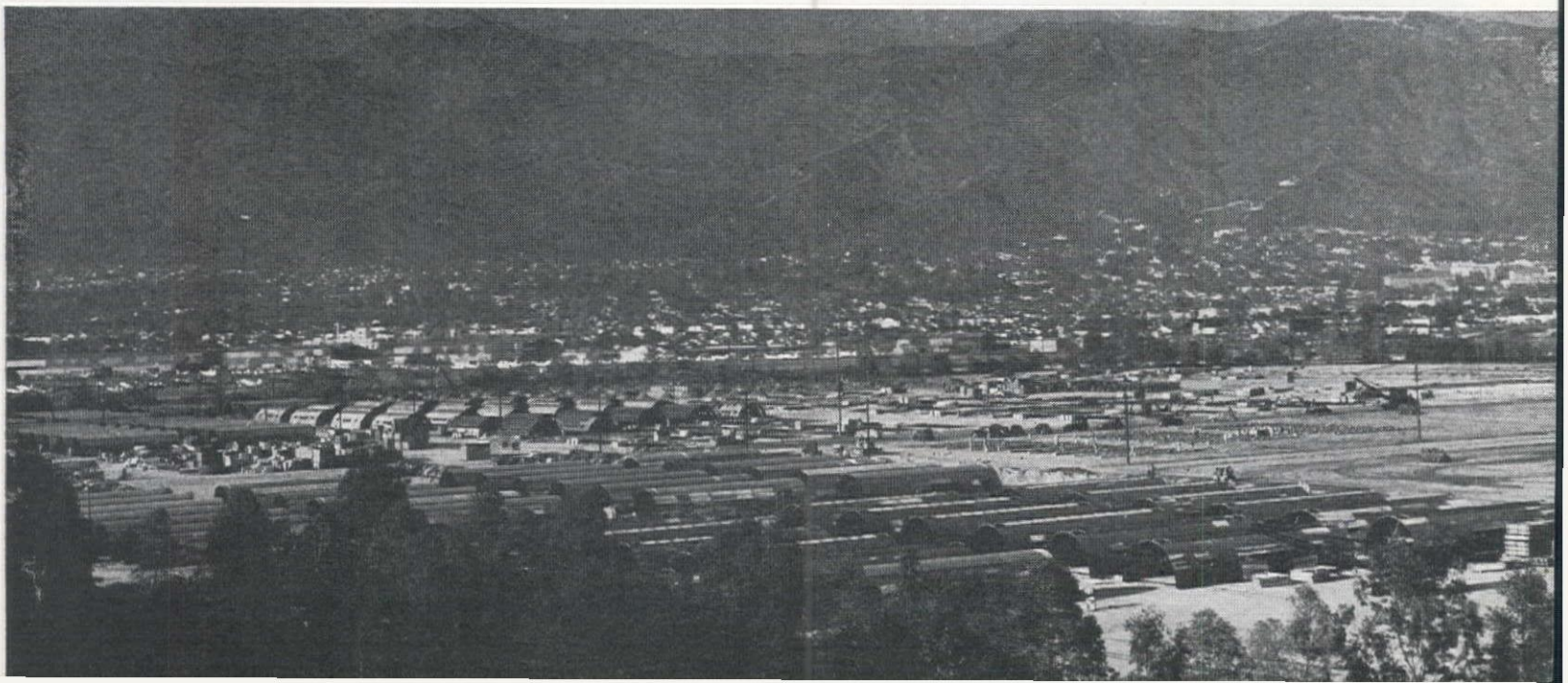
Sub - contractors include: Stetson Electric Co., Hickman & Ritter, plumbing, and Paul Manuel, painting.

GRIFFITH PARK is the site of 1,500 Quonset hut housing units allotted to Los Angeles by the FPHA and being re-erected by Baruch Corp. — The buildings were moved from the abandoned Navy base at Port Hueneme, Calif., to the disputed park site for veterans' families.

Housing Shortage Hits Peak In Alaskan War Boom Town

TWELVE THOUSAND people are crammed into housing facilities for half that number in Anchorage, which has become an Alaskan boom town.

Anchorage's rise in population, its prosperity and industry were brought on by the war. The housing shortage is now



at a peak, with more than 200 government families and countless others virtually homeless. Shacks and Quonset huts dot the city. Though hundreds leave for the United States on every southbound steamship, hundreds arrive weekly, including a number of war veterans anxious to try their luck in "the land of opportunity."

The winter problem of supplying the town with enough electric power has been extremely difficult. Lights are turned off at various times of day or night. Construction of an adequate water system is one projected improvement, and a $7,000,000 bond issue has been proposed for public works.

BECAUSE of unavoidable last-minute mechanical revisions in the make-up and printing of advertising material for this issue of Western Construction News, articles and features in the editorial section of the magazine will appear four pages in advance of the page number positions listed in the table of contents. For example, the San Diego Aqueduct article is listed to appear on page 85, but actually is found on page 81. Similar adjustments must be made for all items.

Bids Called for First Construction On Grand Coulee Irrigation System

THE BUREAU OF RECLAMATION has called for bids for driving a tunnel, 23 ft. in diameter and nearly 2 mi. long, through solid rock in the vicinity of Coulee City, Wash., and for the building of about 4 mi. of main canal and approximately 1,000 ft. of concrete siphon in that area. This is the opening construction schedule on the Columbia Basin irrigation project. The gigantic siphon, which will cross Bacon Coulee and lead directly to the tunnel, also will be 23 ft. in diameter.

Irrigation Engineer H. A. Parker said that the work items in the bid call are divided into three schedules. The first covers excavation, lining, and related work for the Main Canal from the vicinity of the South Dam in the Grand Coulee to the beginning of the siphon. The second covers the building of the siphon across the coulee and the driving of the 10,000-ft. tunnel. The third covers excavation, lining, and related work for the Main Canal from the outlet of the tunnel to a point near Long Lake.

Parker stated that the siphon will be named the Bacon Siphon and the tunnel the Bacon Tunnel. Ultimately, he explained, a companion siphon and another tunnel will be provided to carry the flow of the Main Canal.

Construction of the 23-foot tunnel through basalt will involve 216,500 cu. yd. of rock excavation, 43,400 cu. yd. of concrete lining, placing 2,570,000 lb. of reinforcement bars, and installation of 4,000,000 lb. of steel supports.

Work on the Main Canal will involve about 220,000 cu. yd. of common excavation, 1,800,000 cu. yd. of rock excavation, 5,450 cu. yd. of concrete canal lining, and placing of more than 400,000 lb. of reinforcing bars.

The Main Canal is designed to carry 13,200 cu. ft. of water per sec., an amount greater than the combined average flows of the Entiat, Chelan, Methow, Wenatchee, and Yakima rivers. Parts of the canal, he added, will be 120 ft. wide at the bottom. Some of the canal will occupy age-old channels, thus keeping construction costs to a minimum.

Building of the northerly portion of the Main Canal will result in relocation of a county road and will necessitate construction of a new bridge for the road and for a branch of the Northern Pacific Railroad. The two bridges and the road relocation are included in the bid call.

STUDYING BIDS for the first work on the Columbia Basin project are: Assistant Supervising Engineer R. B. WILLIAMS, Irrigation Engineer H. A. PARKER, Chief Clerk C. B. FUNK, and Office Engineer F. J. SHARKEY. Morrison-Knudsen Co. was low at $677,000.

Port Engineer Opposes CVA, Lauds Flood Act

SPEAKING BEFORE the Society of American Military Engineers in Portland, Ore., Maj. Gen. Thomas M. Robins, recently appointed consulting engineer for the Port of Portland, opposed the Columbia Valley Authority as subjecting the welfare of the Pacific Northwest to the whims of a three-man board and lauded the flood control act of 1944, which soon will establish an interagency commission in the Columbia Basin with representation of all states concerned.

General Robins, formerly deputy chief of engineers, and often called "the father of Bonneville dam," was in charge of North Pacific headquarters of the Corps of Engineers before 1938 and was responsible for much of the drafting of plans for development of the Columbia River Basin. He said the flood control act's requirement that income profits be turned back to the people through the Treasury is better than can be expected from a CVA board.

Work has been planned to keep the Army engineers busy for 15 or 20 years, the general said, and the only two handicaps are obtaining necessary appropriations and winning over local interests. He spoke enthusiastically of the new era under the flood control act, which allows Army engineers to develop recreational facilities on the huge reservoirs and lakes which will form back of the 15 dams of the Columbia and Snake rivers. He urged all Oregon to get together to put over necessary flood control projects.

M-K Subsidiary Starts Designs for India Dam

INTERNATIONAL Engineering Co., Inc. of Denver, Colo., a subsidiary of Morrison-Knudsen Co., Inc., Boise, Ida., is preparing designs for the $130,000,000 Bhakra Dam, Punjab Province, India, H. W. Morrison, M-K president, has divulged.

The multiple-purpose project will be constructed "some time in the future" by the Public Works Department of India and bids have not yet been called.

The proposed dam will be an immense concrete structure on the Sutlej River, about 100 mi. southeast of Lahore, Punjab Province capital.

Principal function of the project will be to impound water for the irrigation of "about 4,000,000 acres" to help augment the food supply of India. Hydroelectric power features play an important role in the construction plans, according to Morrison.

He did not indicate when drawing of the plans would be completed.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—The Southwestern Power Administration has the essence of the Thing on which the issue is joined in that subcommittee of the House Appropriations Committee which is specially devoted to irrigation, reclamation, and power. The essence of the Thing under discussion is fundamentally the essence of the basic issue always involved in any discussion of the future of our Federal Government. In the simplest terms it is the question, where does the ultimate authority lie? With the people and their representatives in Congress, or with the bureaucrats in the Administrative and Executive departments in the Capital?

A nebulous conception

In 1943, the extremely unlamented Secretary of the Interior who recently quit in a flare of bad temper, issued a Departmental Order—mark well, a Departmental Order—which brought into existence the Southwestern Power Administration. The official explanation is that the authority for the Departmental Order flows from Executive Orders 8944, 9366, and 9373, and from the Flood Control Act of 1944. These several orders, and the law made by Congress, are presumed to have bestowed upon the Secretary of the Interior duties "with respect to the Grand River Project in Oklahoma, the Norfork Dam project in Arkansas, and the Denison Dam project in Oklahoma and Texas. By these orders," apparently meaning the collective effect of the Executive Orders and the Departmental Order, "the Administration," meaning the nebulously created Southwest Power Administration, "is charged with completing the construction and the operation of the Grand River Dam project and marketing the electric energy generated at that project and the surplus electric energy generated at the Norfork and Denison projects." Under the terms of the Flood Control Act of 1944 "the (Southwestern Power) Administration has been designated by the Secretary of the Interior as the marketing agent for surplus power and energy generated at projects under control of the War Department in Louisiana, Arkansas, southern Missouri, southeastern Kansas, most of Oklahoma, and eastern Texas."

In 1943 and 1944 the Southwestern Power Administration had little significance nationally. It was obviously important to the region, as a local enterprise. The States had a fiscal as well as political interest. Its first job was paid for out of funds supplied by the Public Works Administration. Other dams and works were built by the Engineers with funds allocated by Congress for flood control and aids to navigation. In the 1945 Budget the Department of the Interior received an appropriation of $240,000 to be spent by the Southwestern Power Administration; it actually spent $274,220.40. In the 1946 Budget, the Department received from Congress for the SPA $110,000, and spent $480,000, taking the balance from funds of the Public Works Administration and from those earmarked for National Industrial Recovery, and for the Department of the Interior. Patently, the funds from the taxpayers' Treasury spent upon the Southwestern Power Administration during the first three years of its existence were in the current astronomical sense so negligible that they meant almost nothing. They were less than Federal "chicken feed."

Law on power disposal

The Flood Control Act of 1944 (HR 4485), Section 5, provides that: "Electric power and energy generated at reservoir projects under the control of the War Department and in the opinion of the Secretary of War not required in the operation of such projects shall be delivered to the Secretary of the Interior, who shall transmit and dispose of such power and energy in such manner as to encourage the most widespread use thereof at the lowest possible rates to consumers consistent with sound business principles, the rate schedules to become effective upon confirmation and approval by the Federal Power Commission."

The Southwestern Power Administration, under these powers, now has control over "14 constructed and authorized multiple-purpose dams, **and 16 additional proposed multiple-purpose dams. The SPA is developing and prosecuting a comprehensive plan for distributing and marketing power from these multiple-purpose dams.**" These words are quoted verbatim from an official declaration by the Department of the Interior. They contain the essence of the idea which is responsible for the protracted consideration by the Appropriations Committee. The comprehensive plan involves the NOT NEGLIGIBLE sum of $200,000,000 which Congress is expected to supply from the taxpayers' pockets via the Treasury. In the Budget approved by the President there is provided the sum of $23,323,000, for expenditure from July 1, 1946, to June 30, 1947, which goes beyond the concept of Federal "chicken feed." This sum is to be expended to build **steam plants to generate power, and transmission lines to retail the power and energy to the people in the Southwestern area.** The most arresting feature of the proposal is the fact that **Congress has never actually enacted any legislation which authorizes the $200,000,000 undertaking, nor empowered any one to begin the enterprise which starts with the expenditure of $23,323,000.**

Hagie pinpoints misconception

It is doubtful whether or not the Congress had any specific and clear picture of the plan until it was explained by Floyd O. Hagie, Secretary-Manager of the National Reclamation Association. In his testimony before the Committee he pointed out that the 1939 Reclamation Act provides that power generated incidental to multiple-purpose dams involves installations which presumably shall be paid for by a system of liquidation spread over a period of 50 years, with annual payments, and an interest charge of 3 per cent. Within the past year or so a dispute apparently arose between the Bureau of Reclamation and the Power Division of the Department of the Interior over the intent of Congress. The Division of Power, headed by Arthur E. Goldschmidt, contended that Congress did not intend that electrical energy should be regarded as incidental, and that Congress meant the principal of the cost for the power installations should never be repaid, but that power should pay to the Reclamation Bureau a subsidy of 3 per cent for 50 years. The issue was finally put up to the Solicitor of the Department, and after consideration he ruled that the Division of Power is right in its interpretation of the law.

When this word came to the Appropriations Committee, last year, a number of its members informally declared

LATE WIRE

AGC, UNLIKE national real estate, chamber of commerce, and building materials organizations, pledged support to Wyatt's housing program. Managing Director H. E. Foreman ended his statement saying, "The Association hopes restrictions will be administered in a realistic manner so that the emergency can be met, and other emergencies are not created through shutting off construction necessary to other parts of the economy." Neutral observers here feel Wyatt's program is essentially imperative to avoid breakdown of civilized living which might result from delay in providing housing.

Heavy construction industry in the West is apparently sitting pretty, for most heavy work is exempted from restrictions. In the East, however, a survey in 15 cities shows the prospective program was based on non-housing construction of plants, etc., and the order leaves the industry stranded, with workers unable to adapt themselves to light building work. The CPA, however, states that only about two billion dollars of work was cut off, and that gross total of all construction this year will exceed fourteen billion dollars.

Local committees of citizens with executive experience will determine the essentiality of all projects under the Wyatt program, and there is some fear that local politics may play a part since the committee must determine if the essentiality is sufficient to divert materials from housing.

that until the Department clearly understood it is the purpose of the law that the cost of the power installations be repaid in 50 years with interest at 3 per cent per year, there would be no more appropriations. A bill to clarify the muddle is now pending in Congress. A crystal-clear law apparently is required because the Interior's interpretation is the basis of the assumption that electrical power and energy, like water, is a primary element, and should be communally as free as water. The principle championed by the Division of Power wipes out the theory that electrical power and energy is incidental to the development of reclamation projects.

The position established by the Solicitor obviously was consonant with the Ickian theory of the paramount right of public ownership of electrical power and energy. It was apparently the springboard for his extraordinary action last January. At that time, without taking the taxpayers of the United States into his confidence, he laid down the principles of the national power policy. He apparently assumed his authority by reason of the presence in the Department of the Interior of the Division of Power, as well as of the Bonneville Power Administration, the Boulder Canyon unit, and the huge gross total of power produced as a by-product of the many reclamation projects of the West; also, because the Flood Control Act of 1944 provides that the War Department shall turn over its public power to the Secretary of the Interior, **"who shall transmit and dispose of such power and energy in such manner as to encourage the most widespread use thereof at the lowest possible rates to consumers consistent with sound business principles."**

Ickes was justified in perceiving more than an implication in these words that the Secretary of the Interior is expected to be the boss of the power and energy produced by public agencies. He built up his declaration of a national power policy adroitly, taking most of the substance from the TVA, and picking bits and pieces from many other laws, welding them into a consistent blend, making a whole that he then presented as the matured policy, and as the law. This Ickian Policy presumably governs the present and future of the electrical power and energy, made by public agencies from public resources, and distributed to communities, States, industries, facilities, and persons.

Collectivist power

Obviously, this incident is historically important to the West. It not only touches collectivist title to power, but the implication of the whole business goes to the roots of the fight over whether there are to be Authorities or not. The fact is eternally true that a rose by any other name smells just as sweet. Collectivism, cooperative-ism, paternalism, communism, fascism, any of the systems which makes the mass move as one in response to some superior stimulus eternally depends upon inducing many to be reluctant to follow any suggestion but that of authority. The fact that the Southwestern Power Administration program touches all forms of communal teamplay ideologies in this country is revealed by the barrage of telegrams, letters, visits, phone calls, laid down upon the members of the Appropriations Committee. These come from CIO, from PAC, from the great Cooperatives, from REA groups, from Farmers' Unionists, from public ownership advocates, from Foster's Communist group, from everything and anything that can apply pressure for the adoption of the $23,000,000 program which means initiation of production and retailing of public power in a big way. These elements perceive that victory with this program will give the collectivist movement in this country a practical momentum it has hitherto lacked.

Krug in office

The new Secretary of the Interior, J. A. Krug, is now at the controls. Credited with sincerity, common sense, and a realistic approach to his job, he has started with almost universal good will. He has made Oscar L. Chapman the Undersecretary of the Interior. The story here is that he was advised either to fire him or to advance him, and that he promoted him because he relies upon his loyalty and because Chapman knows the ropes.

You also are told that even Mike Straus, newly-appointed Commissioner of Reclamation, does not know what will happen to Mike Straus. Bill Warne, the Assistant Commissioner, went West almost exactly the day the new Secretary came into office. He visited Boise, Portland, Olympia, Seattle, Wenatchee, Ephrata, Spokane, and was scheduled to be present late in March at the meeting of the Water Resources Committee in Omaha, the first general meeting of the Reclamation field officials, under the new circumstances, where they were expected, behind closed doors, to get together in the spirit of teamplay, which was indicated by Krug as a fundamental essential of his administration.

It is known of Krug that when he took over the leadership of WPB he called his lieutenants together and asked a pledge of loyalty. As soon and as quickly as he found the pledge was a mere matter of words, most of those who apparently did not mean what they had promised were swiftly but generally painlessly eased out. Straus and others now in the Department of the Interior at one time were in WPB. Most of them left before Krug became the head. Krug is regarded as a good judge of men. In WPB he made an excellent score in placing the right and qualified person in the place where the person was needed.

He does ardently believe in the West. The Senate Committee on Public Lands and Survey gave him a thorough going over before his confirmation. He deeply impressed them with his honesty, sincerity, and intelligent candor. These excerpts from his statements are typical: "The best government is the least government; the closer you can get to the people the better off you are... I have a very profound respect for everything in our democracy because I am sure it works . . . I certainly do not think that the Authority idea is the soundest way to develop every section of the country . . . I feel strongly that the TVA was a sound way to develop the TVA area, I don't know the best way to develop the other sections, and I won't know until I have studied in considerable detail the problems which are involved . . . I think power should stand on its own feet and contribute to the project and not in any way be subsidized by the other services that are essential and go with the problem . . . If a State has rights in the headwaters of a stream for irrigation, the mere fact that you would like to have that water 600 mi. downstream for a power dam, shouldn't resolve the question in favor of depriving that State of its water . . . A State with a waterway primarily within that State might be better developed by the State, than by having the Federal Government in it at all . . . I am a firm believer in public power, because I think in many cases, not at any rate in all, it can provide power cheaper than the private operation. I am a firm believer in the policies established by Congress. I think a public official must always first carry out the policies made by Congress. When power is developed at the big Federal projects, the public group should get the preference and I would carry that intention of Congress out to the letter and with enthusiasm until it is changed by Congress . . . I don't believe the retail distribution of power should be in the hands of the Federal Government at all. I think that is the kind of problem that should be handled by local groups, communities, public power districts, or cooperatives. I don't think all of that should be in the hands of public enterprise. There are excellently run private utilities. I don't think the Federal Government has any business in the local field in telling communities what they should be doing. I think the less we have of Federal agencies telling local communities what to do, the better off the country will be."

Construction prospects

The big thing of the immediate future in the highway picture in the Capital is the President's Highway Safety Conference programmed to be held on May 8, 9, and 10, under the chairmanship of Maj.-Gen. Philip B. Fleming, Federal Works Administrator. Upwards of 35 Governors have already personally accepted. The 4,000 invitations sent out include Mayors and Chiefs of Police in cities of 25,000 and over. The State delegations include highway officials, engineers, and will be limited to 5 persons. The conference was called by reason of the President's concern at the extraordinary upsurge of traffic accidents.

The Public Roads Administration is concerned with the costs of the contracts offered for highway projects. Some misunderstanding has apparently arisen out in the country about the presumed controls set up over the bids by the Federal Government. There are no controls. Where the bids are over 35 per cent of the unit 1940 level, they must be referred to the Capital for review. No figures for ultimate goals have been set, nor is there such a purpose. The present proceeding is only for review. It is probable the field officers will soon be authorized to make

the review that now is required of the Washington headquarters. Meanwhile, it is apparent the road contractors regard the immediate future with very much uncertainty, according to all words coming to the Capital.

Alaska Highway report

The House Committee on Roads, which toured the Alaskan Highway last summer, issued its Report late in March. It declares "the final type road represents an outstanding wartime accomplishment which reflects high credit upon the Corps of Engineers, the Public Roads Administration, and the 81 private construction firms and their employees." It finds the road entirely justifiable, deems it the only practicable route, and is satisfied with the arrangement with Canada. It stresses there was no single indication of graft or corruption on the part of any official.

The reliability of the criticism of Col. Theodore Wyman, Jr., is questioned vigorously. The Committee found that much larger quantities of materials were brought into the area than were needed. The Public Roads Administration transferred $12,000,000 worth of inventory to the War Department when the job was finished. PRA also is credited with paying a very economic rental for equipment. The report especially marks that no equipment was found abandoned along the road. An investigation into the contract for the construction of the Haines Road leads to the conclusion by the committee that the charge of favoritism towards Foley Bros., Inc., and Rohl-Connolly Co., by Col. Wyman is not supported by evidence. The rates paid are reported to have been the smallest to any contractor in the area, and much below the established rates of AGC. A Joint U. S.-Canadian Committee to supervise maintenance is recommended; also establishment of tourist and hunting and fishing facilities and accommodations.

Col. T. D. Weaver Arrives in Portland To Set Up New Army Engineer Division

RE-ESTABLISHMENT of the North Pacific Division of the Army Engineers with Col. Theron D. Weaver as division engineer, has been announced. Colonel Weaver arrived from Washington on March 5 to personally supervise setting up the new office in the Pittock Block, Portland, and selection of the personnel.

Col. Weaver, who was district engineer of the Bonneville District from 1937 to 1939, at the time Bonneville Dam was under construction, said in an interview that re-establishment of the North Pacific Division is in line with the intensification of peace-time engineer activities in the Pacific Northwest and is designed to give closer coordination and detailed attention to the many important projects planned for the area.

The North Pacific Division will comprise the same area it did before with the Portland and Seattle districts, the latter including Alaska, functioning under it instead of under the Pacific Division. The former North Pacific Division was combined with the South Pacific Division to form the Pacific Division in Nov., 1942.

Col. G. J. Zimmerman, executive officer of the Portland District, will become executive officer to Col. Weaver. Roy Scheufele, recently returned from overseas duty and now on Col. Walsh's staff, will take over the post of chief administrative assistant in the division office and B. R. Wood, now in the office of the chief of engineers, will be chief of the engineering branch. There will be approximately 100 people in the North Pacific Division office, Col. Weaver said.

Col. Weaver brings to his new post an understanding of the problems peculiar to the area plus an engineering experience greatly enriched by important wartime assignments, both in this country and in the European theater. In 1939 he was ordered from his Bonneville post to Washington as chief of the Power and Fuel Division in the Office of the Under Secretary of War. A year later he was named chief of the Construction Division in that office at a time when industrial and military construction was reaching its peak.

In March, 1942, he was assigned to duty with the Resources Division of the Services of Supply. He became chief of the division in July of the same year and a month later he was promoted to the rank of brigadier general which he held throughout the war.

In Oct., 1945, when the operation he headed in Europe was transferred to military government, Weaver was ordered back to the office of chief of engineers in Washington to become director of military supply, which he left to take over the new division.

COL. THERON D. WEAVER

Californians Want More Talk on Mexico Treaty

CALIFORNIA CONGRESSMEN have organized a drive to force the State Department to open new discussions with Mexico about provisions of the United States-Mexico water treaty applying to the Colorado River which have not been clearly interpreted.

A majority of House members present at a delegation meeting agreed that the treaty requires "clarification" to protect California from what they feel may mean loss of essential water in drought years and to equalize financial burdens involved in guaranteeing Mexico 1,500,000 ac. ft. of water annually.

A number of people interpret the treaty as meaning that in drought years water will not be taken from southern California regions to fulfill treaty obligations, but that in such years the quanity and quality of water Mexico receives will be reduced. However, Mexican officials contend that they will not receive a reduced quantity or quality, since there is nothing in the treaty to indicate this. This was clearly expressed in a letter from the Mexican Commissioner of Reclamation to *Western Construction News*, published in July, 1945.

Rep. Carl Hinshaw of Pasadena, Calif., maintains that if the Mexican contentions prevail, San Diego, Los Angeles and Imperial Valley stand to suffer reductions in their drinking water and irrigation supplies. The proposed legislation would also call for reallocation of costs of Davis Dam, river improvements below the border, The All-American Canal and Pilot Knob power plant.

Under the treaty, in exchange for Colorado River waters to Mexico, water flowing into the Rio Grande from Mexico will be diverted into southwestern Texas for use there.

Arizona Okehs Tunnel To Provide Irrigation

COLORADO RIVER water will flow into the valleys of Central Arizona through the Bridge Canyon gravity route, it was decided recently by Arizona state officials, with the approval of the U. S. Bureau of Reclamation.

The projected multi-million-dollar development will take at least five years to finish and calls for revision of previous Bridge Canyon plans by increasing the height of the dam 100 ft. to 740 ft. above bedrock. This change will shorten the length of the tunnel required, provide a 100-ft. power drop at the tunnel outlet and deliver water by gravity into the proposed McDowell reservoir at Granite Reef, where another 100-ft. power drop will be utilized.

It was agreed that a canal will be built from Stewart Mountain Dam to a point on the Gila River above Florence to supplement the water supply in Casa Grande Valley, and also upstream through an exchange system, in the Safford and Duncan areas. Detailed

plans of the proposed project are being prepared by the state and the Bureau of Reclamation to obtain Congressional authorization.

For nearly 40 years Arizona has been trying to secure Colorado river water and has been the scene of recurring political battles over it. Under the agreement, Congress will be asked to authorize funds, with amounts apportioned to power development repayable in 50 years with interest at 2 per cent annually, and the portion of costs allocated to irrigation repayable in 80 years without interest charges.

The exact amount of water to be delivered to Central Arizona has not been determined yet but estimates range from 1,000,000 to more than 2,000,000 ac. ft. annually. Arizona has a contract for 2,800,000 ac. ft. of Lake Mead storage annually, plus half of any surplus existing after allocations under the Colorado River compact.

Phoenix Construction Firm's Warehouses Leveled by Fire

FIRE DESTROYED the E. W. Duhame Construction Co. warehouses and two homes on N. Central Avenue in Phoenix, Ariz., March 3, with total damage estimated at more than $30,000.

In the Duhame warehouses was more than $10,000 worth of building materials earmarked for the city's program to reconvert government barracks in South Mountain Park into 85 veteran housing units. Some of the materials, which included 10,000 sq. ft. of sheet rock, 5,000 sq. ft. of plyboard and at least 70 kegs of nails, cannot be replaced for a while.

The fire apparently started in the warehouses and was fought by city firefighters with water "borrowed" from a single hydrant on the U. S. Indian School grounds nearby.

OBITUARIES . . .

Henry Dievendorf Dewell, 65, prominent civil engineer of California's bay region, died March 20 in Oakland, Calif., after 40 years of practice.

From 1906 to 1915 Dewell practiced with leading San Francisco engineers. In 1915 he was chief structural engineer for the Panama-Pacific International Exposition, following which he opened his own San Francisco office as a consulting engineer. He has written several books and numerous engineering articles, and was well known as an authority on timber structures and earthquake resistant construction.

Dewell was a member of the California Board of Registration for Civil Engineers from 1932 to 1945, and was a member of American Society of Civil Engineers, Structural Engineers Assoc. of Northern California, Seismological Society of America, and American Concrete Institute.

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Charles Leonard, 60, partner in the contracting firm of Leonard & Slate, Portland, Ore., and **Jack Ware,** 47, superintendent for the company, were killed March 13 when their pickup truck was struck by a freight train about a mile west of Crown Point, Ore.

Leonard and Ware had been inspecting work that their firm was doing on the new water-grade Columbia River highway near the scene of the accident. Ware had been associated with Leonard & Slate for 15 years.

* * *

M. D. Cahill, 61, president of the Cahill-Mooney Construction Co. of Butte and Billings, Mont., died recently in a hospital following a heart attack. His firm's two outstanding wartime projects were construction of an Army air base at Casper, Wyo., and installation of concentrators and other facilities for chrome operations near Columbus, Montana.

* * *

John P. Forde, 73, British Columbia engineer since 1891, died recently at his home in Esquimalt, B. C. From 1933 until he retired in 1938, Forde had charge of all Dominion public works for British Columbia and Yukon Territory, with headquarters at New Westminster. One of his notable jobs was construction of the Esquimalt drydock.

* * *

Edward G. Taber, 90, chief engineer for the Spokane International Railroad since its formation, died Feb. 19 at his Spokane home. Taber was a construction engineer and locator for the Northern Pacific Railroad when it pushed its transcontinental route from St. Paul to the Pacific Coast.

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Arthur L. Wilson, 54, resident engineer for the Hells Gate project of the International Pacific Salmon Fisheries Commission, died Feb. 22 at the Hells Gate camp on Fraser River, British Columbia. Wilson served in World War I with the Royal Canadian Engineers and later was engineer for many construction projects.

* * *

George A. Linnebach, 72, cast stone cement contractor of Salt Lake City, Utah, died in February. He worked on many large projects in the intermountain west, including the University of Utah, East High School and Nibley Park Ward Chapel in Salt Lake City.

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Charles W. Purdy, 78, pioneer of the construction industry in Vancouver, British Columbia, died at his home there recently. He was associated with the firm of Purdy and Lonergen, construction engineers, till he left Vancouver in 1912. When he returned in 1919 he joined R. T. Rodgers in the construction business.

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Adolph Teichert, Sr., 91, founder of the A. Teichert & Sons Construction Co. of Sacramento, Calif., died recently at his home there. He came to work in Sacramento more than 50 years ago.

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Almon D. Bernard, 69, city electrical inspector for buildings of Pasadena, Calif., died recently in a San Bernardino hospital. Bernard came to California in 1891 and engaged in construction work in Pasadena ever since.

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Henry G. Reed, 54, building contractor of Denver, Colo., died March 12 in his Denver home, of a self-inflicted gunshot wound.

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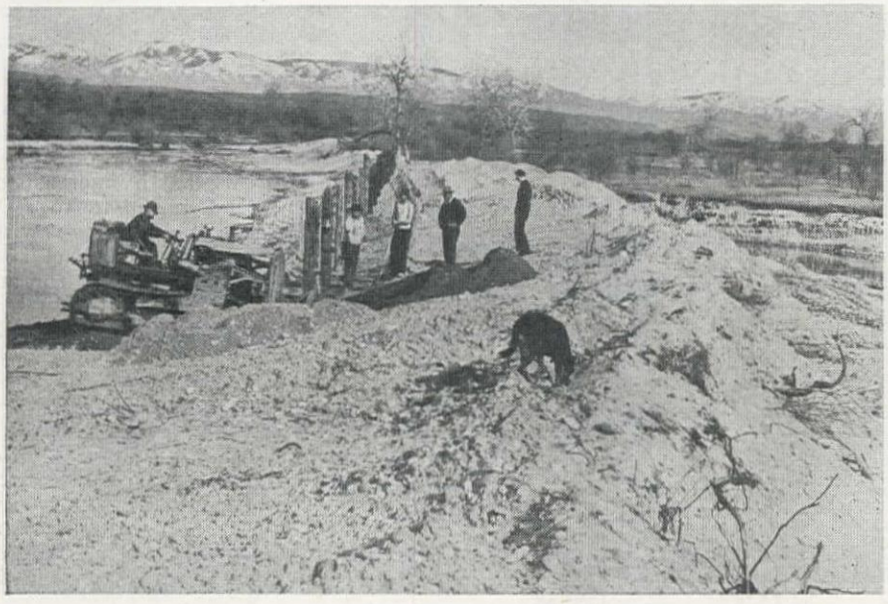
Schuyler R. Pierce, 67, died in Los Angeles last month. Pierce was engaged in building construction in Los Angeles for 26 years as an engineer.

PRISONERS BUILD NEW CHANNEL TO ELIMINATE CURVE ON BOISE RIVER

TRUSTY WORKERS from the Idaho state penitentiary farm near Boise have spent two months constructing a new channel for the Boise River to eliminate one of the worst curves, as a high run-off might cut away further embankment at the Eagle Island prison farm. At right is old channel which washed away bottom land in 1943.



PERSONALLY SPEAKING

New Officers

R. H. Baldock, Salem, Ore., was elected director of the American Road Builders Association for a three-year term. **Paul B. Rynning,** Jackson Co., Ore., engineer, was elected president of the county highway officials' division of the association; **Chris P. Fauerso,** The Dalles, Ore., was named vice president for the western district of the same division; and **F. L. Phipps,** The Dalles, and **Lew Selvidge,** Olympia, Wash., were elected directors of the highway division with terms ending in 1949. **Robert A. Allen** of Nevada was named Western vice president of the association.

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Two westerners were elected to the board of the Airport Division of the American Road Builders' Association in Washington, D. C., recently. **O. J. Porter,** engineer in the materials and research section, California Division of Highways, is vice-president from the western district, and **Arthur H. Benedict,** district engineer of the Asphalt Institute, Los Angeles, is a director, with his term expiring in 1947.

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Embert C. (Nels) Nelson, resident sales engineer for General Electric Co. in Stockton and the surrounding territory, has been elected president of the Engineers' Club of Stockton. New vice-president is **Edward D. Thoits,** sanitary engineer for the San Joaquin health district; **Ralph Brittsan,** engineer for Pacific Gas & Electric, is secretary-treasurer for the 15th year and **Frank Bellato** and **Fred Spiekerman** are on the executive committee.

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The Utah Building and Construction Congress recently elected its new officers. They are: **Raymond J. Ashton,** Salt Lake City, president; **John H. Moser,** Logan; **Ora Bundy,** Ogden; **Gilbert W. Williams,** Salt Lake City; **O. A. Spear,** Provo; **Henry H. Jones,** Sunnyside, and **Arthur Jones,** Cedar City, all vice presidents; and **R. A. Hart,** secretary-treasurer. Ashton, Moser, Bundy, Hart and Arthur Jones were elected for the fifteenth consecutive year.

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Central California Chapter of the AGC elected the following 1946 officers recently: **Robert McCarthy,** president; **Harold W. Smith,** vice-president; **Carl Gellert,** treasurer, and **William Hague,** manager. On the board of directors for 1946 are: **McCarthy, Smith, Gellert, Fred J. Early, Jr., James E. Roberts, Carl N. Swenson** and **George W. Williams.**

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Maxwelton S. Campbell, chief of the division of public health engineering in the Washington State Department of Health, is 1946 head of the Seattle Section of A. S. C. E. New head of the Spokane Section is Harold Doolittle, district engineer in the U. S. Indian Service, Spokane.

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Charles M. Smith, Thermopolis, Wyo., was elected president of the Wyoming Engineering Society at the group's 26th annual convention in Cheyenne recently. Smith succeeds **George T. Cunningham** of Cheyenne. **J. G. Smith** was elected vice-president, and **Kirby H. Olds** remains as secretary-treasurer.

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Officers-elect for the American Water Works Association will take office at the close of the organization's 1946 conference, May 10. Only nominees, and thus elected, are **Wendell R. LaDue,** president; **N. T. Veatch,** vice-president, and **William W. Brush,** treasurer.

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The Mountain Pacific Chapter of A. G. C. announced its 1946 officers recently. **John Rumsey** was elected president; **Harold Wasson,** vice-president; **Paul Fiorito,** treasurer; and **C. W. Erickson,** national director, District 1.

New Mexico State Highway Department is being staffed by war veterans returning to their old jobs. **Maj. C. O. Erwin,** former project engineer, is now assistant district engineer at Las Vegas. **Maj. Tom Mann,** also a former project engineer, is assistant district engineer at Roswell. **Lt. Col. T. G. Brown,** formerly a project and location engineer, is now engineer of road designs and urban planning. **Lt. Comdr. Marshall J. Wylie,** who was district engineer at Santa Fe, is going into private contracting business. **Maj. E. L. Stockton,** former district engineer at Albuquerque and Deming, is now doing supervisory work in the field as assistant construction engineer. **Capt. Howard Leslie** and **Tech. Sgt. Baker Flowers** are now project engineers and **Lt. Comdr. Stuart Cornett** is back designing structures.

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Production Management Engineering Associates, Inc., has been formed as successor to the industrial engineering service firm of Albert Ramond and Associates, Inc., and **Albert Ramond** has resigned. **Charles W. English** of San Francisco and Portland is president of the new firm, with headquarters in San Francisco. District and service offices will be maintained in principal west coast cities. **E. D. Hayward** of Los Angeles is vice-president and secretary and A. M. Brenne and R. L. Kron are directors.

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Col. John M. Johnson, C.E., has replaced **Col. Ross E. Windom,** C.E., as executive officer at the Los Angeles District, U. S. Army Engineers. From 1939 till the Army called him in 1941, Johnson was technical director of the New York State Division of Housing. He served for a while in the Army construction program in Washington, then in the British Isles and Mediterranean areas. In 1943 he returned to the United States and was assigned to Washington until recently.

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Lts. E. N. Johnson and **Richard Dickman,** Corps of Engineers, are now stationed at the American Technical School, Warton, England, but have organized a construction business for Oakland, Calif. Johnson & Dickman, Contractors and Builders, has recruited all of its personnel while overseas. It is a company of all young men; the operators of construction equipment and the supervisory personnel have been selected from soldiers attending the English school.

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Maxwell M. Upson has been elected chairman of the Board of Directors of Raymond Concrete Pile Co., New York, N. Y. Succeeding him as president will be **William V. McMenimen.** The firm, founded in 1897, is internationally known as extension

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FLOOD CONTROL planning along the Boise River is discussed at a recent Boise, Ida., meeting by, l. to r.: HARRY W. MORRISON, president, Morrison-Knudsen Co., Inc.; COL. ORVILLE WALSH, U. S. District Engineer at Portland, Ore.; M. J. KENNEDY, Morrison-Knudsen vice-president in Brazil; ARNOLD WILLIAMS, governor of Idaho.

contractors for government work in South America, Europe, Asia and the U. S., and is a leading foundation contractor in the country. Other appointments were **Henry C. Boschen** to the position of vice president and director; **George F. Ferris** to vice president and general manager; and **Rear Adm. Kirby Smith** to sales manager when he returns from service.

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Maj. Grant P. Gordon, former Idaho civil engineer, is returning to the Bureau of Reclamation with headquarters at Boise, Ida., after separation from the Army at Ft. Lewis, Wash. Maj. Gordon has been chief of the Engineering Division, Seattle District U. S. Army Engineers. From 1933 to 1941 he worked with the Bureau on the construction of Coulee Dam. While serving as an Army engineer he supervised construction of numerous defense installations.

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Walter F. Harcourt-Palmer was elected president of the newly-formed "Pacific Drilling Corp.," San Francisco and Oakland, Calif., a firm specializing in churn, rotary and square shaft drilling for test, exploration and geophysical borings, and industrial drilling. Harcourt-Palmer is a mining and construction engineering executive with Alaskan and U. S. experience with U. S. Smelting, Refining & Mining Co., Permanente Metals Corp., and J. D. Proctor, Inc.

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William D. Alexander and **John L. Hoffmann,** former Army engineers with overseas duty, have established an engineering service office in Boise, Ida., featuring municipal work, structural design, survey and investigations for southern Idaho and eastern Oregon. Alexander was in charge of construction of the Mountain Home air base, and Hoffmann was in charge of Army engineers at Gowen Field.

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Charles A. Jackson, Jr., has been transferred from chief of the Engineering Division, Seattle District U. S. Army Engineers, to the Mobile, Ala., Engineer District to serve as resident engineer for construction of the Allatoona flood control dam, a twenty million dollar project. After three years' military duty with the Seattle Engineers, Jackson was demobilized from the Army last November with the rank of lieutenant colonel and returned to civilian duty with the Engineers.

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R. S. Lieurance, with the combat engineers in Europe during the war, has returned to the Bureau of Reclamation and been appointed project engineer in charge of the Boysen Unit of the Missouri Basin Project in Wind River Canyon, 20 mi. south of Thermopolis, Wyo. Lieurance joined the Bureau in 1920 and was with it until 1942, with the exception of a few years when he was consulting engineer for the Republic of Mexico and with private firms.

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J. H. Fitzmaurice, concrete and asphalt contractor of Oakland, Calif., has been joined by his two sons in the business. **Robert Fitzmaurice,** formerly on the engineering staff of Standard Oil and just back from a far eastern project, is now estimating engineer. **John H. Fitzmaurice, Jr.,** a veteran of the Marine Corps with Pacific duty, is superintendent of construction.

ALLAN E. MECHAM

Allan E. Mecham of Salt Lake City, Utah, has succeeded **Mark Tuttle** as manager-counsel of the Intermountain Branch, Associated General Contractors of America. Mecham is a mechanical engineer and lawyer who formerly served as labor relations counsel for the intermountain organization. Before becoming counsel for the contractors, he served as deputy state administrator for the Utah War Finance Committee. Tuttle was manager of the intermountain group for more than 19 years.

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Edgar Kaiser, eldest son of Henry J. Kaiser, has been appointed vice president and general manager of Kaiser-Frazer Corp., with headquarters at Willow Run, Mich. Young Kaiser supervised the construction of the Bonneville Main-Spillway Dam on the Columbia River in Oregon, as vice president and general manager of the Columbia Construction Co. Then he became vice president and general manager of Consolidated Builders, Inc., and managed the completion of Grand Coulee Dam. During the war he was vice president and general manager of two West Coast shipyards of the Kaiser Co. and one of the Oregon Shipbuilding Corp.

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James S. Moulton has been appointed Executive Engineer of Pacific Gas and Electric Co., succeeding W. G. Vincent who died Jan. 29. Moulton entered the operating department of the San Joaquin Light and Power Corp. at Fresno in 1921, later was executive engineer of Great Western Power Co., and became assistant to the vice president and general manager of P. G. and E. in San Francisco in 1930 after the two former companies merged with P. G. and E. During the war Moulton served as a commander in the Navy Civil Engineers Corps.

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Col. Warren D. Lamport, director of operations at Vancouver barracks, has been appointed manager of the port of Seattle, succeeding the late Col. W. C. Bickford. Lamport served as chief of marine operations at the southern base section of the U. S. Army in England and received the Bronze Medal for outstanding performance of duty. **George Treadwell** has been promoted from assistant engineer to chief engineer of the port.

Marshall Young has been transferred from the Bureau of Reclamation's Colusa, Calif., office to Chico, Calif., to supervise operation and maintenance problems within the Sacramento Valley District. Young has been with the Bureau for more than 12 years, spending the last nine on the Central Valley Project. He helped construct Friant Dam and other work in the San Joaquin Valley. He will be assisted in Chico by **Albert W. Plummer,** just returned from two years with the Seabees. Plummer was formerly employed by the Army Engineers and has had experience on Central Valley flood problems.

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Don E. Akins of Ellensburg, Wash., is now Kittitas County, Washington, engineer, succeeding **S. J. Dumbolton,** who resigned to become assistant engineer in Spokane Co. Akins came to the area in 1945 with the Coast Construction Co. and later opened the Akins Engineering Co. and was connected with the Inland Equipment Co., for which he will still do work on his own time.

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Maj. Albert J. Bateman was recently appointed manager of the Sewer Contractors' Association of Southern California. Major Bateman served for more than three years as Post Engineer at Fort Worden, Wash. Before he entered the service, he was Engineer-Manager for the city of Lynwood, Calif., where he had been city engineer for 10 years.

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Arthur E. W. Dodds, associate member of the American Society of Civil Engineers, has joined the staff of Young & Richardson, Seattle architects and engineers. For the past four years Dodds has been chief engineer for the Weyerhaeuser Sales Co. of Tacoma, and before that he served three and a half years in the architectural department of the Bonneville Power Administration in charge of structural design of buildings.

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Rufus W. Putnam, prior to the war port engineer for the Port of Chicago, Ill., has been made head of the Los Angeles office of Kaiser Engineers, Inc. Putnam served during the war as district engineer of the U. S. Engineers in Los Angeles, supervising a tremendous volume of civil and military construction.

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Perley A. Jones, managing director and owner of the Fraser River Pile Driving Co., Ltd., New Westminster, British Columbia, has sold his interests in the company to **John B. Prevost, Peter Eckland** and **K. A. Matheson.** The firm has been in business in New Westminster since 1912, and Jones had been sole owner for the past nine years.

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Eugene L. Christian, who for 20 years has been handling diversions from the San Joaquin River as an engineer for private irrigation companies, including Miller & Lux, has been named assistant water master of the Central Valley Project, where he will assist **Martin H. Blote,** chief of irrigation operations of the Branch of Operation and Maintenance.

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R. D. Cooper, a former engineering consultant of Salem, Ore., and former city engineer at Warrenton, has joined the field

office of the Boatwright engineering and surveying firm at Cannon Beach. The company is currently engaged on the survey for filling the low ground in the main part of Nehalem, Ore.

Two new construction firms have been started in British Columbia recently. In Port Alberni, **Martha McCandless** and **Donald M. Pelley** have registered the M. & P. Construction Co.; and in Victoria, **N. T.** and **S. T. Johnson** and **K. Byberg** have joined to form the Johnson Construction Co.

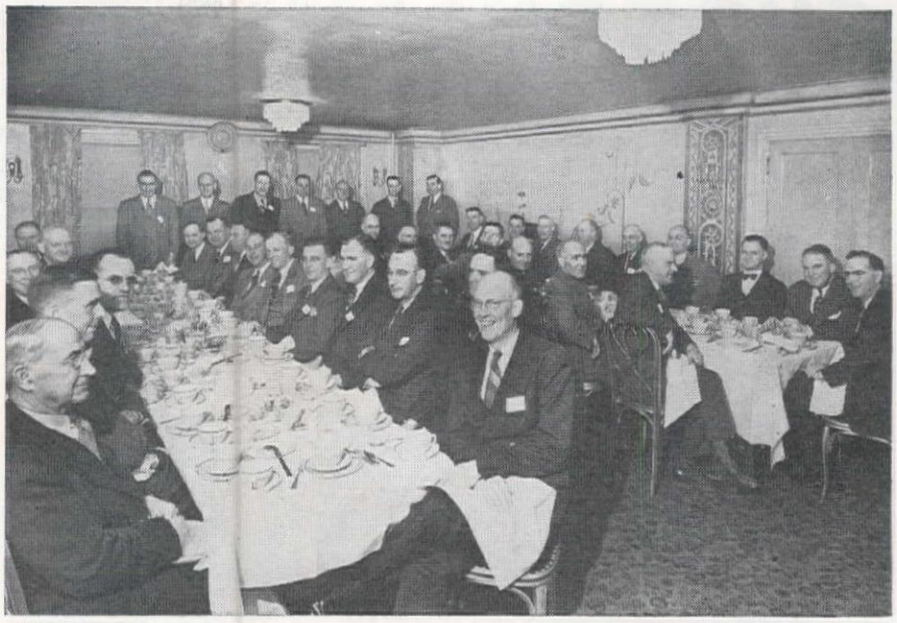
A. B. West has been appointed supervisor of the Bureau of Reclamation's Regional Branch of Operation and Maintenance and will be in charge of the Bureau's land use, settlement and irrigation operation program in Region III, Boulder City, Nev. West came to Region III in 1944 as assistant to the regional director.

Maj. R. H. Thompson, who has been executive officer of the Sacramento District, U. S. Engineers, is now deputy chief of operations in anticipation of a heavy civil works schedule this summer. **Maj. N. E. Wise** has been named the executive officer and will retain his post in labor relations work with the department.

Maj. John R. Barfield, Corps of Engineers, has retired from active duty because of injuries and returned to Portland, Ore., on terminal leave, where he has resumed general construction work with Milbrandt Construction Co., Inc. He worked on construction of bases on Biak and New Guinea.

Maurice King has been appointed city engineer for Santa Monica, Calif., succeeding **Howard B. Carter,** who resigned because of ill health. King was senior engineer under Carter and has also been appointed to serve on the planning commission.

WALTER E. JESSUP, recently returned from army service, has been named western district representative for the American Society of Civil Engineers, with headquarters in Los Angeles, Calif.



LUNCHEON MEETING at the Northwest Branch meeting of Associated General Contractors held in Seattle on March 16. Standing in back are, l. to r.: CHAUNCEY SMITH, manager, Seattle chapter; ROY JACKSON, attorney; M. P. MUNTER, new president of the branch; PAUL VERNON, past president; C. W. MATHEUS, of Matheus Lumber Co.; EARL ANDERSON and ELMER STUBBS of the Washington Labor and Industries Department.

John M. Striegler has established a building contracting firm in Kamloops, British Columbia, under the name of Striegler & Co., with **James Knight** as his associate. Striegler has been engaged in building in Kamloops for two and one-half years.

George Stevens fills the new office of city administrator of Culver City, Calif., along with his old job of city engineer. He will serve directly under the supervision and control of the city council in an administrative capacity.

A. E. Holgate, county planning engineer of Clark Co., Nev., has also been appointed advisory engineer to the Virginia and Truckee Railroad, a position without salary. Among his duties will be determination of number and places for grade crossings.

Henry Thygesen, owner of Henry Thygesen & Co., contractors of Albuquerque, N. M., has leased the Ascarate Grant sand pit in El Paso, Tex., and will operate the sand firm under the name of The El Paso Sand Products Co.

Roy T. Longworth recently succeeded **S. F. Elliott** as city engineer of Pueblo, Colo. Longworth has been in the city engineer's office for nine years, previous to which he was assistant city engineer for Detroit, Mich.

L. J. Wright and **Frank Gilkey** of Mount Vernon, Wash., have formed a firm, Gilkey & Wright, to render service as civil engineers. Gilkey was formerly assistant county engineer and Wright practiced in Mount Vernon.

Clayton W. Paige is out of the Seabees and back as city engineer of Burbank, Calif. **Harmon R. Bennett,** in Paige's position during the war, was retained in city employ and temporarily appointed planning-transportation engineer, a new position.

General Contractors James & Yost have opened new offices in Portland, Ore., and launched construction of more than $100,000 worth of work in the Union Depot and Guild's Lake areas for the Northern Pacific Terminal Co. of Oregon.

G. E. Dallemand, recently released from the Army engineers where he worked 16 months on construction of the Alcan highway, is new city engineer of Loveland, Colo.

R. J. Templeton is back from the Army and again with the Wyoming State Highway Department as construction engineer. Templeton joined the highway department in 1919.

Maitland L. Bishop, engineer of the Pasadena, Calif., City Planning Commission, was chosen to serve on the executive committee of the Los Angeles Co. Planning Congress.

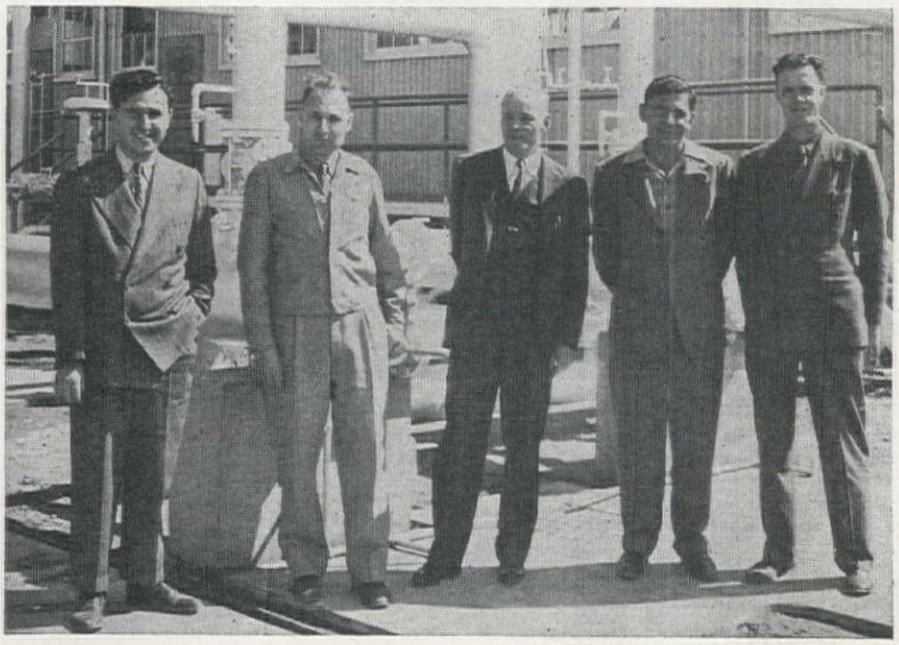
Fred L. Breckon has just resigned as city engineer of Ellensburg, Wash., after 15 years in the post. His successor has not yet been announced.

Maj. Arthur B. Sullivan has succeeded **William B. Soule** as city manager of San Mateo, Calif. Soule resigned to enter private business.

Leo Huth of San Antonino, Tex., has been named city manager of Brownsville, succeeding **O. J. S. Ellington.**

W. E. Alworth, planning engineer of Oakland, has taken over the position of city manager of Palm Springs, Calif.

SUPERVISING THE JOBS



KEY MEN for Ofcco Construction Co., Inc., Long Beach, Calif., on construction of a large compressor station being built by the firm for the city of Long Beach, are, l. to r.: M. A. NISHKIAN, chief engineer, in charge of design and construction; R. E. STEWART, process engineer; G. LEWIS, estimating engineer; JULIUS HERRMANN, job superintendent; and C. B. ENGLISH, general superintendent of all Ofcco work.

O. H. Lillard, civil engineer, is office engineer in charge of the central division of the San Diego Aqueduct, a Navy construction job. Lillard is stationed in the Vista office, about 40 mi. north of San Diego. **Charles Clapp** is superintendent of tunnel construction for Grafe-Callahan Construction Co. and others, who are jointly driving the Poway, Firehill and San Vicente tunnels in the southern division of the aqueduct. **H. E. Clark** is resident engineer, **Oscar Benson** is shift boss and **Mike Roych** is tunnel superintendent there. **W. C. Terrill,** formerly doing gold mining near Auburn, Calif., is construction inspector for the Navy on the Firehill and San Vicente tunnels. **K. A. Clark,** project manager for J. S. Barrett, subcontractor for construction of Rainbow tunnel of the aqueduct, is assisted by **Sam Ross** as tunnel superintendent. On the southern division of the aqueduct, **H. J. Dickison** is resident engineer. In charge of the El Cajon concrete pipe casting yard for the American Pipe and Concrete Co. is **C.M. Mead. Al Denton** is yard boss and **L. R. McKinney** is in charge of transporting the pipe from the yard to the aqueduct line.

* * *

J. A. Webb is project manager for McLaughlin Construction Co. of Livingston, Mont., one of the contracting firms working on the Deschutes canals in Oregon. **Frank I. Gronski** is superintendent, **R. L. Anderson** is office manager and **Sig Mahlum** and **Ralph Scheline** are carpenter foremen. **Kenneth R. Cater** and **Joe Blickle** hold another of the Deschutes contracts and are doing the general supervision and mangement. For them **Mark Monroe** is foreman on lateral excavation, **Tom Monroe** is mechanic and **K. F. Gipson, Fred Heller, E. H. Mason** and **Horace Case** are other foremen.

* * *

Keith Wasson is superintendent on the Friant-Kern canal work that Peter Kiewit Sons' Co. of San Francisco is doing in Fresno Co., Calif. **J. Lester Brown** is job engineer, **Herb Mardelon** is office manager, **D. O. Kelly** is structure superintendent on the western division, **S. J. Hamby** is shop superintendent, and **Marion Mohr, C. B. Schmidt** and **A. M. Willis** are all foremen on the job.

* * *

A. W. Meyer is job superintendent on construction of a 12-storeroom building Womack Construction Co. of Phoenix, Ariz., is building for $120,000 at 16th St. and Thomas Rd. in Phoenix. **Jim Tharp** is carpenter foreman; **Tom Gibbs,** concrete foreman; **William Kircher,** timekeeper, and **Cliff Shields,** purchasing agent.

* * *

George W. Cole is superintendent at the new yard and hot plant covering four acres on the site of the old Timber Erectors property on Alameda St., Wilmington, for the Griffith Co. **Bill Crocker** is office manager on the job.

* * *

George M. Stiers, superintendent for the Amis Construction Co., is acting as general superintendent on the Canton Dam project in Oklahoma for C. F. Lytle Co. and Amis Construction Co., joint contractors of Canton, Okla., for the dam. Assistant superintendent in charge of grading is **P. C. Royer,** and in charge of concrete is **Ken Mosher.** Chief engineer for the project is **Ralph Milliron.** All of these men were recently discharged from the Navy.

* * *

M. E. Diddier is job superintendent for Louis C. Dunn on the United Rexall Drug building in Los Angeles. **Roy Willard** and **Henry Sweet** are assistant superintendents, **C. H. Ormiston** is carpenter foreman and **W. H. Whelan** is office manager. **Bob Ray** and **R. H. Laws** are superintendent and foreman, respectively, for the subcontractors, Raymond Concrete Pile Co.

* * *

Otto Herman and **Al McEachern** are job superintendents on the removal and disposal of two seaplane ramps, the dredging of three million cu. yd. of material and the construction of a breakwater and timber groin at Bremerton, Wash. General Construction Co. of Seattle is doing the work for $776,000.

* * *

J. C. Norris is construction superintendent for A. R. McEwen of Sacramento, Calif., on the sub-contract from Peter Kiewit Sons Co. on Friant-Kern Canal, near Friant, Calif. **E. O. Evans** is grade foreman and **J. H. Raymond** is master mechanic.

* * *

C. E. Blakley is superintendent of structures for Clifford A. Dunn of Klamath Falls, Ore., on the construction of canals, laterals and drains in the Coppeck Bay area of the Tule Lake division of Klamath reclamation project. A joint contract for $145,-558 for the job is held by the Dunn firm and Slate Construction Co., Klamath Falls.

* * *

W. E. Munson is job superintendent for the E. W. Elliott Construction Co. of San Francisco on the $79,870 steel beam span bridge and the 1 mi. of grading and surfacing the firm is constructing at Freeman Gulch in Kern Co., Calif. **Harvey Case** is assisting Munson.

* * *

Alfred J. Hyde is job superintendent for The Cascade Contractors, Inc. of Seattle on construction of a 420-mi. transmission line and rural electric distribution system in Douglas Co., Wash. The job will cost $408,034 and **Lyle Nugent** is foreman and **Robert W. Austin** field engineer.

* * *

James Carter is supervising construction of a $100,000 auto sales and garage building at 28th and Crenshaw Blvd. in Los Angeles, for Noel M. Calhoun, contractor of that city. **R. C. Hinton** is the estimator on the job and is also in charge of purchasing. **Samuel B. Jones** is field superintendent.

* * *

H. C. Erling has been appointed job superintendent for Northern Improvement Co., of Fargo, N. Dak., on a $334,231 contract for stabilized base, bituminous surfacing, etc., on State highway from New Salem, N. Dak., west, according to **J. L. McCormick,** president of the firm. The firm also was awarded a contract for $505,-214 for similar work on 23.8 mi. from Glen Ullin, N. Dak., west.

* * *

John Shea is superintendent and **Harvey Vann** is assistant on the absorption gasoline plant Bechtel McCone Corp. is building

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SEATTLE 4 . . . 3410 First Avenue South

DALEY BROS. of San Francisco and PAUL SPENCER of Los Angeles are moving 1,450 housing units from Washington and Oregon to cities and schools near Los Angeles. Daley personnel are, l. to r.: WALTER H. MAXWELL, Seattle area superintendent; MORRIS DALEY; PAUL STEPHENS, project manager for the $2,250,000 undertaking; JOHN P. DALEY; CHARLES C. MacCLOSKY, Portland area superintendent. Other personnel active on the contract, but not shown in the above picture, are: WM. H. ADAMS, Los Angeles area superintendent; and WM. H. CARR, co-ordinator.

for General Petroleum at Burrel, Calif. **Earl Lindauer** is pipe fitter general foreman, **Lynn Sweet** is rigger general foreman, **W. Gould** is carpenter foreman, **C. A. Rowley** is electrical foreman, and **Tom Walker** is chief material man.

* * *

Otto Christensen is general superintendent for United Construction Co. of Portland, Ore., on a canal being built at the Deschutes Project in Oregon. Foremen on the job are **J. W. Wulf, W. H. Patterson, Clarence Burmeister, Charles W. Sheppard, George Green** and **O. Hogen.**

* * *

J. E. Stark is job superintendent for C. T. and W. P. Stover of Claremont, Calif., on the $340,000 reinforced concrete dormitory the contractors are building for Pomona College. **G. Perry Hack** is project manager on the job.

* * *

Carl Hansen is general superintendent and **William Belger** is his assistant for Wm. P. Neil Co., Ltd. of Los Angeles, general contractors on the naval ammunition depot going up at Hawthorne, Nev. **G. H. Leigh** is contract-manager.

* * *

Milton Shedd is superintendent on the new Ford Ave. Freeway in Wilmington, Calif., for the United Concrete Pipe Co. of Los Angeles. **Les Freeman** is superintendent for subcontractor Proctor & Kuhn of San Francisco.

* * *

J. H. Beale is superintendent on a canal being built as part of Oregon's Deschutes Project. W. C. Thompson of San Francisco is the contractor and the foremen are **W. M. Bailey, Harry Thompson, George Rodman** and **Ray Walters.**

* * *

Nicholas Shuga is superintending construction of two 22-family frame and stucco apartment buildings that H. S. Lamb of Los Angeles is building for $100,000 on N. Commonwealth Ave. in Los Angeles. **H. S. Lamb** is general superintendent and in charge of purchasing.

* * *

M. E. Apgar is with the Utah Construction Co. of San Francisco in El Dorado Co., Calif., as job superintendent on the grading and surfacing of 3.4 mi. of highway. **O. E. Cox** is office manager for the $260,925 job.

* * *

H. S. Robertson of Kansas City, Mo., is superintendent on a grain elevator and feed mill Jones Hecttelsater of Kansas City is building at Eugene, Ore. **Vern Maddox** is assistant superintendent and **Glenn K. Stevens** is general foreman.

* * *

Lee Arnold is job superintendent on the $500,000, three-story and mezzanine J. C. Penney store building that MacDonald, Young & Nelson of San Francisco are constructing at 1st and Santa Clara Sts. in San Jose, Calif. **Ken Gooding** is engineer.

* * *

Ed Ferguson is with J. H. Thomas & Beyer Construction Co. of Los Angeles as job superintendent on the Mitchell building on American Ave., Long Beach. Steel superintendent is **Victor Newton** and architect's representative is **William H. Brown.**

* * *

Glenn Eades is superintendent for the Rogers Construction Co. of Tillamook, Ore., on the rock crushing project the firm has undertaken at Klamath Falls, Ore. **Jack Weaver** is resident engineer and **William Riley** is foreman.

* * *

Roger Reed is master mechanic at the field shop of Stolte, Inc. at Fairfield-Suisun airport. **Martin G. Illgen** is shop foreman and other members of the Stolte gang are **Marvin Miller, James Gallen, A. L. Averett, Harry G. Porter, Elmer C. Baker, Carman D. Spencer, Richard A. Elston, Isaac H. Reynolds** and **Leo J. King.**

* * *

Charles Burrell is with Baruch Corp. of Los Angeles as job superintendent on the erection of 750 Quonset huts into 1,500 housing units for veterans in Los Angeles' Griffith Park. Project manager on the $3,081,000 FPHA job is **John H. Hickey.**

* * *

Charles Mason is job superintendent for Fred D. Kyle on the N. Oceanside overhead at Oceanside, Calif. Assistant superintendent there is **Jim Sidal** and resident engineer is **W. V. Cryderman.**

* * *

Chris Yonlick is supervising the clearing of 30 mi. of right-of-way for the Chehalis-Olympia 230-kv. transmission line in Washington. **K. M. Simpson** is office manager and Morrison-Knudsen Co., Inc. of Seattle holds the contract for $136,070.

* * *

Cris Krebiel is supervising construction of a $100,000 theater and store building that Los Angeles' Bard Construction Co. is building at 9th St. and 3rd Ave. in Upland, Calif. Chief engineer for the project is **L. A. Smith.**

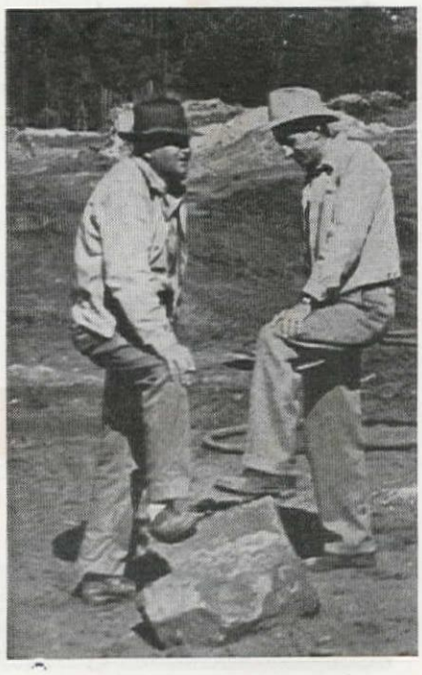
* * *

R. J. Stempel is project manager of the market he is building in Richmond, Calif. **Lawrence Lopez** is foreman. Lopez is also superintendent for Stempel on a project of 100 homes at Walnut Creek.

* * *

J. K. Long is superintendent for Todd Building Co. of Eugene, Ore., on the Skinner Butte Homes in Eugene. **Herman Berg** is superintendent of the firm's $74,444 Seaside Hospital and **Russell Sheridan** is

DISCUSSING handling of heavy rock on the San Diego aqueduct, now under construction, are, left, FRED CHERRY, drill foreman for S. A. Healy Co.; H. J. DICKISON, Navy resident engineer.



HARRY L. McCARTHY, shovel operator, and B. C. PETERSON, oiler, move their shovel onto an excavation job in Benedict Canyon, Beverly Hills, for L. E. Dixon, contractor of Los Angeles, Calif.

supervising construction of the Willis Small feed mill.

* * *

Gene Finn is job superintendent for Haas Construction Co. of San Francisco on construction of $183,674 worth of additions to the water system at the Alameda, Calif., Naval Air Station. **Clarence Troop** is job engineer.

* * *

T. H. Schaefer is superintending construction of the Wolf Creek, Ore., highway that McNutt Bros. of Eugene are building for the state. **Ira McNutt** is project manager and **Glenn E. Roberts** is resident engineer.

* * *

J. E. Oakley, formerly with Oakley & Sons, contractors of Salinas, Calif., is general superintendent for Carl Overaa of Richmond, Calif., on construction of a store building in Richmond.

* * *

Jerry Kelly, Jr., is job superintendent on construction of a $60,000 business block building at 1614 E. McDowell Rd., Phoenix, Ariz., being built by J. W. Lillywhite Construction Co. of Phoenix.

* * *

Sheldon Modglin is project manager on the packing plant M & K Corp. of San Francisco are building on San Leandro Blvd. in Oakland. **Oscar Koskella** is construction superintendent, **Rudolph Buhlman** is carpenter foreman, **Carney Hartman** is labor foreman and **Raymond Boyd** is office manager.

* * *

C. C. Montag is project manager on the powerhouse the Bureau of Reclamation has contracted C. J. Montag & Sons of Portland, Ore., to build at Cove, Ore. Foremen on the project are **George Berry, Sander Lundmark** and **Earl Taylor.**

* * *

Jack Barker is job superintendent on a super market, W. S. Harding of Eugene, Ore., is constructing at Elmira Junction, north of Eugene.

UNIT BID SUMMARY

Highway and Street...

Arizona—Mohave County—Bur. of Reclam.—Streets, etc.

Charles J. Dorfman, Los Angeles, Calif., with a bid of $214,251, was the low bidder on construction of streets, sidewalks, gutters, water, sewage and drainage facilities at the government camp to be built at the site of Davis dam, about 35 mi. west of Kingman. The unit bids were as follows:

(A) Charles J. Dorfman.....$214,251
(B) W. S. Ford..... 217,118
(C) Vinson Construction Co..... 235,791
(D) Green-Mears Construction Co., and R. R. Hensler 242,712
(E) Utah Construction Co. $267,280
(F) Fisher Contracting Co..... 310,714
(G) N. P. Van Valkenburgh Co..... 313,455
(H) Haddock Engineers, Ltd. 371,213

(1) 70,000 cu. yds. excav. for sts. and highways.
(2) 2,900 cu. yds. excav. for ditches and culverts.
(3) 1,400 lin. ft. excav. and backfill of sewer pipe trenches, 4 ft. deep or less.
(4) 1,400 lin. ft. excav. and backfill of sewer pipe trenches 4 ft. to 6 ft. deep.
(5) 1,650 lin. ft. excav. and backfill of sewer pipe trenches 6 to 8 ft. deep.
(6) 2,400 lin. ft. excav. and backfill of sewer pipe trenches 8 to 10 ft. deep.
(7) 2,200 lin. ft. excav. and backfill of sewer pipe trenches 10 to 12 ft. deep.
(8) 250 lin. ft. excav. and backfill of sewer pipe trenches 12 to 14 ft. deep.
(9) 150 lin. ft. excav. and backfill of sewer pipe trenches 14 to 16 ft. deep.
(10) 10 lin. ft. excav. and backfill of sewer pipe trenches over 16 ft. deep.
(11) 11,300 lin. ft. excav. and backfill of water pipe trenches.
(12) 1,225 cu. yds. excav. for structures.
(13) 800 cu. yds. excav. for leaching field.
(14) 1,200 cu. yds. backfill around structures.
(15) 400 cu. yds. tamping backfill around structs.
(16) 40,000 cu. yds. compacting fill for streets and highways.
(17) 400 cu. yds. excav. in borrow pits.
(18) 25,000 sta. cu. yds. overhaul.
(19) 300 sq. yds. dry rock paving.
(20) 25 cu. yds. dumped riprap.
(21) 8,200 cu. yds. gravel or crushed rock for base course surf.
(22) 300 M. gallons watering base course.
(23) 15,000 gal. asph. material for prime coat.
(24) 3,050 cu. yds. gravel or crushed rock for surface course.
(25) 58,000 gal. asph. material for surface course.
(26) 49,000 sq. yds. surface course.
(27) 8,500 gal. asph. material for seal coat.
(28) 170 cu. yds. coarse sand for seal coat.
(29) 50 cu. yds. gravel or crushed rock for surface course.
(30) 10 cu. yds. coarse sand for seal coat.
(31) 120 lin. ft. 15-in. concrete pipe.
(32) 230 lin. ft. 18-in. concrete pipe.
(33) 410 lin. ft. 21-in. concrete pipe.
(34) 130 lin. ft. 24-in. concrete pipe.
(35) 60 lin. ft. 30-in. concrete pipe.
(36) 190 lin. ft. 36-in. concrete pipe.
(37) 9 ea. inlets or catch basins 6 ft. deep or less.
(38) 7 add. ft. inlets and catch basins, each additional foot over 6 ft. deep.
(39) 3,000 lin. ft. 4-in. clay sewer pipe and fittings for sewer lines.
(40) 1,780 lin. ft. 6-in. clay sewer pipe and fittings for sewer lines.
(41) 2,500 lin. ft. 8-in. clay sewer pipe and fittings for sewer lines.
(42) 1,600 lin. ft. 10-in. clay sewer pipe and fittings for sewer lines.
(43) 20 lin. ft. 10-in. cast iron soil pipe for sewer line.
(44) 1,050 lin. ft. 4-in. cast iron AWWA pipe and fittings for sewer line.
(45) 36 lin. ft. 8-in. cast iron AWWA pipe and fittings for sewer line.
(46) 19 ea. sewer manholes 6 ft. deep or less.
(47) 70 addl. sewer manholes, each. addl. foot over 6 ft. deep.
(48) Lump sum. connecting existing sewer line to Manhole No. 5.
(49) 2,650 lin. ft. 4-in. clay sewer pipe for leaching field and backfilling trenches.
(50) 400 lin. ft. 6-in. clay sewer pipe for leaching field and backfilling trenches.
(51) Lump sum, constructing manhole "A" in leaching field.
(52) Lump sum, constructing septic tank.
(53) Lump sum. constructing sewage pump house.
(54) 1,500 lbs. installing sewage pumps.
(55) 80 lin. ft. 4-in. asbestos cement water pipe and cast iron fittings.
(56) 4,650 lin. ft. 6-in. asbestos cement water pipe and cast iron fittings.
(57) 3,200 lin. ft. 8-in. asbestos cement water pipe and cast iron fittings.
(58) 2,200 lin. ft. ¾-in. lead or copper serv. piping.
(59) 550 lin. ft. 1-in. lead or copper service piping.
(60) 500 lin. ft. 1½-in. lead or copper service piping
(61) 150 lin. ft. 2-in. lead or copper service piping.
(62) 80 ea. ¾-in. lead or copper water service connections.
(63) 8 ea. 1-in. lead or copper water service conn.
(64) 4 ea. 1½-in. lead or copper water serv. conn.
(65) 4 ea. 2-in. lead or copper water serv. conn.
(66) 80 ea. ¾-in. curb stop and serv. box assemb.
(67) 8 ea. 1-in. curb stop and serv. box assemb.
(68) 4 ea. 1½-in. curb. stop and serv. box assemb.
(69) 4 ea. 2-in. curb stop and serv. box assemb.
(70) 18 ea. fire hydrants and connections.
(71) 14 ea. street washers.
(72) 1 ea. 4-in. gate valve and valve box assemb.
(73) 12 ea. 6-in. gate valve and valve box assemb.
(74) 3 ea. 8-in. gate valve and valve box assemb.
(75) Lump sum, erecting 65,000-gallon water tank.
(76) 1,200 lin. ft. conc. in combined gutters and curbs.
(77) 63,000 sq. ft. conc. in sidewalks, gutters and combined sidewalks and gutters.
(78) 20 cu. yds. conc. in culvert head walls.
(79) 75 cu. yd. conc. in water tank foundation.
(80) 45,000 lbs. furn. and placing reinf. bars.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	.55	.60	.7481	.35	.50	.50	1.00	.61
(2)	.75	.78	2.18	.80	1.00	2.00	2.50	2.65
(3)	.45	.36	1.03	.52	.55	.71	.60	.74
(4)	.65	.53	1.05	.67	.90	1.05	.70	.95
(5)	.75	1.00	1.07	.72	1.25	1.42	.80	1.15
(6)	.85	1.40	1.15	.92	1.75	2.25	1.00	1.40
(7)	1.15	1.50	1.23	.97	2.40	2.96	1.25	2.05
(8)	2.00	1.80	1.49	1.80	3.00	4.60	1.75	2.20
(9)	3.00	2.20	1.80	1.80	3.50	5.80	2.00	3.70
(10)	5.00	2.50	6.25	2.50	4.75	6.40	4.00	4.00
(11)	.50	.31	.53	.52	.60	.55	.60	.75
(12)	1.35	1.90	1.83	2.76	1.75	5.50	3.00	2.55
(13)	2.50	2.00	1.45	1.39	1.00	1.50	1.50	.86
(14)	.60	.60	1.06	.34	.50	.72	.75	.95
(15)	1.75	.60	1.11	5.32	1.25	3.35	1.50	1.55
(16)	.15	.32	.11	.20	.25	.15	.40	.19
(17)	1.00	1.31	1.13	2.00	.50	1.00	1.00	.86
(18)	.02	.035	.013	.03	.02	.03	.03	.04
(19)	2.50	2.10	10.48	2.50	4.00	3.20	5.00	7.35
(20)	5.00	4.20	20.68	12.00	3.50	6.25	15.00	19.20
(21)	1.85	1.95	2.35	2.20	2.40	2.50	4.50	3.25
(22)	2.00	1.50	2.75	4.50	2.50	3.70	2.50	4.50
(23)	.16	.12	.13	.15	.20	.16	.20	.183
(24)	1.50	2.21	2.15	1.50	2.50	2.88	4.50	3.35
(25)	.15	.12	.13	.12	.20	.16	.20	.185
(26)	.10	.28	.12	.10	.50	.66	.25	.15
(27)	.15	.13	.13	.15	.20	.16	.20	.19
(28)	6.00	6.30	7.50	10.00	3.00	7.55	6.00	7.70
(29)	1.50	2.20	3.00	1.50	2.50	3.35	4.00	7.70
(30)	1.50	3.30	4.80	8.50	2.50	3.90	6.00	7.70
(31)	2.45	3.27	2.90	2.65	2.75	3.50	2.50	7.15
(32)	3.10	4.30	4.00	3.30	3.50	4.67	3.50	6.75

(Continued on next page)

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Cate Equipment Co., Salt Lake City 4
Liberty Trucks & Parts Co., Denver 1
Coast Equipment Company, San Francisco 1
A. H. Cox & Co., Seattle 4, Washington
Bunting Tractor Co., Inc., Boise, Twin Falls, Gooding, Fairfield, and Burley, Idaho; LaGrande, Oregon
Connelly Machinery Company, Billings and Great Falls, Montana
Sanford Tractor & Equipment Co., Reno, Nevada
The Mountain Tractor Co., Missoula, Montana
The Tractor & Equipment Co., Sidney, Montana
P. L. Crooks & Co., Portland 10, Oregon
Lee Redman Company, 2020 West Grant St., Phoenix, Arizona

(33)	4.20	5.35	5.00	4.05	4.50	8.45	4.00	7.15
(34)	6.50	7.60	7.00	6.40	5.50	9.88	6.00	10.50
(35)	8.30	9.90	11.00	8.27	7.75	14.00	7.00	13.80
(36)	10.55	12.85	12.00	10.54	9.00	17.30	12.00	17.50
(37)	250.00	188.00	245.00	269.00	240.00	430.00	200.00	500.00
(38)	40.00	23.00	27.50	48.00	50.00	20.00	20.00	55.00
(39)	.85	.75	.74	1.22	.85	1.15	1.60	1.70
(40)	1.30	1.11	.88	1.34	1.00	1.30	1.70	2.20
(41)	1.50	1.38	1.11	1.47	1.50	1.50	1.80	2.40
(42)	1.80	2.13	1.42	1.77	2.00	1.80	2.00	3.30
(43)	4.00	7.50	7.10	4.00	7.50	4.75	4.00	8.00
(44)	1.85	1.75	1.92	2.02	1.70	5.20	2.25	3.70
(45)	2.60	4.16	4.75	4.00	5.00	8.20	3.25	8.60
(46)	250.00	162.00	217.40	250.00	400.00	338.00	200.00	500.00
(47)	30.00	15.00	31.00	34.00	40.00	23.00	20.00	75.00
(48)	300.00	10.00	187.50	110.00	200.00	37.00	50.00	260.00
(49)	1.40	.89	1.14	1.55	.85	1.00	1.80	3.00
(50)	2.20	1.28	1.73	1.67	1.00	1.80	2.10	3.35
(51)	440.00	495.70	501.00	685.00	175.00	700.00	250.00	230.00
(52)	$4,100	$3,000	$3,970	$8,000	$6,000	$6,000	$2,000	$8,500
(53)	$4,500	$1,981	$4,686	$9,800	$8,400	$7,800	$5,000	$11,000
(54)	1.00	.07	.26	1.65	.20	.35	.20	.19
(55)	1.40	1.19	3.05	1.70	1.25	1.55	2.00	3.50
(56)	1.70	1.56	1.37	1.94	1.55	1.63	2.50	3.20
(57)	2.25	1.98	1.92	2.50	2.15	2.40	3.00	4.15
(58)	.35	.41	.48	.77	.65	.63	1.25	2.30
(59)	.45	.51	.68	.82	.75	.70	1.30	2.50
(60)	.60	.71	.98	1.02	1.00	.90	1.50	2.65
(61)	.80	.91	1.96	1.29	1.20	1.75	2.10	3.45
(62)	13.70	11.70	9.17	10.80	8.00	7.10	15.00	85.00
(63)	20.25	17.60	2.11	17.50	9.00	14.00	18.00	90.00
(64)	4.00	32.20	3.16	21.00	10.00	17.00	20.00	155.00
(65)	4.50	34.20	3.31	21.00	11.00	24.00	25.00	162.00
(66)	8.50	16.10	11.40	19.80	14.00	13.35	15.00	86.00
(67)	9.90	17.20	13.00	22.80	14.00	24.50	16.00	88.00
(68)	20.70	22.50	29.37	33.00	20.00	38.50	20.00	150.00
(69)	27.00	31.50	35.56	33.00	20.00	47.50	25.00	160.00
(70)	150.00	161.50	206.75	200.00	200.00	230.00	150.00	320.00
(71)	55.00	35.00	27.77	51.50	17.00	25.00	100.00	75.00
(72)	50.00	37.00	90.00	64.50	25.00	65.00	35.00	145.00
(73)	60.00	57.10	76.98	71.50	55.00	73.00	50.00	180.00
(74)	100.00	74.65	138.00	95.50	70.00	97.00	70.00	235.00
(75)	$4,387	$6,000	$11,043	$7,500	$7,500	$13,920	$1,000	$13,000
(76)	1.65	.82	1.59	2.00	1.25	2.25	1.50	2.70
(77)	.40	.30	.30	.60	.50	.60	.35	.64
(78)	50.00	28.50	40.87	70.00	50.00	105.00	60.00	150.00
(79)	40.00	27.50	27.82	56.00	35.00	47.00	50.00	57.00
(80)	.10	.105	.087	.10	.10	.09	.12	.15

California—Los Angeles County—State—Paving

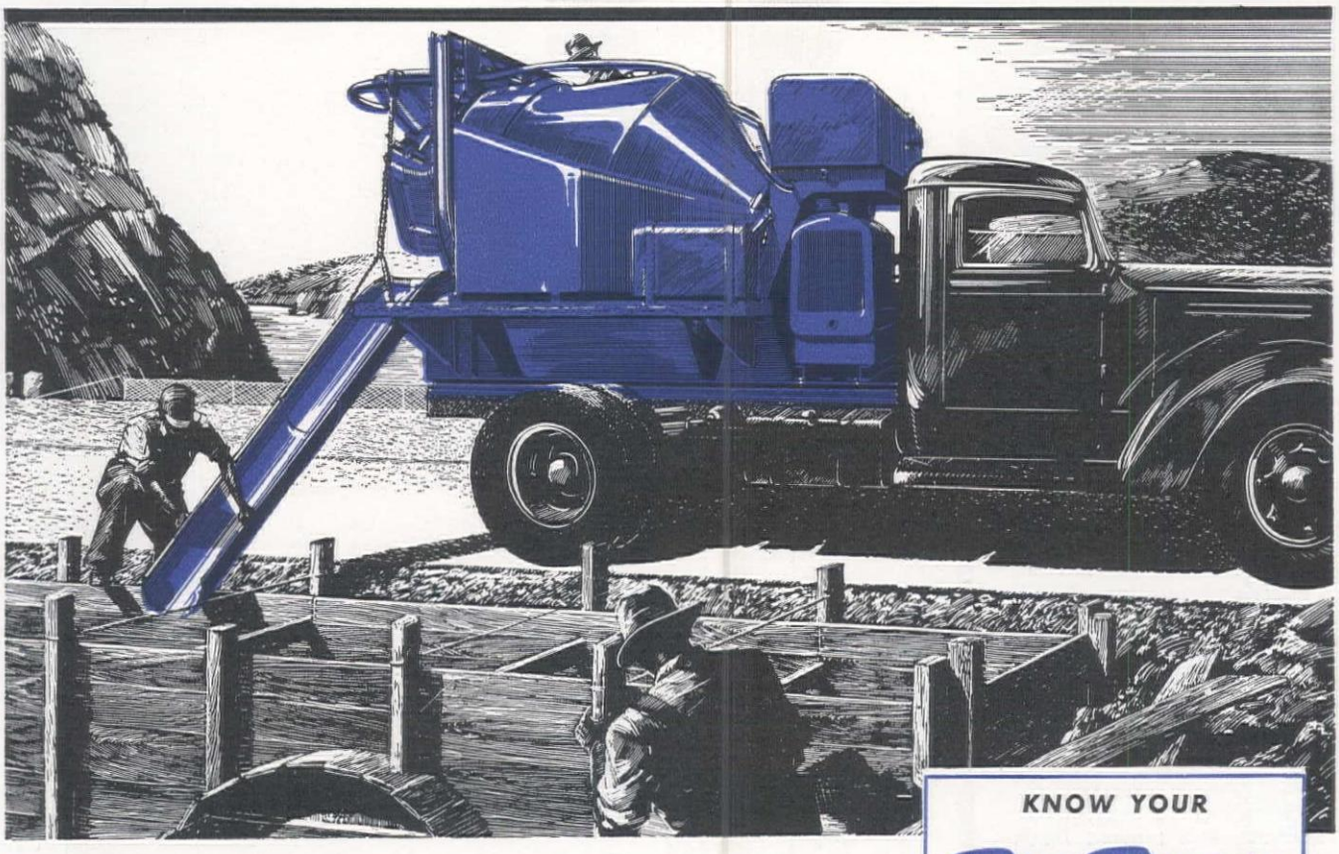
Peter Kiewit Sons' Co., Los Angeles, submitted the low bid of $1,333,066 to the Division of Highways, Sacramento, for the grading and paving with Portland cement concrete and asphalt concrete 1.6 mi. of the Santa Ana Parkway between Kearney and Soto Streets in Los Angeles. The following is a summary of the work and unit bids submitted:

(1) Peter Kiewit Sons' Co. $1,333,066
(2) Griffith Co. 1,372,281
(3) Guy F. Atkinson Co. 1,383,605
(4) E. W. Elliott Const. Co. $1,457,313
(5) J. E. Haddock Ltd. 1,586,421

		(1)	(2)	(3)	(4)	(5)
4,000	cu. yd. removing concrete	3.70	5.00	7.00	7.00	5.60
50	ac. clearing and grubbing	135.00	270.00	75.00	100.00	420.00
515,000	cu. yd. roadway excavation	.37	.43	.55	.57	.63
55,500	cu. yd. structure excavation	2.30	1.70	1.50	3.50	3.00
6,500,000	sta. yd. overhaul	.003	.005	.004	.004	.006
10,000	sq. yd. compacting original ground	.03	.06	.05	.06	.09
22,000	cu. yd. imported subgrade material	1.60	1.25	1.25	1.10	1.65
26,000	tons untreated rock base	1.90	1.90	2.25	1.50	2.00
22,000	cu. yd. imported top soil	2.40	2.20	1.50	2.20	1.75
100,000	sq. yd. preparatory landscape treatment	.04	.07	.02	.20	.04
Lump sum,	developing water supply and furn. watering equipment	$2,000	$3,000	$4,000	$3,000	$30,000
8,500	M. gal. applying water	1.85	1.90	1.00	1.15	2.00
85	sta. finishing roadway	10.00	16.00	20.00	22.00	50.00
2	tons liq. asph., SC-2 (Pr. Ct., P.M.S.)	25.00	50.00	40.00	40.00	27.50
400	tons plant-mixed surfacing	15.25	5.20	4.00	4.75	4.50
3,150	tons asphalt concrete	4.00	4.10	4.00	5.50	4.00
24	tons asphaltic emulsion (paint, binder and cur. seal)	47.00	52.00	40.00	38.00	30.00
17,500	cu. yd. Cl. "B" P.C.C. (pavement and base)	11.80	13.60	12.50	9.00	12.50
12,000	ea. pavement tie bolt assemblies	.50	.70	.60	.60	.70
6,300	cu. yd. Cl. "A" P.C.C. (structures)	29.25	34.00	40.00	34.00	40.00
630,000	lb. bar reinforcing steel	.07	.07	.06	.06	.069
170	sq. yd. membrane waterproofing (pedestrian underpass)	1.25	2.00	1.50	2.50	2.00
300	sq. yd. spatter dash finish (pedestrian underpass)	1.25	2.00	1.00	2.00	1.25
730	lb. metal safety treads (pedestrian underpass)	.50	.50	.40	.50	.40
109	lin. ft. pipe rail (pedestrian underpass)	3.40	4.00	3.00	3.50	2.50
109	lin. ft. handrailing (pedestrian underpass)	3.40	4.00	3.00	4.00	3.00
Lump sum,	tunnel washing equipt. (pedestrian underpass)	400.00	500.00	300.00	$1,200	400.00
Lump sum,	lighting equipt. (pedestrian underpass)	$2,500	$3,000	$2,500	$1,800	$2,300
1,050	lin. ft. rubber waterstops (retaining walls)	2.00	1.80	2.00	2.50	1.30
2,200	cu. yd. Cl. "A" P.C.C. (curbs, gutters and sidewalks)	30.35	24.00	30.00	34.00	28.00
2,000	cu. yd. Cl. "C" P.C.C. (pipe reinforcement)	11.30	15.00	12.00	38.00	16.00
390	cu. yd. Cl. "A" P.C.C. (surface drain lining)	28.85	30.00	30.00	40.00	36.00
120	lin. ft. metal plate guard railing	2.50	2.70	2.50	2.50	2.75
18,000	lin. ft. chain link fence	1.70	1.80	1.50	2.20	1.60
20	ea. walk gates (chain link fence)	50.00	50.00	50.00	20.00	57.00
1,880	lin. ft. 18-in. reinforced concrete pipe (std. str.)	6.00	3.50	3.00	3.00	3.80
600	lin. ft. 21-in. R.C.P. (std. str.)	6.50	4.00	3.75	3.45	4.30
30	lin. ft. 24-in. R.C.P. (std. str.)	7.00	4.50	4.00	3.80	5.00
120	lin. ft. 24-in. R.C.P. (1,500-D)	7.00	4.50	4.25	3.80	4.90
70	lin. ft. 24-in. R.C.P. (1,750-D)	7.10	4.50	4.50	4.00	5.20
80	lin. ft. 24-in. R.C.P. (2,250-D)	7.85	5.30	5.00	4.70	6.20
110	lin. ft. 24-in. R.C.P. (2,500-D)	8.00	5.30	5.00	4.90	6.00
110	lin. ft. 27-in. R.C.P. (1,750-D)	7.80	5.30	5.00	4.65	6.00
50	lin. ft. 27-in. R.C.P. (2,000-D)	8.75	6.30	6.00	5.50	7.25
200	lin. ft. 30-in. R.C.P. (1,500-D)	8.50	6.00	5.50	5.60	6.45
580	lin. ft. 33-in. R.C.P. (1,400-D)	10.25	7.00	6.75	7.00	7.80
280	lin. ft. 33-in. R.C.P. (1,750-D)	10.00	7.00	6.75	7.00	7.85
400	lin. ft. 33-in. R.C.P. (2,250-D)	12.00	8.00	7.60	7.60	8.60
180	lin. ft. 33-in. R.C.P. (2,500-D)	11.70	8.00	7.60	7.60	9.00
30	lin. ft. 36-in. R.C.P. (1,500-D)	11.00	8.00	7.70	7.25	9.65
190	lin. ft. 36-in. R.C.P. (2,250-D, jack installed)	70.00	45.00	12.80	27.50	26.50
570	lin. ft. 66-in. R.C.P. (2,000-D)	22.70	20.00	19.50	19.50	22.40
110	lin. ft. 72-in. R.C.P. (std. str.)	23.50	19.00	19.00	20.20	20.75

(Continued on next page)

HI-UP... IN NAME, REPUTATION AND QUALITY



Flexibility, engineered into all Ransome Blue Brute Truck Mixers, reaches its peak in the new Hi-Up. This flexibility eliminates all strains resulting from misalignment while charging, discharging, or operating over uneven ground. The truck mixer is designed so that when discharging is completed, all moving parts return to their normal positions.

The transmission shows a marked advance over usual design. Enclosed water pump clutch requires no adjustment and at no time is there any need for manual lubrication. A separate engine clutch, two speeds forward and reverse, and multiple disc clutches assure easier starting, a wider performance range and smoother operation.

Other new design details: Unbreakable, anti-freeze gauge glasses, in full view of the operator . . . Quick-charging, unobstructed hopper, with improved sealing door, prevents jamming . . . Positively leak-proof poppet valves with renewable discs — found only in Ransome Truck Mixers . . . Exclusive mixing drum design, with new type spiral blades, for quick charging and fast, clean discharging.

These are but a few of the reasons why the Blue Brute Hi-Up is setting a new high in truck mixer performance — and offering time-saving, trouble-free production of better concrete at lower cost.

Get the whole story from your nearby Worthington-Ransome dealer, or write for Bulletin No. 221.

R6-7

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute Hi-Up Truck Mixers and other construction equipment can put your planning on a profitable basis — and prove that *there's more worth in Worthington*. His name is listed on Page **124.** Blue Brutes include:

RANSOME EQUIPMENT

Pavers, Concrete Spreaders and Finishers*, Portable and Stationary Mixers, Pneumatic Placing Equipment, Truck Mixers, Plaster & Bituminous Mixers and Accessories.

WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Contractors' Pumps* and Accessories.

*To be announced.

BUY BLUE BRUTES

Truck Mixers
Capacities:
2, 3, 4½ cu. yds.

Portable Mixers
Capacities:
3½, 6, 11, 16, 28 cu. ft.

Big Stationary Mixers
Capacities:
28, 56, 84, 126 cu. ft.

Pneumatic Placer
Capacity:
7, 14, 28 cu. ft.

WORTHINGTON

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

300 lin. ft. 6-in. V.C.P. (std. str.)	3.60	.80	.60	1.00	1.00
1,740 lin. ft. 8-in. V.C.P. (std. str.)	4.15	1.30	.70	1.15	1.10
600 lin. ft. 8-in. V.C.P. (ext. str.)	4.60	1.70	.80	1.35	1.25
200 lin. ft. 10-in. V.C.P. (std. str.)	4.25	2.00	1.00	2.90	1.60
70 lin. ft. 18-in. V.C.P. (ext. str.)	5.60	3.70	2.50	3.25	3.35
850 lin. ft. 21-in. V.C.P. (ext. str.)	6.40	4.40	3.50	3.70	4.35
170 lin. ft. "B" manholes (sanitary sewer)	45.00	23.00	15.00	17.50	28.00
80 lin. ft. "S" manholes (sanitary sewer)	53.00	22.00	15.00	19.00	23.00
50 lin. ft. "H" junction structure (sanitary sewer)	45.00	27.00	15.00	11.00	35.00
70 lin. ft. "F" junction structure (sanitary sewer)	45.00	23.00	15.00	11.00	24.00
Lump sum, special shallow structure (sanitary sewer)	170.00	200.00	100.00	150.00	200.00
90 ea. house connection caps (sanitary sewer)	20.00	27.00	30.00	5.00	15.00
36 lin. ft. 8-in. plain concrete pipe (retaining wall)	1.10	1.40	1.00	1.00	1.85
200 lin. ft. 12-in. plain concrete pipe (storm drain)	4.00	1.90	1.00	1.25	1.55
6,000 lin. ft. 15-in. plain concrete pipe (storm drain)	4.50	1.60	1.40	1.70	1.80
150 lin. ft. 4-in. cast iron pipe	4.00	2.30	1.00	1.25	2.00
270 lin. ft. 8-in. cast iron pipe	9.00	4.30	2.50	2.00	3.00
36 lin ft. pipe shaft manhole (storm drain)	24.00	10.00	20.00	15.00	13.00
3 ea. remodeling man holes	200.00	50.00	65.00	50.00	150.00
2 ea. adjusting manholes to grade	185.00	100.00	35.00	50.00	30.00
55,000 lb. miscellaneous iron and steel	.25	.21	.25	.20	.21
120 ea. turning unions (sprinkling system)	45.00	24.00	20.00	15.00	52.00
250 ea. sprinkler connections (sprinkling system)	21.60	12.50	12.00	5.00	25.00
11,300 lin. ft. ¾-in. galvanized pipe (sprinkling system)	.70	.80	.70	.25	.40
15,100 lin. ft. 1-in. galvanized pipe (sprinkling system)	.75	.90	.80	.40	.60
3,200 lin. ft. 1¼-in. galvanized pipe (sprinkling system)	.85	2.00	1.75	.50	.90
3,100 lin. ft. 1½-in. galvanized pipe (sprinkling system)	1.00	2.30	2.00	.65	.95
4,700 lin. ft. 2-in. galvanized pipe (sprinkling system)	1.10	2.60	2.50	.90	1.00
3,600 lin. ft. 2½-in. galvanized pipe (sprinkling system)	1.35	3.00	2.75	1.10	1.25
2,300 lin. ft. 3-in. galvanized pipe (sprinkling system)	1.70	3.50	3.00	1.40	1.65
1,330 lin. ft. 4-in. galvanized pipe (sprinkling system)	2.20	4.00	3.50	1.75	2.10
Lump sum, traffic warning system	$11,360	$13,000	$10,279	$7,500	$11,000

Montana—Lake County—State—Surf.

Nyberg Construction Co., Yardley, Wash., was the low bidder to the Montana Highway Commission, at $179,406, for grading and gravel surfacing on 3.2 mi. of Flathead Lake-East Shore highway. However, the low bid was $71,000 higher than the engineer's estimate, so all bids were rejected by the Commission. On eight other projects offered for bid on the same date, no offers were received. The unit bids on this project were:

(1) Nyberg Construction Co. $179,406
(2) Morrison-Knudsen Co., Inc. 184,891
(3) Engineer's Estimate $108,335

	(1)	(2)
173,261 cu. yd. unclass. excav. and borrow	.63	.62
1,127 cu. yd. culvert excavation	2.00	1.50
393,400 sta. yd. overhaul	.01	.01
24,201 ton base Co. crushed gravel surface	1.00	1.25
7,288 ton Grade A top Co. crushed gravel surface	1.40	1.75
1,000 cu. yd. binder	.01	.50
2,000 yd. mi. overhaul on binder	.01	.15
38,465 gal. appl. MC-2 cut. asphalt	.15	.18
950 M. gal. watering	3.00	1.50
145 unit rolling	6.50	8.00
23 acre clearing	250.00	225.00
11 acre grubbing	250.00	200.00
104 lin. ft. 8-in. corr. metal pipe culv.	1.75	1.85
796 lin. ft. 15-in. corr. metal pipe culv.	2.35	2.40
80 lin. ft. 18-in. corr. metal pipe culv.	2.90	2.80
1,008 lin. ft. 24-in. corr. metal pipe culv.	3.90	3.50
48 lin. ft. 30-in. corr. metal pipe culv.	4.50	5.00
92 lin. ft. 36-in. corr. metal pipe culv.	6.25	6.50
1,000 lin. ft. 8-in. per. corr. metal pipe culv.	1.75	1.90
144 cu. yd. backfill for underdrain	2.00	1.00
1 ea. concrete project marker	15.00	10.00
116 ea. concrete r/w monuments	5.00	3.80
Lump sum, rear, water sup. facil. (FA)	$1,500	$1,500
240 tons stock piled gravel	1.50	1.90

Washington—Grant County—State—Surf.

C. E. Oneal, Ellensburg, was the low bidder, at $222,866, and received the contract for light surf. bituminous surface treatment and two treated timber trestles on 8.1 mi. of State Highway 7, from Stratford and Wilson Creek. The Department of Highways was the awarding agency. Unit bids were submitted as follows:

(A) C. E. Oneal $222,866
(B) Peter Kiewit Sons' Co. 257,861
(C) Max J. Kuney Co. 261,777
(D) Guy J. Norris 266,999
(E) Sather & Sons 269,719
(F) M. E. Nelson Construction Co. 276,951
(G) Colonial Construction Co. $279,788
(H) K. L. Goulter & Co. 280,907
(I) Roy L. Bair & Co. 282,506
(J) N. Fiorito Co. 291,583
(K) J. A. Terteling & Sons, Inc. 351,601

(1) Lump sum, clearing and grubbing.
(2) 147,720 cu. yd. common excav. incl. haul of 600 ft.
(3) 64,400 cu. yd. solid rock excav. incl. haul of 600 ft.
(4) 400 cu. yd. common trench excav. incl. haul of 600 ft.
(5) 80 cu. yd. solid rock trench excav. incl. haul of 600 ft.
(6) 148,220 cu. yd. stas. overhaul on above matls.
(7) 991.95 M. cu. yd. stas. overhaul on above matls.
(8) 710 cu. yd. structure excavation.
(9) 43,710 lin. ft. slope treatment.
(10) 442.6 stas. (100 ft.) finishing roadway.
(11) 42,430 cu. yd. ballast in place on roadway.
(12) 14,590 cu. yd. cr. stone surf. top course in place on rdwy.
(13) 3,820 cu. yd. cr. cover stone in stockpile.
(14) 2,410 cu. yd. sand filler (incl. haul).
(15) 902 M. gals. water.
(16) 8.4 mi. preparation, constr. and finishing.
(17) 273 tons bituminous cement MC-2 in place.
(18) 2,170 cu. yd. placing cr. cover stone from stockpile.
(19) 2.0 cu. yd. concrete Class C in place.
(20) 3 only reinf. concr. Fed. aid markers in place.
(21) 103 only reinf. concr. right-of-way markers in place.
(22) 4 only reflector units in place.
(23) 330 lin. ft. plain concr. or V.C. culv. pipe 12 in. diam. in place.
(24) 57 lin. ft. pl. concr. or V.C. culv. pipe 18 in. diam. in place.
(25) 963 lin. ft. stan. reinf. conc. culv. pipe 18 in. diam. in place.
(26) 300 lin. ft. stan. reinf. concr. culv. pipe 24 in. diam. in place.
(27) 280 lin. ft. stan. reinf. concr. culv. pipe 36 in. diam. in place.
(28) 168 lin. ft. stan. reinf. concr. culv. pipe 48 in. diam. in place.
(29) 213 lin. ft. bit. coated corr. metal pipe cat. pass 84 in. diam. in place.
(30) 6.4 M.B.M. timber and lumber untreated in place.
(31) 124.0 M.B.M. timber and lumber creosoted treated in place.
(32) 4,450 lin. ft. furn. timber piles (creos. trtd.) at site.
(33) 103 only dr. timber piles (creos. trtd.) in pl.
(34) 2 only furn. and dr. timber test piles.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	$4,000	$2,000	$3,000	$2,500	$2,000	$2,000	$2,000	$2,000	$1,800	$7,000	650.00
(2)	.22	.25	.35	.25	.23	.30	.30	.385	.30	.28	.36

(Continued on next page)

(3)	.88	.90	.80	1.15	1.30	1.10	.84	.385	1.30	.90	1.80
(4)	1.00	1.50	1.00	1.00	1.00	.75	2.00	1.00	1.50	3.00	1.10
(5)	2.00	4.50	3.00	3.00	3.00	2.00	3.50	3.00	2.50	5.00	3.60
(6)	.01	.02	.01	.01	.02	.02	.015	.01	.01	.02	.015
(7)	5.00	4.00	7.00	6.00	4.50	5.00	5.00	5.00	6.00	5.00	10.00
(8)	2.00	2.50	3.00	3.00	2.00	2.00	5.00	5.00	1.50	3.00	3.00
(9)	.08	.10	.10	.12	.08	.15	.10	.10	.10	.10	.12
(10)	8.00	10.00	7.00	12.00	10.00	15.00	10.00	10.00	10.00	10.00	6.00
(11)	.77	1.00	.80	.90	1.00	1.00	1.25	1.50	1.05	1.40	1.10
(12)	1.20	1.60	2.00	1.60	1.50	1.40	2.00	2.20	1.15	2.15	1.50
(13)	1.10	1.60	2.00	1.50	1.25	1.40	2.00	2.20	1.00	2.00	1.10
(14)	.50	1.50	.50	1.35	1.10	1.00	1.50	1.10	1.20	1.50	1.05
(15)	2.00	1.50	2.70	2.00	2.50	2.00	1.50	2.20	2.00	4.00	3.00
(16)	100.00	225.00	150.00	300.00	150.00	200.00	200.00	350.00	150.00	150.00	500.00
(17)	32.00	30.00	32.00	27.50	30.00	33.00	30.00	35.00	30.00	32.00	37.50
(18)	1.50	2.00	1.50	1.65	2.00	1.75	2.50	1.50	1.00	1.25	2.00
(19)	40.00	75.00	50.00	80.00	50.00	55.00	70.00	50.00	50.00	100.00	75.00
(20)	10.00	10.00	20.00	10.00	6.00	10.00	20.00	10.00	10.00	25.00	10.00
(21)	3.00	3.50	4.00	6.00	4.00	5.00	4.00	5.00	4.00	4.00	6.50
(22)	10.00	10.00	15.00	10.00	10.00	25.00	25.00	10.00	10.00	25.00	15.00
(23)	1.50	1.40	2.20	1.40	1.30	2.00	1.70	1.25	1.50	1.45	2.30
(24)	2.50	2.40	3.50	2.25	2.25	3.00	3.20	2.00	3.00	2.70	3.90
(25)	3.00	2.90	3.80	2.75	2.50	3.50	3.60	2.30	3.10	3.25	4.25
(26)	4.00	4.15	5.50	3.75	4.50	5.00	5.50	3.50	4.50	4.50	6.75
(27)	7.90	8.05	10.00	7.50	8.00	9.00	10.00	10.00	9.00	9.25	9.50
(28)	12.00	12.00	15.00	12.00	11.00	14.00	15.00	15.00	15.00	14.00	20.00
(29)	27.00	36.00	35.00	29.00	30.00	30.00	33.00	35.00	35.00	33.00	48.00
(30)	120.00	175.00	170.00	135.00	100.00	130.00	125.00	165.00	200.00	115.00	130.00
(31)	170.00	195.00	170.00	180.00	180.00	180.00	175.00	200.00	200.00	165.00	225.00
(32)	.95	1.05	1.00	1.00	1.00	1.00	1.00	1.20	1.50	.95	1.20
(33)	25.00	35.00	25.00	28.00	18.00	40.00	25.00	44.00	25.00	25.00	36.00
(34)	100.00	250.00	200.00	400.00	100.00	225.00	100.00	150.00	250.00	300.00	72.00

Dam . . .

Oklahoma—Le Flore County—U. S. Engineer—Earthfill Dam

Groves, Lundin & Cox, Minneapolis, Minn., submitted the low bid of $4,016,727 to the U. S. Engineer Office, Tulsa, Okla., for the construction of Wister Dam, situated near Wister, Okla., on the Poteau River. Bids were received from the following:

(A) Groves, Lundin & Cox.....$4,016,727
(B) Mittry Bros. Const. Co..... 4,241,305
(C) Morrison-Knudsen Co. 4,375,311
(D) Grafe-Callahan Const. Co., & W. K. McIlyar 4,612,661
(E) James & Phelps Const. & S. E. Evans Const.....$4,760,950
(F) C. F. Lytle Co. & Amis Const. Co.... 4,767,881
(G) Winston Bros. Company 4,977,640
(H) Leo Sanders 5,492,800
(I) Engineer's estimate 4,065,577

(1) Lump sum, clearing
(2) 100 acres additional clearing.
(3) Lump sum, cofferdams and steam control.
(4) 40,000 cu. yd. excav., embankment fdns.
(4a) 20,000 cu. yd. excav., embank. drainage.
(5) 100,000 cu. yd. common excavation.
(6) 111,000 cu. yd. rock excavation.
(7) 650,000 cu. yd. uncl. excav., spillway.
(8) 16,000 sq. ft. line drilling.
(9) 3,000 cu. yd. trench excavation.
(10) 6,000 cu. yd. excav., special.
(11) 80,000 cu. yd. stripping borrow areas.
(12) 1,675,000 cu. yd. exc., bor. areas "E" & "U".
(13) 250,000 cu. yd. excav., bor. area "G".
(14) 200 sq. ft. rock treat., one coat.
(15) 1,900,000 cu. yd. impervious fill.
(16) 325,000 cu. yd. random fill.
(17) 19,000 cu. yd. roadway fill.
(18) 13,000 cu. yd. topsoil.
(19) 23,000 cu. yd. backfill, structures.
(20) 20,000 cu. yd. sand and gravel drains.
(21) 50,000 cu. yd. sand and gravel under riprap.
(22) 6,100 cu. yd. compact grav. pavement.
(23) 400 cu. yd. gravel drains.
(24) 25,000 cu. yd. rock spalls.
(25) 125,000 cu. yd. riprap, dumped.
(26) 700 sq. yd. rock gutters.
(27) 31,000 sq. yd. sodding, Class A.
(28) 8,000 sq. yd. sodding, Class B.
(29) 1,700,000 lb. steel reinforcement.
(30) 820 cu. yd. "A" concrete.
(31) 33,000 cu yd. "B" concrete.
(32) 2,000 cu. yd. concrete, porous.
(33) 50,000 bbl. cement.
(34) 1,800 lb. corrosion resist. steel water stops.
(35) 1,000 lbs. copper water stops.
(36) 60,000 lbs. misc. metalwork.
(37) 300 lb. misc. brass and bronze.
(38) 900 lbs. misc. aluminum work.
(39) 94,000 lb. misc. C.I.P. and fittings.
(40) 35,000 lb. misc. black steel pipe & ftgs.
(41) 19,600 lb. misc. galv. wrought-iron pipe and fittings.
(42) 260 lin. ft. 24-in. corr. iron pipe.
(43) 10,000 lb. black pipe handrailing.
(44) Lump sum, gates, conduit lining.
(45) Lump sum, traveling crane.
(46) Lump sum, stand-by elec. generator unit.
(47) 8,000 lb. conduit, rigid metal.
(48) Lump sum, electric wiring.
(49) Lump sum, elec. fixtures and equipment.
(50) Lump sum, gate tower superstructure.
(51) 740 lb. misc. iron-body valves.
(52) Lump sum, sump pump, complete.
(53) 5,000 lin. ft. hwy. guardrail, Type A.
(54) 13,500 lin. ft. hwy. guardrail, Type B.
(55) Lump sum, piezometers and settlement gages in embankment.
(56) Lump sum, field construction buildings.
(57) 12,000 gal. bitum. prime matl., MC-1.
(58) 22,000 gal. asph. binder, RC-2
(59) 400 cu. yd. cover matl. for bitum. surf.
(60) Lump sum, raw water pump.
(61) Lump sum, water storage tank.
(62) 1,500 lin. ft. drilling overburden.
(63) 3,000 lin. ft. drill, 2-in. grout holes in rock (0 to 50 ft. below top of rock).
(64) 1,500 lin. ft. reaming grout from holes previously drilled and grouted.
(65) 1,000 bags cement pressure grouting.
(66) 200 lin. ft. drill 6-in. conc. test cores.
(67) Lump sum, low flow control system.
(68) Lump sum, valve chamber ventilation syst.
(69) 70,000 sq. ft. roll, ea. addn. two passes.
(70) 2,000 cu. yd. sand and gravel in stockpiles.
(71) 5,000 cu. yd. riprap stone in stockpiles.
(72) 1,000 lin. ft. 6-in. perf. vitr. clay pipe.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	$25,000	$150,850	$20,425	$13,200	$50,000	$40,000	$60,000	$25,000	$24,660
(2)	100.00	150.00	115.00	87.00	200.00	150.00	200.00	100.00	62.00
(3)	$50,000	$115,000	$85,000	$150,000	$25,000	$175,000	$150,000	$25,000	$120,000
(4)	1.00	.25	.18	.44	.50	.45	.60	.60	.43
(4a)	1.00	1.00	1.70	.52	.50	.50	1.50	2.00	.38
(5)	1.00	.80	.34	.43	.60	.79	.65	.75	.41
(6)	3.00	.80	.68	1.18	1.35	.79	1.10	1.50	1.70
(7)	.75	.70	.56	.79	1.10	.79	.75	1.50	.80
(8)	.50	1.00	.95	1.20	1.50	1.00	1.00	2.00	.45
(9)	10.00	10.00	11.25	10.90	10.00	20.50	12.00	20.00	6.40
(10)	5.00	5.00	7.90	7.50	7.50	7.25	5.00	10.00	4.85
(11)	.25	.25	.20	.30	.40	.40	.40	.25	.32
(12)	.30	.32	.45	.40	.40	.46	.50	.50	.26
(13)	.30	.26	.45	.37	.50	.43	.60	.50	.25
(14)	5.00	10.00	2.25	3.30	2.25	4.00	3.00	5.00	2.20
(15)	.08	.12	.15	.10	.12	.12	.15	.10	.106
(16)	.05	.08	.035	.09	.04	.09	.12	.10	.03
(17)	.10	.10	.15	.25	.20	.25	.20	.10	.22
(18)	1.00	.70	1.15	.50	.35	.75	.80	.50	.73
(19)	.60	1.50	1.70	1.45	1.75	1.75	1.50	2.00	.88
(20)	4.00	4.50	5.45	5.00	3.30	2.40	4.00	4.00	2.85

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(21)	3.00	3.50	4.70	3.80	3.30	3.43	3.65	4.00	3.40
(22)	4.50	3.25	5.60	7.50	5.00	3.95	4.00	5.00	3.35
(23)	5.00	6.00	9.50	7.00	5.00	5.10	4.00	10.00	6.20
(24)	2.00	3.10	4.00	3.00	2.45	3.22	4.25	4.00	3.70
(25)	2.00	3.10	1.75	3.00	2.45	3.19	3.50	4.00	2.87
(26)	4.00	5.00	4.50	3.70	1.65	2.50	6.00	10.00	2.60
(27)	.40	1.50	1.10	.12	.75	1.00	.75	1.00	.28
(28)	.30	1.50	.65	.08	.60	.75	.80	.50	.16
(29)	.075	.068	.075	.09	.07	.075	.08	.07	.067
(30)	38.35	38.00	41.00	35.00	40.00	59.50	50.00	40.00	44.00
(31)	19.50	15.40	20.25	20.00	24.00	21.85	22.40	25.00	21.00
(32)	12.25	16.00	14.00	13.00	17.50	11.50	12.00	25.00	13.00
(33)	3.00	2.90	3.10	3.90	3.00	3.00	2.50	3.00	3.34
(34)	.50	1.00	.82	1.80	1.00	1.50	.40	1.00	1.09
(35)	1.00	2.00	.57	1.10	1.00	1.25	1.25	1.00	1.23
(36)	.30	.40	.41	.30	.18	.25	.50	.25	.19
(37)	2.00	2.00	.90	2.20	1.75	4.00	2.00	2.00	1.54
(38)	2.00	4.00	.92	3.60	3.00	5.00	.90	2.00	1.23
(39)	.20	.20	.20	.22	.20	.12	.20	.20	.14
(40)	.30	.35	.26	.20	.28	.30	.30	.30	.27
(41)	.40	.45	.29	.31	.35	.35	.30	.40	.36
(42)	5.00	6.00	4.35	6.50	5.00	6.50	4.00	6.00	5.00
(43)	.40	.50	.38	.40	.40	.40	.50	.40	.20
(44)	$250,000	$260,000	$315,000	$366,000	$300,000	$290,000	$250,000	$300,000	$272,000
(45)	$15,000	$10,000	$18,670	$20,000	$18,000	$18,000	$20,000	$12,000	$15,000
(46)	$7,000	$8,000	$7,520	$11,000	$6,000	$6,000	$7,500	$7,000	$7,000
(47)	1.00	.70	.65	1.15	.60	1.00	1.00	.75	.64
(48)	$5,000	$12,000	$5,550	$5,000	$3,000	$4,500	$5,500	$5,000	$5,340
(49)	$10,000	$25,000	$14,665	$14,000	$17,000	$7,300	$12,000	$15,000	$14,600
(50)	$50,000	$99,000	$90,410	$76,500	$92,000	$112,500	$80,000	$50,000	$7,600
(51)	1.00	2.00	1.00	1.50	1.00	1.10	2.00	2.50	.67
(52)	$2,000	750.00	750.00	750.00	250.00	650.00	300.00	$1,000	450.00
(53)	1.00	1.50	1.30	1.20	1.50	1.80	1.80	2.00	1.76
(54)	1.00	1.50	1.45	1.75	1.82	2.20	2.00	2.50	1.58
(55)	$7,000	$2,500	$3,640	$5,500	$5,000	$7,285	$8,000	$5,000	$6,920
(56)	$25,000	$58,000	$38,815	$38,000	$100,000	$32,725	$35,000	$25,000	$25,200
(57)	.20	.12	.20	.09	.16	.17	.12	.20	.23
(58)	.20	.16	.20	.09	.16	.17	.13	.20	.27
(59)	5.00	6.00	6.15	7.20	5.00	6.00	5.00	6.00	3.75
(60)	$2,000	750.00	350.00	500.00	450.00	625.00	700.00	$1,000	280.00
(61)	$5,000	$7,500	$5,400	$6,400	$18,000	$5,745	$5,000	$7,500	$7,435
(62)	1.00	2.00	4.55	2.20	1.75	3.10	3.00	2.00	3.25
(63)	3.00	3.00	2.60	7.00	1.75	2.85	3.00	4.00	3.50
(64)	2.00	2.50	1.20	2.20	1.50	2.10	2.50	2.00	.85
(65)	2.00	4.00	3.20	2.20	1.00	2.20	2.50	5.00	1.60
(66)	5.00	10.00	10.00	16.00	12.50	9.11	10.00	10.00	6.80
(67)	$10,000	$8,000	$5,895	$5,300	$7,000	$5,645	$10,000	$5,000	$5,510
(68)	$5,000	$3,500	272.00	360.00	300.00	395.00	500.00	500.00	235.00
(69)	.05	.03	.03	.03	.04	.05	.02	.02	.022
(70)	4.00	3.00	5.50	3.60	3.30	2.40	4.00	3.00	3.75
(71)	2.00	3.00	1.58	2.90	2.45	2.45	4.00	3.00	2.35
(72)	2.00	1.50	.75	1.50	1.00	.95	1.50	1.50	.65

Bridge and Grade Separation...

Washington—Cowlitz County—State—Grade Separation

MacRae Bros., Seattle, submitted the lowest bid of $207,231 to the Department of Highways, Olympia, for the construction of a grade separation of State Highway No. 1 and Allen St., Brinyon St. in the city of Kelso. The project involves reinforced concrete and both timber and steel piling. Unit bids were received from the following:

(1) MacRae Bros. $207,231
(2) Fielding & Shepley, Inc. 207,667
(3) Hawkins & Armstrong 213,989
(4) Rumsey & Co. 214,313
(5) Kern & Kibbe $241,230
(6) Marine Contrs., Inc. 199,681
(7) M. P. Munter Co. 249,134

Note: 6 & 7 irregular bids.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1,790 cu. yd. structure excav.	10.00	5.00	6.00	8.00	10.00	5.10	10.00
2,025 cu. yd. concrete, Class A, in place	46.00	53.00	51.00	152.00	60.12	42.00	55.00
30 cu. yd. concrete, Class B, in place	46.00	40.00	51.00	52.00	30.48	40.00	55.00
360 cu. yd. concrete, Class F, in place	46.00	40.00	51.00	35.00	17.88	37.00	55.00
867 lin. ft. reinf. conc bridge railing in place	6.00	6.00	5.50	7.00	8.04	13.00	7.00
595,000 lbs. steel reinforcing bars, in place	.065	.06	.065	.07	.078	.075	.07
11 only, bridge drains complete in place	50.00	60.00	60.00	50.00	48.00	60.00	80.00
30 lin. ft. down spouts complete, in place	10.00	5.00	1.00	2.00	2.40	4.00	8.00
5,000 lin. ft. furn. timber piles (untreated) at site	.42	.30	.32	.35	.33	.45	.35
168 only, driving timber piles (untreat.) in pl.	18.00	25.00	18.00	20.00	30.00	23.50	50.00
8,200 lin. ft. furn. steel piling at site	2.50	2.10	3.00	2.50	2.66	2.50	3.00
162 only, driving steel piles in place	30.00	60.00	36.00	32.00	60.00	36.00	50.00
24 only, pile splices	25.00	10.00	43.00	15.00	30.00	39.00	30.00
3 only, furn. and driving steel test piles	810.00	400.00	450.00	350.00	438.00	280.00	$2,000

California—Kern County—State—Steel Beam Span

E. W. Elliott Const. Co., San Francisco, offered the low bid of $79,807 to the California Division of Highways, Sacramento, for the construction of a steel beam span bridge and about one mile of approach to grade and surface. Location is Freeman Gulch. Bids were received from the following:

(1) E. W. Elliott Const. Co. ..... $ 79,807
(2) Frank T. Hickey and Spencer Webb. .. 99,338
(3) Norman I. Fadel 100,068
(4) R. R. Hensler 110,007
(5) Combs Bros. $112,153
(6) Vinnell Company 112,572
(7) Haddock Engineers, Ltd. 128,680

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lump sum, removing existing bridge	$1,000	$3,000	$1,565	$1,000	$1,500	$1,350	$1,000
2 cu. yd. removing concrete	10.00	12.00	10.00	20.00	25.00	15.00	25.00
Clearing and grubbing	500.00	800.00	$1,000	$1,000	500.00	180.00	400.00
34,300 cu. yd. roadway excavation	.40	.50	.50	.45	.295	.40	.45
1,980 cu. yd. structure excavation	2.50	2.00	1.00	2.50	2.50	2.00	3.60
2,600 cu. yd. ditch and channel excav.	.50	.50	.60	.75	1.375	.85	.75
5,000 sq. yd. compacting original ground	.05	.10	.05	.04	.125	.05	.06
4,500 cu. yd. imported borrow	.50	1.00	2.50	1.90	2.65	1.30	2.50
280,000 sta. yd. overhaul	.005	.005	.0075	.01	.0075	.015	.01
Lump sum, dev. water sup. & furn. wat'g equip.	$1,500	$3,500	$2,000	$2,500	$2,500	$2,400	500.00
1,800 M. gals. applying water	1.50	2.50	2.00	2.00	1.75	2.40	4.50
53 sta. finishing roadway	10.00	10.00	10.00	12.00	15.00	15.00	12.00
14,500 sq. yd. prep. mix'g & shap'g surf. (B.S.T.)	.10	.10	.14	.08	.15	.14	.27
136 tons liq. asph. SC-3 or 4 (B.S.T.)	20.00	20.00	19.00	22.00	17.50	15.00	17.50

(Continued on next page)

CONSTRUCTION PLANT AND EQUIPMENT FROM SHASTA DAM, CALIFORNIA

AVAILABLE FOR SALE **IMMEDIATE DELIVERY**

CABLEWAYS AND HOISTS

3—Lidgerwood, 3-drum electric hoists with 500 h.p. G. E. motors. Ward Leonard control, complete with controls and all electric equipment.

2—Lidgerwood, 3-drum electric hoists with 500 h.p. Westinghouse motors complete with controls and all electrical apparatus.

5—Cableway towers, structural steel, 3—125 ft.; 1—75 ft. and 1—45 ft., complete with travel mechanism.

6—Complete sets of carriages, main and auxiliary, fall and dump blocks, fall rope carriers, buttons, takeup bars and takeup sheaves.

1—American pillar crane. Cap. 5 T. at 48½ ft. and 15 T. at 25 ft. radius.

1—Colby elevator hoist, double drum, 75 h.p., equipped with brakes and emergency equipment, including one hoist cage. 15 ton capacity.

12,000 lin. ft. of used 3" dia. locked coil cable in length from 500 to 2600 lin. ft.

Misc. lot of sheaves, jewels, blocks, etc.

CEMENT PLANT

1—Dual No. 265 Fuller Fluxo cement pump, duplex type complete with gravity feed and automatic control equipment. 400 bbls. per hr. capacity. Pumping distance 3300 ft.

1—Fuller-Kinyon pump—type "D," 125 h.p., complete with air hose power control cable, control cabinet.

1—C-200 Fuller single stage rotary compressor Westinghouse motor 100 h.p.

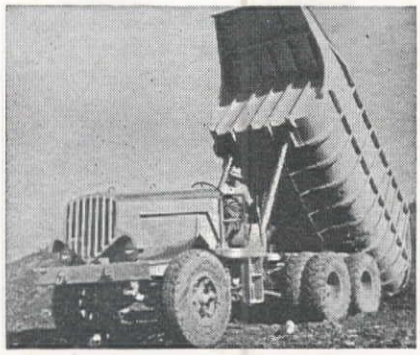
CONVEYORS

66—Motor operated gates for sand and gravel up to 6" cobbles with 1-h.p. Allis-Chalmers gear motor.

2—Complete sets, including 42" tandem drive pulleys, 42" head pulleys, 36" tail pulleys.

3—150 h.p. Westinghouse gear motors, 144 r.p.m., 2300 volts, 3-phase, 60 cycle.

1—Airplane tripper for 36" belt with two 17' wing belts, capacity 1,000 T. per hour, complete with pulleys, drives and gear motors.



12—White Dump Trucks Model 1580-691, 24 cu. yd. capacity in good condition.

DRILLING EQUIPMENT

2—Mod. 315 I-R portable compressors, gas driven.

5—I-R paving breakers.

8—I-R drifters DA35.

1—I-R-54 drill sharpener.

10—I-R jackhammers.

TANKS AND RECEIVERS

10—8 cu. yd. steel hoppers, including gates and air rams.

2—Water filters.

2—Wallace & Tiernan chlorinators.

1—9500 bbl. all welded water tank, 48' dia., 30' high.

1—5400 bbl. all welded water tank, 36' dia., 30' high.

1—200 bbl. steel water tank.

10—Sandblast tanks 24" x 96" with hoppers and fittings.

10—Lubricator tanks 14" x 30"; 24" x 48"; and 24" x 60".

PUMPS

3—Bingham type SVD submersible pumps.

1—Byron-Jackson 150 h.p. 10 in. deep well.

2—Byron-Jackson 200 h.p., 5 K-H type 8Q1 deep well turbine pumps.

10—I-R No. 25 sump pumps.

MIXING PLANTS

1—3000 cy. bin with 5 compartments for aggregates, 2 compartments cement, incl. turnhead, gates.

1—Complete set C. S. Johnson fully automatic batching equipment for 5 aggregates, cement and water for 4 cy. batchers.

5—4 cy. Koehring concentric zone mixers, including batchmeters, timers, consistency meters.

MISCELLANEOUS

1—P.A.X. automatic telephone switchboard with 76 phones.

Pole line hardware.

Floodlites—500 to 1500 w.

1—1¼ cu. yd. heavy duty clamshell bucket.

12—Muck skips, 7—14 cu. yds.

50—Chicago pneumatic concrete vibrators, Nos. 417, 518 and 519.

Several sizes of monkey wrenches, wood borers, chipping and riveting guns.

New and used rubber hose, ¾" to 4".

MACHINERY AND SUPPLIES

1—125 kw. motor generator set, 275 volts D.C.

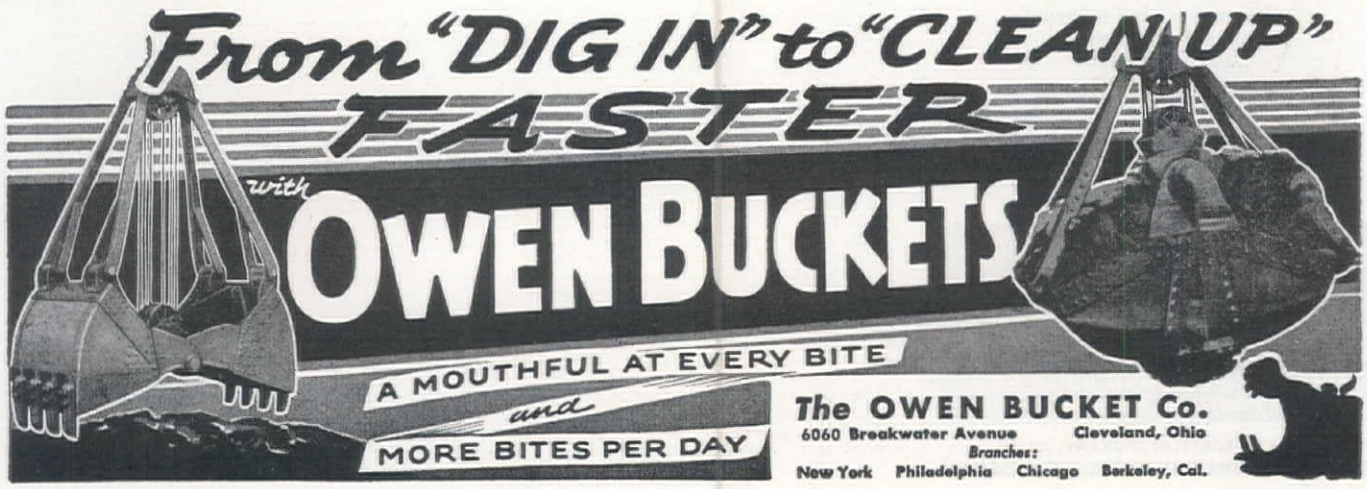
Complete stock of warehouse supplies.

Complete line of transformers and electric motors.

ALL ITEMS SUBJECT TO PRIOR SALE

PACIFIC CONSTRUCTORS, INC.

GENERAL CONTRACTORS—BOX 898, REDDING, CALIFORNIA **Phone 512 and 1779 REDDING**



14 M.F.B.M. Douglas fir timber	120.00	150.00	150.00	225.00	150.00	270.00	300.00
737 cu. yd. Class "A" P.C.C. (struc.)	30.00	35.00	29.50	40.00	45.00	50.00	46.50
71,000 lbs. furnishing struc. steel	.09	.10	.10	.13	.08	.10	.10
71,000 lbs. erecting struc. steel	.0175	.03	.03	.03	.07	.038	.04
91,000 lbs. furnishing bar reinf. steel	.05	.06	.06	.06	.05	.075	.07
91,000 lbs. placing bar reinf. steel	.02	.02	.03	.03	.025	.03	.03
246 cu. yd. sacked conc. riprap	20.00	20.00	26.00	28.00	25.00	22.00	40.00
292 lin. ft. tee rail bridge railing	2.00	3.00	3.25	2.50	2.50	4.00	7.00
6 ea., monuments	4.00	10.00	5.00	6.00	5.00	7.00	10.00
22 ea., culv., mkrs., proj. mkrs. & guide posts	4.00	5.00	5.00	6.00	4.50	7.00	5.00
74 lin. ft. 24-in. C.M.P. (14 ga.)	3.25	4.00	4.00	4.50	3.25	5.40	4.75
82 lin. ft. 36-in. C.M.P. (12 ga.)	6.00	6.50	6.00	8.00	6.00	10.00	9.50
1 ea., removing and resetting headwalls	50.00	50.00	60.00	25.00	75.00	50.00	25.00
103 lin. ft. salv. exist. pipe culv.	2.00	1.50	1.50	1.50	1.00	3.00	2.00
10 cu. yd. surface down drains	12.00	20.00	20.00	6.00	15.00	15.00	25.00
Lump sum, misc. items of work	$1,000	$2,400	$2,500	$2,000	$5,000	750.00	$1,660

California—Los Angeles County—State—Overcrossing

Macco Const. Co., Clearwater, submitted the low bid of $599,121 to the California Division of Highways, Sacramento, for the construction of a structural steel overhead crossing of the Terminal Island Freeway over the Union Pacific R.R. tracks. Unit bids follow:

(A) Macco Const. Co.	$599,121	(G) Robert E. McKee	$651,366
(B) E. B. Bishop	599,879	(H) Pacific Bridge Co.	658,915
(C) E. W. Elliott Const. Co.	621,886	(I) Geo. Pollock Co.	663,504
(D) Guy F. Atkinson Company	622,734	(J) Carlo Bongiovanni	699,389
(E) Oberg Bros.	625,379	(K) Griffith Co.	733,712
(F) Peter Kiewit Sons Co.	633,629		

(1) 3,700 cu. yd. structure excavation.
(2) 5,960 cu. yd. Class "A" P.C.C.
(3) 2,743,000 lb. furnishing structural steel.
(4) 2,743,000 lb. erecting structural steel.
(5) 53,950 lin. ft. furnishing timber piles.
(6) 1,078 ea. driving timber piles.
(7) 3,224 lin. ft. furnishing steel piles.
(8) 52 ea. driving steel piles.
(9) 30 ea. steel pile splices.
(10) 1,024,000 lb. furnishing bar reinforcing steel.
(11) 1,024,000 lb. placing bar reinforcing steel.
(12) 2,250 lin. ft. steel railing.
(13) Lump sum, electric equipment.
(14) Lump sum, miscellaneous items of work.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	2.00	3.00	3.50	2.50	10.00	5.00	9.00	4.00	3.76	5.20	4.10
(2)	30.00	30.00	30.00	32.00	30.00	33.30	28.50	33.00	38.00	34.00	35.00
(3)	.08	.085	.08	.075	.078	.082	.093	.084	.082	.09	.10
(4)	.02	.015	.015	.03	.02	.023	.021	.028	.025	.02	.023
(5)	.45	.55	.94	.50	.45	.50	.61	.50	.53	.60	.65
(6)	27.00	22.00	35.00	20.00	30.00	13.50	12.36	27.00	17.00	34.00	30.00
(7)	2.00	2.75	2.00	2.25	2.00	1.80	2.17	2.00	2.40	2.41	2.35
(8)	50.00	40.00	80.00	35.00	30.00	32.00	29.00	60.00	85.00	100.00	40.00
(9)	25.00	30.00	10.00	15.00	15.00	27.50	32.00	50.00	25.00	15.00	17.00
(10)	.04	.045	.04	.045	.04	.047	.045	.04	.04	.047	.05
(11)	.02	.01	.01	.015	.02	.0145	.017	.015	.013	.015	.02
(12)	4.00	4.50	6.00	5.00	4.00	5.00	4.50	5.00	4.45	5.00	5.60
(13)	$3,500	$3,000	$2,500	$2,600	$3,250	$3,200	$3,744	$3,000	$4,000	$2,600	$1,700
(14)	$1,500	$1,000	$3,000	$1,400	$2,000	$1,400	$2,450	$2,500	$1,500	$1,600	$9,000

Irrigation . . .

California—Contra Costa County—Bureau of Reclamation—Earthwork and Structures

Parish Bros., Benicia, California, submitted the low bid of $345,885 for Schedule 1, and $223,089 for Schedule 2, to the Antioch office of the Bureau of Reclamation for the construction, earthwork, canal lining, and structures, Contra Costa Canal from Sta. 2321 plus 25 to the end, and Mountain View Reservoir, Delta Division, Central Valley Project. The project is located about 3 miles southeast of Martinez, Calif. The following unit bids were received based upon Specification No. 1172.

	Schedule 1	Schedule 2
(1) Parish Bros.	$345,885	$223,089
(2) Guerin Bros.	No Bid	279,580
(3) Guy F. Atkinson Company	393,285	305,360
(4) Fredrickson & Watson Construction Co.	384,580	345,429

SCHEDULE 1—CONTRA COST CANAL, STA. 2321/25 to 2512/25	(1)	(2)	(3)
23 acres clear orchards and vineyards	125.00	45.00	90.00
20 acres grub orchards and vineyards	125.00	65.00	40.00
65,000 cu. yd. excavation, all classes, canal	.45	.50	.57
400 cu. yd. excavation, all classes, subbase for structs.	5.00	3.00	1.80
100,000 sta. cu. yd. overhaul	.02	.025	.02
1,000 cu. yd. compact embankment	.35	.45	.56
400 cu. yd. gravel subbase under structures	5.00	6.00	5.00
51,000 cu. yd. excavation, all classes, structures	1.10	1.10	.96
18,800 sq. yds. trim fdns. for concrete lining	.35	.80	.65
42,000 cu. yd. backfill	.40	.38	.48
10,000 cu. yd. compact backfill	2.25	2.50	1.80
2,350 cu. yd. concrete in structures	62.00	72.00	72.00
1,550 cu. yd. concrete in canal lining	18.00	27.00	24.00
260,000 lbs. place reinforcement bars	.045	.04	.06
120 sq. ft. place elastic filler matl. in joints	1.00	2.00	.90
18,000 lbs. place metal water stops in joints	.15	.20	.24
200 sq. yds. dry-rock paving	5.75	10.00	5.00
500 lin. ft. drive timber piles	3.00	2.50	2.00
26 M.F.B.M. erect timber in structs. except cattle guards	140.00	90.00	93.00
10 ea. construct cattle guards	150.00	150.00	169.00
36 lin. ft. jack 6 ft. corr. metal pipe under railroad	35.00	40.00	28.00
50 lin. ft. jack 5 ft. 6 -in. corr. metal pipe under highway	22.00	40.00	26.50
300 lin. ft. lay 12 in. concrete pipe	1.50	1.00	.80
200 lin. ft. lay 15 in. concrete pipe	1.85	1.25	.95
200 lin. ft. lay 18 in. concrete pipe	3.00	1.60	1.05
60 lin. ft. lay 24 in. concrete pipe	4.00	2.25	1.35
3,500 lbs. inst. gates and gate hoists	.30	.20	.28
6,500 lbs. inst. miscellaneous metalwork	.30	.25	.48

SCHEDULE 2—CONTRA COST CANAL & MT. VIEW RESERVOIR (1)	(2)	(3)	(4)
13 acres clear orchards and vineyards 125.00	25.00	45.00	90.00
13 acres grub orchards and vineyards 125.00	25.00	45.00	40.00
2,000 cu. yd. exc., all cl., outlet and spillway channels .45	.42	.70	1.80
9,500 cu. yd. exc., strip down dam fdn. and borrow pits 1.00	.25	.35	.36
350 cu. yd. exc., all cl., embank. toe drains .85	.50	1.50	3.00
160,000 cu. yd. const. dam embankment .38	.625	.68	.77

(Continued on next page)

Now you can get what it takes

...to Handle Heavy Tonnage

GOOD NEWS! There's plenty of TIGER BRAND Wire Rope on the market again. Now... you can prove for yourself... on your own equipment... why Uncle Sam demanded so much of it—practically all we could make—these past four years! TIGER BRAND is as strong, as tough and as tireless as wire rope comes.

Consider, for instance, the experience of the Bonneville Dam contractor who, by using TIGER BRAND haulage lines, button lines and hoist lines on his two cableways, delivered two times more tonnage of concrete than the rope previously used. The extraordinary part of this operation was that after these ropes were removed from the cableways and put into service on excavating shovels and draglines, they still gave 75% of the life of ordinary new rope!

And here's why: U·S·S American TIGER BRAND Excellay Preformed Wire Rope is made of high tensile wire from select U·S·S Steel. It is extra strong, extra tough, extra flexible. It has high resistance to bending fatigue and abrasion. It stands up under long, hard service. It is safe... crown wires lie flat and in place even when broken.

You can depend on TIGER BRAND to help reduce maintenance and replacement costs... to do a more efficient job in every operation requiring wire rope. See your supplier today. He has, or can quickly get, TIGER BRAND for you. And if you have any questions about size and type, our wire rope experts will gladly work with you... without obligation.

. . .

EVERY SUNDAY EVENING, United States Steel presents *The Theatre Guild on the Air.* American Broadcasting Company coast-to-coast network. Consult your newspaper for time and station.

Excellay Preformed

COLUMBIA STEEL COMPANY
San Francisco · Los Angeles · Portland · Seattle · Salt Lake City
AMERICAN STEEL & WIRE COMPANY
Cleveland · Chicago · New York
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York
UNITED STATES STEEL

USS AMERICAN TIGER BRAND WIRE ROPE UNITED STATES STEEL

U·S·S AMERICAN
TIGER BRAND *Wire Rope*

10,000 lin. ft. sand-filled drain holes	1.45	2.00	.75	1.25
17,000 cu. yd. sand drain in dam embankment	2.25	3.40	4.00	3.45
6,000 cu. yd. riprap on dam	5.40	6.00	6.50	10.90
450 cu. yd. gravel surf. on dam crest	4.20	3.00	3.50	5.40
10,000 cu. yd. excav., all classes, structures	.65	1.00	1.00	1.80
3,000 cu. yd. backfill	.40	.35	.65	.48
2,500 cu. yd. compact backfill	2.25	2.50	2.50	1.80
480 cu. yd. concrete, structures	70.00	60.00	80.00	66.00
55,000 lb. place reinforcement bars	.045	.03	.05	.06
25 sq. ft. place elastic filler matl. in joints	1.00	1.00	2.00	1.00
10 lin. ft. place rubber water stops in joints	2.50	2.00	2.00	1.20
360. lb. place metal water stops in joints	.20	.25	.75	.50
600 sq. yd. dry-rock paving	5.75	10.00	10.00	5.00
1,400 lin. ft. 12-in. sewer pipe drain, uncemented joints	1.00	1.00	1.50	.80
100 lin. ft. lay 12-in. sewer pipe, cemented joints	1.50	1.25	1.00	1.20
2,100 lbs. inst. gates and gate hoists	.30	.25	.20	.40
7,100 lbs. inst. outlet pipes and valves	.30	.25	.15	.40
13,400 lbs. inst. miscellaneous metal work	.30	.20	.35	.48

Idaho—Valley County—Bureau of Reclamation—Earthwork, Track

H. B. Nicholson, Los Angeles, Calif., presented the lowest bid of $454,650 to the Bureau of Reclamation, Boise, for the completion of earthwork, structures, railway track and telegraph line for the relocation of the Idaho Northern branch of Oregon Short Line R.R. from Cascade to Donnelly. Unit bids received are as follows, for Specification No. 1142:

(1) H. B. Nicholson ..... $454,650 (2) J. A. Terteling & Sons $464,105

	(1)	(2)
12.60 mi. fine grading	850.00	600.00
42,000 cu. yd. com. exc., roadway	.55	.50
21,000 cu. yd. rock exc., roadway	1.75	3.00
850,000 sta. cu. yd. overhaul	.01	.02
40,000 cu. yd. riprap	3.50	2.50
1,000 cu. yd. backfill	1.00	1.00
1,000 cu. yd. compacting backfill	.50	5.00
400 tr. ft. galv. deck protection	5.00	1.50
231,000 lb. erect struct. steel	.04	.07
14.6 mi. lay track	$8,000	$9,800
8,500 ea. app. rail anchors	.10	.15
4 ea. turnouts	300.00	300.00
26,000 cu. yd. ballasting	2.70	2.00
1 mi. right-of-way fence	400.00	300.00
16 ea. cattle guards	75.00	200.00
12 M.F.B.M. highway crossing	100.00	60.00
1 mi. telegraph line	$1,000	$1,000
Lump sum, rem. and salv. materials	$30,000	$30,000

California—Fresno County—Bureau of Reclamation—Canal Lining, Earthwork

Peter Kiewit Sons' Co., San Francisco, was low bidder with $1,598,856 to the Bureau of Reclamation, Friant, for the construction of earthwork, canal lining, and structures for Friant-Kern Canal, Sta. 1144 plus 00 to 1591 plus 66 on the Central Valley Project situated about 18 miles east of Fresno. Unit bids received for Specification No. 1171 follow:

(A) Peter Kiewit Sons' Co. $1,598,856
(B) Arizona-Nevada Constrs. 1,652,805
(C) Morrison-Knudsen & M. H. Hasler 1,683,998
(D) W. E. Kier & Bressi-Bevanda 1,687,093
(E) Shofner, Gordon & Hinman $1,789,915
(F) Fredrickson & Watson 1,888,888
(G) Geo. Pollock Co. 1,937,838
(H) Grafe-Callahan Const. Co. 2,244,196

(1) 1,570,000 cu. yd. common canal excavation.
(2) 286,000 cu. yd. rock canal excavation.
(3) 171,000 sta. cu. yd. overhaul.
(4) 170,000 cu. yd. compact embankments.
(5) 28,000 cu. yd. comm. exc., drain. chan. and dikes.
(6) 12,000 cu. yd. rock exc., drain. chan. & dikes.
(7) 8,000 cu. yd. com. struc. excavation.
(8) 1,750 cu. yd. rock struct. excavation.
(9) 141,000 sq. yd. prep. rock fdns., conc. lin.
(10) 330,000 sq. yd. trim earth fdn., conc. lin.
(11) 6,200 cu. yd. backfill.
(12) 3,300 cu. yd. compact backfill.
(13) 200 sq. yd. dry-rock paving.
(14) 1,775 cy. yd. conc. in structures.
(15) 22,600 cu. yd. reinf. conc., canal lining.
(16) 22,600 cu. yd. unreinf. conc., canal lin.
(17) 1,170,000 lbs. pl. reinf. bars, canal lining.
(18) 260,000 lbs. place reinf. bars, structs.
(19) 760 sq. ft. pl. elast. joint filler matl.
(20) 140 lin. ft. place rubber water stops.
(21) 283 M.F.B.M. erect timber, structs.
(22) 2,500 lbs. inst. misc. metalwork.
(23) 24 ea., const. cattle guards.
(24) 16 mi. barb wire right-of-way fence.
(25) 2 mi. comb. right-of-way fence.
(26) 1,800 lin. ft. rem. exist. pipe lines.
(27) 800 lin. ft. lay 2½-in. and 3-in. iron pipe.
(28) 5,800 lin. ft. lay 4-in., 6-in. and 12-in. thn-wl. steel pipe.
(29) 16 lin. ft. lay 18-in. corr. metal pipe.
(30) 145 units orch. outlets and stand. pipes.
(31) 17,000 lin. ft. underdr., uncem. joints.
(32) 12,500 lin. ft. feeder drains.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	.28	.33	.26	.32	.37	.44	.48	.405
(2)	.28	.33	.26	.32	.37	.44	.48	.405
(3)	.02	.03	.10	.02	.04	.025	.01	.015
(4)	.40	.20	.22	.20	.20	.22	.18	.30
(5)	.36	.42	.56	.65	.48	.52	.30	1.00
(6)	.36	.42	.56	.65	.48	.52	.30	1.50
(7)	1.90	1.30	2.50	2.00	4.00	1.85	2.50	2.26
(8)	1.90	1.30	2.50	2.00	4.00	1.85	2.50	3.48
(9)	.40	.48	.56	.50	.48	.52	.50	1.00
(10)	.40	.48	.56	.50	.48	.52	.50	1.00
(11)	.85	.60	.38	.50	.30	.72	.50	.50
(12)	3.40	2.00	2.60	3.00	1.60	2.60	1.00	3.74
(13)	10.00	10.00	5.60	7.00	6.00	5.80	5.00	7.30
(14)	60.00	40.00	51.50	60.00	40.00	57.00	50.00	60.00
(15)	11.25	11.50	13.00	11.25	11.85	11.00	10.00	13.50
(16)	11.00	11.50	13.00	11.75	12.00	11.00	10.00	13.50
(17)	.035	.025	.028	.025	.03	.036	.03	.03
(18)	.06	.03	.028	.05	.035	.036	.03	.05
(19)	.75	1.25	.90	1.00	1.00	.60	5.00	.80
(20)	1.45	.30	2.00	1.00	2.00	1.25	2.00	1.60
(21)	90.00	100.00	100.00	85.00	90.00	94.00	65.00	90.00
(22)	.35	.50	.25	.30	.20	.20	.10	.97
(23)	250.00	200.00	180.00	150.00	150.00	144.00	300.00	320.00
(24)	500.00	350.00	780.00	500.00	450.00	536.00	750.00	800.00
(25)	$1,000	400.00	900.00	700.00	700.00	648.69	$1,000	$1,100
(26)	1.75	2.25	2.25	2.50	1.50	.70	3.00	2.20
(27)	1.75	1.10	1.15	1.00	1.00	.65	1.00	.76
(28)	2.00	2.00	1.80	1.50	1.70	.50	1.00	.77
(29)	3.00	3.00	3.25	3.00	5.00	1.25	3.00	3.00
(30)	85.00	20.00	22.50	15.00	15.00	6.00	50.00	33.00
(31)	1.20	1.50	1.50	1.25	2.10	1.50	3.00	1.79
(32)	.80	1.50	1.00	1.25	2.00	.85	3.00	1.63

CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $10,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information may be secured concerning employment conditions, wage rates, etc., by writing directly to the contractor. When available, the names of the supervisory personnel will be published in the "Supervising the Jobs" columns.

CONTRACTS AWARDED

Large Western Projects . . .

R. J. Daum, Inglewood, Calif., and **C. T. and W. P. Stover,** Claremont, Calif., have joined to build a $25,000,000 private housing project for Pomona Homes, which is composed of the contractors and Edwin A. Tomlin. The project will include 2,500 three-bedroom homes.

Reimers & Jolivette, Seattle, Wash., has started work remodeling a seven-story and basement office building at SW. Pine St. in Seattle. Macabe Co. of Seattle awarded the $1,000,000 contract.

C. F. Lytle Co. of Sioux City, Ia., and **Amis Construction Co.** of Oklahoma City, Okla., have received a $5,192,623 contract to construct a spillway and complete an embankment at Canton Dam on the North Canadian River in Blaine Co., Okla., from the Bureau of Reclamation.

P. J. Walker, Los Angeles, Calif., will receive $2,800,000 for building a 10-story office building with basement and sub-basement at 2nd and Spring Sts. in Los Angeles for the Times-Mirror Co.

Dinwiddie Construction Co. of San Francisco, Calif., received a contract from O'Connor, Moffatt & Co. for $1,250,000 to remodel the eight-story and basement department store building at Stockton St. near O'Farrell St., San Francisco.

Western Contracting Corp., Sioux City, Ia., will build Kanapolis Dam across the Smokey Hill River near Ellsworth and Salina, Kans. Costing $4,142,833, it will be 100 ft. high and 4,000 ft. long. The U. S. Engineers awarded the contract.

M & K Corp., San Francisco, has a $1,000,000 contract from Butler Packing Co. of Seattle, Wash., to construct a food packing plant at 98th Ave. and San Leandro Blvd. in Oakland, Calif.

Walton A. Gould Construction Co., San Carlos, Calif., is building a $2,000,000 housing project in San Carlos' Sunset Highlands. Composed of two subdivisions, there will be 108 homes in Project 1 and 100 homes in Project 2.

Del E. Webb Construction Co., Phoenix, Ariz., will construct a 120-room resort hotel including dining room, cocktail lounge, casino, lobby, glassed-in swimming pool and five cottages, in Las Vegas, Nev., for Billy Wilkerson & Associates, at a cost of $1,250,000.

Groves, Lundin & Cox of Minneapolis, Minn., has a $4,016,727 contract for construction of Wister Dam on Poteau River in Oklahoma, from the U. S. Engineers.

Swinerton & Walberg, San Francisco, has received a $1,100,000 contract from Matson Navigation Co. to build a 15-story and basement addition to the office building at Main and Market Sts., San Francisco.

Peter Kiewit Sons' Co. of Omaha, Neb., received the $3,377,605 contract to construct the next 15-mi. lap of Friant-Kern Canal in Fresno Co., Calif., part of the Central Valley Project of the Bureau of Reclamation. The work will include earthwork, concrete lining and structures from station 301 plus 60 to station

1144, and a wasteway at station 298 plus 66, about 15 mi. from Fresno.

Carroll Duncan & Co., Los Angeles, has a $1,000,000 contract to plaster the new Tripler General Hospital which is under construction in Honolulu, T. H., for the U. S. Army.

General Construction Co. of Seattle will receive $776,000 for the removal and disposal of two seaplane ramps, dredging three million cubic yards and construction of a breakwater and timber groin at Astoria, Ore., for the Bureau of Yards and Docks.

Allred & Enix Construction Co. of Pampa, Tex., is improving the water system for the city of Laramie, Wyo., at a cost of $692,000.

H. Mayson, Los Angeles, has a contract for $1,132,476 to construct a one and a two-story reinforced concrete ward building for disturbed females at Stockton State Hospital in Stockton, Calif., for the State Department of Public Works.

Highway and Street . . .

California

ALAMEDA CO.—**Lee J. Immell,** Box 65, Sta. A, Berkeley—$135,659 for 1.4 mi. widening and resurf., betw. distribution structs. and 7th St., Oakland—by Div. of Hwys., Sacramento. 3-15

ALAMEDA CO.—**A. S. Jones,** Box 3067, Brown's Valley Rd., Napa—$40,824 for 8.3 mi. hwy. improvements and widening of shoulders, Mission San Jose betw. Warm Springs and Centerville—by Div. of Hwys., Sacramento. 3-15

CONTRA COSTA CO.—**Guy F. Atkinson Co.,** Orange and Railroad Aves., San Francisco—$209,469 for 2.3 mi. grade and paving betw. Concord Ave. and .4 mi. W. of Ohmer Station—by Dept. of Public Works, Sacramento. 3-19

EL DORADO CO.—**H. Earl Parker,** 12th and F Sts., Marysville—$470,032 for 3.1 mi. of Placerville-Lake Tahoe highway in Eldorado Natl. Forest—by Public Roads Admin., San Francisco. 3-19

LAKE CO.—**Louis Biasotti & Son,** 40 W. Clay St., Stockton—$159,978 for 2 mi. grade. and surf. betw. 1.2 mi. N. of Rodman Narrow Rd. and Rt. 15—by Div. of Hwys., Sacramento. 3-28

LOS ANGELES CO.—**Griffith Co.,** 502 L. A. Railway Bldg., Los Angeles—$36,849 for pave. Anaheim St. 1,600 ft. E. from Vermont Ave., Los Angeles—by Board of Public Works, Los Angeles. 3-2

LOS ANGELES CO. — **Warren-Southwest, Inc.,** 2145 E. 25th St., Los Angeles—$35,118 for grade, paving and removal of walks and guard rails along Mission Rd. betw. Aliso and 1st Sts., Los Angeles—by Board of Public Works, Los Angeles. 3-1

MONTEREY CO.—**Granite Construction Co.,** Box 900, Watsonville—$227,373 for 1.9 mi. grade., paving and surf. shoulders, hwy. betw. 2 mi. S. of Salinas and Salinas—by Division of Hwys., Sacramento. 3-21

SISKIYOU CO.—**Clements & Co.,** Box 277, Hayward—$168,879 for 13.3 mi. surf. betw. Yreka and Camp Lowe—by Div. of Hwys., Sacramento. 3-25

Colorado

RIO BLANCO CO.—**Brown Construction Co.,** 1530 E. Abriendo, Pueblo—$55,401 for 1.2 mi. gravel surf. betw. Meeker and Craig on S. H. No. 13—by State Hwy. Dept., Denver. 3-15

Nevada

CLARK CO.—**Westbrook & Pope, Inc.,** 1331 C St., Sacramento, Calif. — $422,096 for 19 mi. of state hwy. from junction with U. S. 95, approx. 1 mi. N. of Nev.-Calif. state line to Davis Dam—by State Hwy. Dept., Carson City. 3-6

Oklahoma

MAJOR CO.—**Brewer, McMichael & Oliver,** Holdenville—.1 mi. grade. and surf. and 1 bridge 3 mi. S. of Fairview—by State Hwy. Commission, Oklahoma City. 2-27

Oregon

DOUGLAS CO.—**C. J. Eldon,** Box 5685, Kenton Sta., Portland—$150,319 for grade., surf. and oiling 5.8 mi. of Milo-Tiller section of Tiller-Trail secondary hwy. — by State Hwy. Commission, Salem. 3-15

LINN CO.—**Warren Northwest, Inc.,** Box 5072, Portland—$83,574 for 8 mi. pavement resurf., west unit, Lebanon-Sweet Home section of Santiam Hwy.—by State Hwy. Commission, Salem. 2-25

Texas

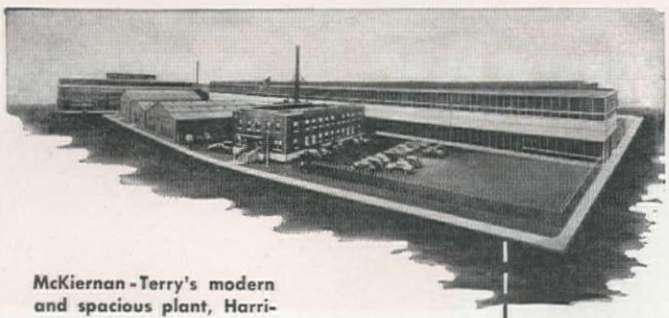
CALDWELL CO.—**McKown & Son,** Box 151, Austin—$239,564 for 19.1 mi. grade., structs. and base from Dockhart to Bastrop and from 6.8 mi. N. of Luling to County Rd. at McMahon, on Hwy. FM 20 and 86 —by State Hwy. Dept., Austin. 2-28

CAMERON CO. — **Harry Newton,** Graham — $138,441 for .2 mi. of Arroyo Colo. Bridge and roadway apprs. on U. S. 77 and 83—by State Hwy. Dept., Austin. 2-28

COKE CO.—**Bell & Braden,** Herring Hotel, Amarillo—$241,007 for 13 mi. road work on Hwy. 18—by State Hwy. Dept., Austin. 2-28

COTTLE & DICKENS COS. — **Plains Construction Co.,** Andrews — $38,082 for 8.1 mi. grade., drain, structs., etc. on FM 452 and 264—by State Hwy. Dept., Austin. 2-28

EASTLAND CO.—**A. L. Bucy,** 804 Ave.



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MK-110

McKiernan-Terry

McKIERNAN-TERRY CORPORATION

Manufacturing Engineers

16 Park Row **New York 7, N. Y.**

1, Brownwood—$59,734 for 5.5 mi. of structs., etc. on Hwy. FM 569—by State Hwy. Dept., Austin. 2-28

FLOYD CO.—**Kerr & Middleton,** Lubbock—$41,086 for 7.6 mi. structs., etc. on Hwy. 207 and Hwy. FM 135—by State Hwy. Dept., Austin. 2-28

KERR CO.—**Brazos Valley Construction Co.,** 411 Mid-Continent Bldg., Fort Worth—$256,878 for 5.7 mi .grade., structs., etc. on Hwys. 27 and 41—by State Hwy. Dept., Austin. 2-28

LIVE OAK CO.—**H. R. Henderson Co.,** Marshall—$101,633 for 11.7 mi. grade., structs., base and surf. on Hwy. 72—by State Hwy. Dept., Austin. 2-28

LUBBOCK CO.—**Kerr & Middleton,** Lubbock—$62,827 for 11.2 mi. base and base preservative on Hwy. FM 400—by State Hwy. Dept., Austin. 2-28

LYNN CO.—**Kerr & Middleton,** Lubbock—$69,995 for 11 mi. road work on Hwy. FM 211—by State Hwy. Dept., Austin. 2-28

PECOS CO.—**Uvalde Construction Co.,** Santa Fe Bldg., Dallas—$408,655 for 22.1 mi. of road work on U. S. 67—by State Hwy. Dept., Austin. 2-28

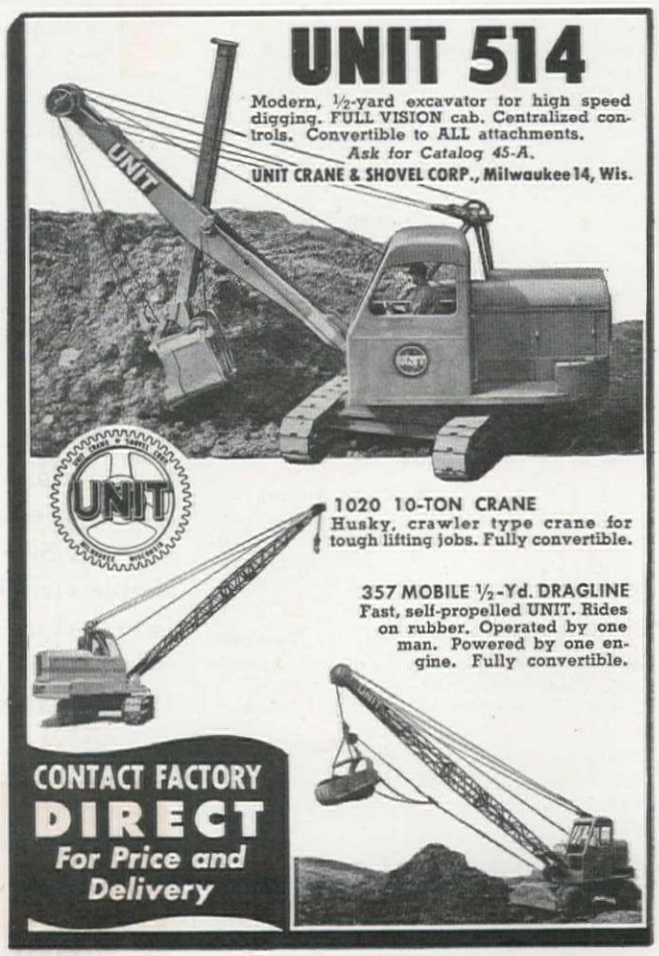
ROCKWALL CO.—**Russ Mitchell, Inc.,** 2302 Jefferson Ave., Houston—$168,276 for 4 mi. road work on Hwy. 205—by State Hwy. Dept., Austin. 2-28

SHACKLEFORD & CALLAHAN COS.—**Thomas & Ratliff,** Rogers—$268,915 for 24.5 mi. of road work on U. S. 183—by State Hwy. Dept., Austin. 2-28

STEPHENS CO.—**Austin Road Co.,** Box 1590, Dallas—$120,180 for 4.9 mi. of sectioning, extending structs., etc. on U. S. Hwy. 180—by State Hwy. Dept., Austin. 2-28

Utah

CARBON CO.—**W. W. Clyde,** N. Main St., Springville—$104,043 for 2-in. rd. mix bitu. surf., U. S. 50 betw. Price and Helper—by State Road Commission, Salt Lake City. 3-15



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MILLARD CO.—**Strong Co.,** Springville—$196,895 for 2½-in. surf. on 5 mi. of U. S. 91 betw. Holden and Scipio—by State Road Commission, Salt Lake City. 2-28

Washington

COWLITZ CO.—**Erickson Paving Co.,** 1550 N. 30th St., Seattle—$244,161 for grade. and resurf. 1.9 mi. State Hwys. 1 and 12, Kelso to Rocky Point and Allen St. connection—by Dept. of Hwys., Olympia. 3-25

KING CO.—**Toney Romano,** 1833 Dearborn St., Seattle—$48,770 for widening and repaving Boren Ave., Seattle—by Board of Public Works, Seattle. 3-22

KING CO.—**Superior Construction Co.,** 3281 36th Ave., Seattle—$11,827 for grading and conc. walks, 28th Ave. W., Seattle—by Board of Public Works, Seattle. 3-22

KLICKITAT CO.—**Cox Brothers,** Spokane—$171,331 for 6-mi. improvement project on Mount Adams Hwy., near White Salmon—by Public Roads Administration, Portland. 3-22

Bridge & Grade Separation...

California

SAN DIEGO CO.—**M. H. Golden Construction Co.,** 3485 Noell St., San Diego—$62,053 for reinf. conc. overcrossing over Balboa Parkway at Richmond St., San Diego—by Dept. of Public Works, Sacramento. 3-1

SOLANO CO.—**Healy-Tibbitts Construction Co.,** 1100 Evans Ave., San Francisco—$13,345 for repairing bridge fender across Napa R. at W. city limits of Vallejo—by Dept. of Public Works, Sacramento. 3-5

Oregon

CLATSOP CO.—**Philpott & Buckingham,** Portland—$16,680 for placing new timbers in two 105-ft. truss spans in Vine Maple Bridge over Nehalem R. on Fishhawk Falls Hwy.—By State Hwy. Commission, Salem. 2-25

Texas

HASKELL CO.—**J. B. Clardy Construction Co.,** 2213 Goldenrod, Fort Worth—$82,255 for .1 mi. on Double Mountain Fork of Brazos R. bridge and roadway apprs., near Rule—by State Hwy. Dept., Austin. 2-28

GRAND CO.—**T. H. Rowland,** Box 547, Clearfield—$22,992 for Bootlegger Wash conc. bridge on U. S. 50 betw. Thompson and Cisco—by State Road Commission, Salt Lake City. 3-6

Washington

COWLITZ CO.—**McRae Bros.,** 2733 4th St. S., Seattle—$207,231 for 3 reinf. conc. grade separation structs., State Hwy. 1, near Kelso, at Allen St. and Brinyon St.—by Dept. of Hwys., Olympia. 3-25

Airport...

Utah

WASHINGTON CO.—**W. W. Clyde & Co.,** N. Main St., Springville—$102,925 for clearing, grade., sealing NE.-SW. runway and clearing, grade., and smoothing NW-SE. landing strip, St. George Intermediate Field, St. George—by C. A. A., Santa Monica, Calif. 3-16

Water Supply...

Colorado

WELD CO.—**West Construction Co.,** Evans—$150,000 for water distribution line from Greeley to Evans—by City Council, Greeley. 3-9

Oregon

JACKSON CO.—**Thorburn & Logozo,** 4608 36th SW., Seattle, Wash.—$36,990 for installation of 2 mi. 8-in. main to connect with Medford city water system, and 9 mi. of water lines, Central Point—by City Council, Central Point. 3-1

Texas

TARRANT CO.—**Wyche & Bruce,** Box 249, Gonzales—$30,932 for pump sta., reservoir and water and sewer extensions, Handley—by Tarrant Co. Water Control & Improvement District No. 2, Fort Worth. 3-1

Washington

ADAMS CO.—**Hansen Construction Co.,** W. 232 Pacific Ave., Spokane—$35,574 for reinf. conc. tank, million-gal. capacity, Ritzville—by City Council, Ritzville. 3-5

PIERCE CO.—**Burrows & Milone,** 3215 S. M St., Tacoma—improvement of water systems in four local improvement districts, Tacoma—by City Council, Tacoma. 3-14

PIERCE CO.—**Paine & Gallucci, Inc.,** 1521 S. Grant, Tacoma—$60,660 for installation of cast iron water mains betw. Oakes and Warner Sts., from S. 56th to 64th Sts., Tacoma—by City Council, Tacoma. 3-21

PIERCE CO.—**Paine & Gallucci, Inc.,** 1521 S. Grant, Tacoma—water system improvements in one local district and insulating connections betw. Fletcher stand-pipe and distribution system, Tacoma—by City Council, Tacoma. 3-14

PIERCE CO.—**Paine & Gallucci, Inc.,** 1521 S. Grant, Tacoma—$37,500 for installation of cast iron water mains on S. 12th St. and Mason St., Tacoma—by City Council, Tacoma. 3-5

Wyoming

ALBANY CO.—**Allred & Enix Construction Co.,** Pampa, Tex.—$692,000 for improvements to water system, Laramie—by City Council, Laramie. 2-7

Sewerage...

California

CONTRA COSTA CO.—**McGuire & Hester,** 796 66th Ave., Oakland—$44,270 for sanitary sewers, Oakley—by Oakley Sanitary District, Oakley. 3-5

FRESNO CO.—**Pacific Pipeline Construction Co.,** 2268 Fire-

stone Blvd., Los Angeles—$15,651 for 6-in. and 8-in. vitrified sewer, High Addition, Clinton Terrace, Frisbee Tract and Weldon Terrace, Fresno—by City Council, Fresno. 3-1

LOS ANGELES CO.—**Tom L. Gogo,** 10024 S. Figueroa St., Los Angeles—$41,367 for sanitary sewer in Sylmar Ave. and Weddington St., Los Angeles—by Board of Public Works, Los Angeles. 3-1

LOS ANGELES CO.—**Martin Construction Co.,** 1529 Olympic Blvd., Montebello—$14,522 for installation of sewers, .78 mi., Wilmar Ave. district, Los Angeles—by County Board of Supervisors, Los Angeles. 3-1

LOS ANGELES CO.—**George Miller,** 3032 Bandini Blvd., Los Angeles—$54,418 for sewers in Isis Ave. and other sts., 3.4 mi., Los Angeles—by County Board of Supervisors, Los Angeles. 3-1

LOS ANGELES CO.—**V. C. K. Construction Co.,** 629 S. Atlantic Blvd., Los Angeles—$21,420 for Arlington Ave. extension trunk sewer, from P. E. RR. to first alley E. of Western Ave. on 108th St., Los Angeles—by Co. Sanitation District No. 5, Los Angeles. 3-8

LOS ANGELES CO.—**R. A. Wattson Co.,** 5528 Vineland Ave., N. Hollywood—$94,687 for sanitary sewer and resurf. of sts. in Teesdale Ave. and Valley Spring Lane sewer district, Los Angeles—by Board of Public Works, Los Angeles. 3-8

RIVERSIDE CO.—**Hoagland-Findlay Engineering Co.,** 3254 Cherry Ave., Long Beach—$34,456 for sewage treatment plant and appurtenances, Riverside—by City Council, Riverside. 3-8

SAN DIEGO CO.—**Haddock-Engineers, Ltd.,** 129 W. 2nd St., Los Angeles—$151,960 for portion of trunk sewer No. 2, Old Town to Cudahy and Linda Vista connection, San Diego—by City Council, San Diego. 3-8

SAN FRANCISCO CO.—**Lowrie Paving Co.,** 1540 16th St., San Francisco—$54,077 for constr. of Folsom St. sewer from 12th to 18th Sts., San Francisco—by Dept. of Public Works, San Francisco. 3-28

SAN FRANCISCO CO.—**Martin Murphy,** Rt. 2, Box 894, Walnut Creek—$37,572 for Hampshire St. sewer, 25th St. to Army St., San Francisco—by Dept. of Public Works, San Francisco. 3-14

Montana

ROOSEVELT CO. — **Elmer Johnson,** Glasgow—$63,000 for sewage treatment plant, Culbertson—by City Council, Culbertson. 3-20

Texas

BEXAR CO. — **Anderson & Waite Co.,** 606-7 American Hospital & Life Bldg., San Antonio—sanitary sewer main, S. Walters St. and on alley S. of Hicks St., San Antonio—by City Council, San Antonio. 2-28

Waterway . . .

California

LOS ANGELES CO.—**Standard Dredging Corp.,** 800 Central Bldg., Los Angeles—$76,000 for dredging Channel No. 3, Slip 5, Entrance Channel and adjacent to Pier D, Long Beach Harbor—by Board of Harbor Commissioners, Long Beach. 3-1

SAN DIEGO CO. — **Ofcco Construction Co.,** 2650 Cherry Ave., Long Beach—$274,289 and $833,650 for new connections to station's existing fresh water piping with branches and outlets, new extensions to water mains, boiler house work, steam distribution systems and other miscellaneous work, Piers 6 and 8, and Piers 10 through 13, San Diego — by U. S. Navy, Public Works Office, San Diego. 2-28

Oregon

CLATSOP CO. — **General Construction Co.,** 3840 Iowa St., Seattle—$776,000 for removal and disposal of two seaplane ramps, dreding of 3,000,000 cu. yd., constr. of breakwater and timber groin, Astoria—by Bureau of Yards and Docks, Seattle, Wash. 3-8

KITSAP CO. — **Scheumann & Johnson,** Lloyd Bldg., Seattle—$442,441 for subdivision of dry dock No. 3, Puget Sound Navy Yard, Bremerton—by Public Works Division, Puget Sound Navy Yard, Bremerton. 2-6

PIERCE CO.—**Don L. Cooney,** Securities Bldg., Seattle—$167,382 for constr. of pontoon camels to provide inactive fleet base, Todd Pacific Shipyards, Tacoma—by U. S. Navy, Seattle. 3-19

PIERCE CO.—**Puget Sound Bridge and Dredging Co.,** 2929 16th Ave. SW., Seattle —$54,282 for dredging inactive fleet base, Todd Pacific Shipyards, Tacoma — by Navy Bureau of Public Works, Seattle. 3-9

Territories

GUAM — **Guam Dredging Contractors,** Honolulu, T. H.—cost plus fixed fee interim contract for rehabilitation of Navy dredges, and dredging, Guam—by Bureau of Yards and Docks, Washington, D. C. 3-4

Dam . . .

Kansas

ELLSWORTH AND SALINE COS. — **Western Contracting Corp.,** 400 Warnock Bldg., Sioux City, Ia. — $4,142,833 for Kanapolis Dam, 100 ft. high, 4,000 ft. long, riprap on slope, compacted struct., across Smokey Hill R. near Ellsworth and Salina —by U. S. District Engineer Office, Kansas City, Mo. 3-20

New Mexico

OTERO CO.—**Jones & Jones,** Albuquerque—$84,164 for earthfill dam and water storage reservoir, Alamogordo — by City Council, Alamogordo. 3-25

Oklahoma

BLAINE CO.—**C. F. Lytle Co.,** Box 206, Sioux City, Ia., and **Amis Construction Co.,** Box 1871, Oklahoma City—$5,192,623 for spillway and completion of embankment, Canton Dam, N. Canadian R.—by U. S. Bureau of Reclamation, Washington, D. C. 2-28

LE FLORE CO.—**Groves, Lundin & Cox,** 908 Wesley Temple Bldg., Minneapolis, Minn.—$4,016,727 for Wister Dam on Poteau River—by U. S. Engineers, Tulsa. 3-19

Irrigation . . .

California

FRESNO CO. — **Bechtel Bros.-McCone,** 220 Bush St., San Francisco—$267,805 for Little Dry Creek siphon and wasteway on Friant-Kern Canal—by Bureau of Reclamation, Friant. 3-28

FRESNO CO.—**Peter Kiewit Sons' Co.,** 1024 Omaha Natl. Bank Bldg., Omaha, Neb. — $3,377,605 for next 15-mi. lap of Friant-Kern Canal: earthwork, conc. lining and structs., sta. 301 plus 60 to sta. 1144 and wasteway at sta. 298 plus 66, 14 mi. N. to 15 mi. E. of Fresno, Friant Division, Central Valley Project—by Bureau of Reclamation, Friant. 3-20

SISKIYOU CO.—**Clifford A. Dunn** and

Slate Construction Co., Box 431, Klamath Falls, Ore. — $145,558 for canals, laterals and drains, in Coppeck Bay area of Tule Lake Division, Klamath Reclamation Project—by Bureau of Reclamation, Sacramento. 3-5

STANISLAUS CO.—**Lloyd W. Terrell,** 221 9th Ave., Turlock—$10,000 for construction work in Chapman ditch, Turlock —by Turlock Irrigation District, Turlock. 3-5

Idaho

ADA CO.—**S. Relyea & Sons,** New Plymouth—$18,345 for levee repairs at Ballantine heading, 1 mi. E. of Eagle—by Army Corps of Engineers, Boise. 3-12

ADA & CANYON COS. — **S. Relyea & Sons,** New Plymouth—$13,300 for levee on Boise R. at Davis Place near Starr—by Bureau of Reclamation, Portland, Ore.

CANYON CO.—**S. Relyea & Sons,** New Plymouth — $13,587 for levee repairs at Raymond Black Place, 1.5 mi. W. of Middleton—by Army Corps of Engineers, Boise. 3-12

CANYON CO. — **Vernon Brothers, Inc.,** Box 1787, Boise — $15,220 for restoration and levee repair, Boise R. near Parma—Corps of Engineers, Portland, Ore. 3-25

Oregon

MALHEUR CO.—**Henry L. Horn,** 216 E. Logan St., Caldwell, Ida.—$177,700 for 2-mi. earth and conc. lined wasteway for Owyhee Project, 10 mi. SW. of Nyssa—by Bureau of Reclamation, Boise. 3-23

Utah

UTAH CO.—**The Utah Construction Co.,** Ogden—$538,185 for fabrication of plate steel pipe for high-pressure parts of Salt Lake Aqueduct from Deer Creek Dam, Provo Canyon—by Bureau of Reclamation, Provo. 2-28

UTAH CO.—**Carl B. Warren,** 2601 Dakota, Spokane, Wash.—$442,751 for laying 4.5 mi. of steel pipe for 41-mi. Salt Lake Aqueduct from Deer Creek Dam, Provo Canyon — by Bureau of Reclamation, Provo. 3-6

Tunnel . . .

Washington

CHELAN CO.—**Ole Singstad,** Engineer, New York, N. Y.—$40,000 for survey of Cascade tunnel route—by State Toll Bridge Authority, Olympia. 3-20

Power . . .

New Mexico

LINCOLN & OTERO COS.—**J. H. Baxter & Co.,** 333 Montgomery St., San Francisco—$73,548 for delivery of 1,140 poles for bldg. the 55-mi. Alamogordo-Hollywood section of 120-mi. Las Cruces-Hollywood 115,000-volt transmission line — by Bureau of Reclamation, Denver, Colo. 3-29

Oregon

LINN AND LINCOLN COS.—**H. H. Walker,** 1323 Venice Blvd., Los Angeles —$69,932 for Albany-Toledo 115-kv. wood pole transmission line, 2 mi. NW. of Albany west to .25 mi. E. of Toledo—by Bonneville Power Administration, Portland. 3-8

Washington

SPOKANE AND STEPHENS COS.—**H. H. Walker, Inc.,** Ellensburg—$124,064 for 62 mi. Spokane-Colville transmission line—by Bonneville Power Administration, Spokane. 3-7

Building . . .

Arizona

MARICOPA CO.—**Ray Bradley,** Phoenix —$50,000 for modern bldg., 709-11 E. Indian School Rd., Phoenix—by Sam Reich, Phoenix.

MARICOPA CO. — **Clinton Campbell Construction Co.,** Phoenix—$100,000 for 5-story bldg. for auto servicing and parking, E. Adams St., Phoenix — by Hotel Adams Co., Phoenix. 3-3

MARICOPA CO. — **Del E. Webb Construction Co.,** Box 4066, Phoenix—$120,000 for adding 8 stories to 1-story bldg., 141 N. Central Ave., Phoenix—by Valley National Bank, Phoenix. 3-7

MARICOPA CO. — **Del E. Webb Construction Co.,** Box 4066, Phoenix—$65,000 for seed warehouse and mill bldg., S. 23rd Ave., Phoenix—by Northrup-King & Co., Minneapolis, Minn. 3-3

California

ALAMEDA CO. — **Empire Construction Co., Ltd.,** 344 Harriet St., San Francisco —$75,000 for reinf. conc. store bldg., Broderick St., Oakland—by Norman Ogilare, Oakland. 3-25

ALAMEDA CO.—**Larsen & Larsen,** 629 Bryant St., San Francisco—$80,000 for 1-story brick factory bldg., 916 98th Ave., Oakland—by Barr Foods, Inc., Oakland. 3-12

ALAMEDA CO.—**M & K Corp.,** 405 Montgomery St., San Francisco—$1,000,000 for food packing plant, 98th Ave. and San Leandro Blvd., Oakland—by Butler Packing Co., Seattle. 3-1

ALAMEDA CO.—**Stolte, Inc.,** 8451 San Leandro Blvd., Oakland—$50,000 for warehouse and office bldg., 1916 Webster St., Alameda—by Rosefield Packing Co., Alameda. 3-21

ALAMEDA CO.—**C. H. Thrams,** 1100 6th Ave., Oakland—$90,000 for alterations to dairy bldg., 2743 San Pablo Ave., Oakland—by Borden's Dairy Delivery Co., Oakland. 3-26

CONTRA COSTA CO.—**Empire Construction Co.,** 344 Harriet St., San Francisco—$100,000 for 2-story department store and remodeling of Keller Bldg., 10th St., Richmond—by Alberts, Inc., Richmond. 3-22

CONTRA COSTA CO.—**Elmer J. Freethy,** 1432 Kearney St., El Cerrito—$262,161 for 2 conc., frame and stucco school bldgs., Castro School, Donal Ave. and Lawrence St., El Cerrito, and Alvarado School, Placer and Sutter Sts., Richmond—by Richmond Union School District, Richmond. 3-8

CONTRA COSTA CO.—**W. K. Owen,** 5755 Landgren Ave., Emeryville—$60,000 for masonry mfg. and office bldg., 1141 S. 14th St., Richmond—by National Oil Products Co., Richmond. 3-22

CONTRA COSTA CO.—**Stolte, Inc.,** 8451 San Leandro Blvd., Oakland—$132,700 for corner furniture store bldg., alterations to adjacent bldg. and new adjoining bldg., Railroad Ave. and E. 7th St., Pittsburg—by Camillo Lamzafame, San Francisco. 3-5

DEL NORTE CO.—**Mercer-Fraser Co.,** 2nd and Commercial Sts., Eureka—$250,000 for 3-story, L-shaped, redwood frame resort hotel, swimming pool, parking lot, driveway, Redwood Hwy., Smith River—by H. A. Saunders, Astoria, Ore. 3-4

FRESNO CO.—**Fisher & McNulty,** Pacific Southwest Bldg., Fresno—$200,000 for packing plant, 1625 Tulare St., Fresno—by California Packing Corp., Fresno. 3-28

FRESNO CO.—**Franceschi Construction Co.,** 845 Marina Blvd., San Francisco—$350,000 for storage warehouse, 20 loading doors and special conveyor system, Church and East Aves., Fresno—by Roma Wine Co., Fresno. 3-1

FRESNO CO.—**E. S. McKittrick Co.,** 610 16th St., Oakland—$190,000 for reinf. conc. mill bldg. and silos, 315 N. H St., Fresno—by J. B. Hill Co., Fresno. 3-20

KERN CO.—**Roy Wattenbarger,** 511 Woodrow St., Oildale—$78,500 for ten homes for sale to veterans, Standard Park Tract 1270, Bakersfield—by self. 3-23

LOS ANGELES CO.—**Aetna Construction Co.,** 631 S. Witmer St., Los Angeles—$290,400 for 11 4-family, 18-room, frame and stucco apartment buildings, 2400 block, Silver Lake Blvd., Los Angeles—by self. 3-15

LOS ANGELES CO.—**Aldon Construction Co.,** 6233 Wilshire Blvd., Los Angeles—$65,000 for reinf. conc. cafe bldg., 151 Ocean Front Blvd., Venice—by N. H. Schur, Beverly Hills. 3-15

LOS ANGELES CO.—**The Austin Co.,** 777 E. Washington Blvd., Los Angeles—$350,000 for steel frame factory bldg., Valley Blvd., Los Angeles—by Square D. Electric Co., Los Angeles. 3-1

LOS ANGELES CO.—**The Austin Co.,** 777 E. Washington Blvd., Los Angeles—constr. of three or four bldgs. for new glass container factory, betw. Valley Blvd. and S. P. tracks, and Arden Dr. and Rio Hondo Rd., El Monte—by Ball Bros., Muncie, Ind. 3-22

LOS ANGELES CO.—**The Austin Co.,** 777 E. Washington Blvd., Los Angeles—$140,000 for warehouse and office bldg., 900 N. Cahuenga Blvd., Los Angeles—by Upjohn Co., Kalamazoo, Mich. 3-7

LOS ANGELES CO.—**S. N. Benjamin,** 718 E. 16th St., Los Angeles—$75,000 for 2-story store bldg., 1043-45 Broxton Ave., W. Los Angeles—by Janss Investment Co., W. Los Angeles. 3-15

LOS ANGELES CO.—**Biltmore Homes, Inc.,** 6330 Cherry Ave., Long Beach—60 3-bedroom homes in N. Long Beach district—by M. Taper, Long Beach. 3-8

LOS ANGELES CO.—**Biltmore Homes, Inc.,** 6330 Cherry Ave., Long Beach—2-story, 23-unit apartment-hotel bldg., Atlantic Ave., Lynwood. 3-8

LOS ANGELES CO.—**Charles T. Bingemer,** 14611 Arminta St., Van Nuys—$80,000 for 32-unit, 96-room, frame and stucco bungalow court, 14619-37 Arminta St., Van Nuys—by self. 3-15

LOS ANGELES CO.—**C. F. Braun & Co.,** 1000 S. Fremont Ave., Alhambra—$150,000 for 2-story office bldg., 1000 S. Fremont Ave., Alhambra—by self. 3-1

LOS ANGELES CO.—**Buffums,** 135 Pine Ave., Long Beach—$70,000 for altering department store bldg., 147 Pine Ave., Long Beach—by self. 3-22

LOS ANGELES CO.—**J. E. Burrell & Son,** 518 W. 17th St., Long Beach—$73,400 for longshoremen's dispatch hall, Broad Ave. and D St., Wilmington—by Long Beach Harbor Commission, Long Beach. 3-1

LOS ANGELES CO.—**Buttress & McClellan,** 1013 E. 8th St., Los Angeles—$60,000 for conc. machine shop bldg., 3656 9th Ave., Los Angeles—by Pacific Brake Co., Los Angeles. 3-15

LOS ANGELES CO.—**Noel M. Calhoun,** 845 N. Highland Ave., Los Angeles—$100,000 for auto sales and service garage bldg.,

28th St. and Crenshaw Blvd., Los Angeles —by Crenshaw Co., Los Angeles. 3-1

LOS ANGELES CO. — **California National Builders,** 128 S. La Brea Ave., Los Angeles — $144,000 for 8 22-room, 8-unit apartment bldgs., 4500 block, Banner Dr., Long Beach—by Banner Investment Co., Long Beach. 3-22

LOS ANGELES CO.—**Contracting Engineers Co.,** 2310½ W. Vernon Ave., Los Angeles — $65,000 for 96x100-ft. restaurant bldg., 2902 Wilshire Blvd., Santa Monica—by Harold Gelber, Los Angeles. 3-15

LOS ANGELES CO.—**Contracting Engineers Co.,** 2310½ W. Vernon Ave., Los Angeles—$250,000 for reinf. conc. and brick factory bldg., 60th and Gramercy Sts., Los Angeles—by Crown Upholstering Co., Los Angeles. 3-8

LOS ANGELES CO.—**Ted R. Cooper Co.,** 1121 S. Hill St., Los Angeles—$51,400 for 1-story masonry factory bldg., 240 W. Ave. 26, Los Angeles—by Sani-Gard Cover Co., Los Angeles. 3-8

LOS ANGELES CO.—**Coronet Construction Co.,** 5733 Lankershim Blvd., N. Hollywood—$142,000 for 20 6-room dwellings, Califa St., N. Hollywood — by Leonard Chudacoff, N. Hollywood. 3-8

LOS ANGELES CO. — **William Curlett,** 2940 E. Pacific Coast Hwy., Long Beach—$60,000 for 3 adjoining store bldgs., Crenshaw Blvd., Los Angeles — by Dr. Lewis Stanton, Los Angeles. 3-1

LOS ANGELES CO.—**R. J. Daum, C. T. and W. P. Stover,** 116 N. Alexander Ave., Claremont — $25,000,000 for 2,500 3-bedroom homes, private housing project, W. Pomona—by Pomona Homes, Pomona. 8-22

LOS ANGELES CO.—**DeCamp-Hudson Co.,** 1277 W. 24th St., Los Angeles—$81,500 for 1-story frame and stucco school bldg., Dominguez Elementary School, 21250 Santa Fe Ave., Dominguez—by Board of Education, Los Angeles. 3-1

LOS ANGELES CO.—**James J. Drouillard,** 553 Buffalo Ave., Van Nuys—$150,000 for 1- and part 2-story, steel and wood frame factory bldg., 8687 Otis St., South Gate—by Paul B. Sogg, W. Los Angeles. 3-22

LOS ANGELES CO.—**George Familian,** 3801 Longridge Ave., Van Nuys — $62,000 for 13-unit, 39-room frame and stucco apartment bldg., 1659-61 Rodney Dr., Los Angeles—by self. 3-8

LOS ANGELES CO.—**Gorelnik Co.,** 1220 S. La Brea Ave., Los Angeles—$171,450 for 35 6-room, frame and stucco houses, Venice—by self. 3-15

LOS ANGELES CO.—**M. S. Jepsen,** 1540 S. Robertson Blvd., Los Angeles—$50,000 for 100-room, 30-unit, 2-story apartment bldg., 1834 Montana Ave., Santa Monica—by self. 3-1

LOS ANGELES CO.—**Scott King,** 575 S. Sepulveda Blvd., W. Los Angeles—$65,000 for 44-room, conc. block motor court, 400 S. Sepulveda Blvd., W. Los Angeles—by Dr. H. E. Horner, W. Los Angeles. 3-1

LOS ANGELES CO. — **Kersey Kinsey,** 12345 Ventura Blvd., Studio City — $70,000 for 5-unit store bldg., 5623-33 Lankershim Blvd., N. Hollywood—by Ray Woodruff, N. Hollywood. 3-1

LOS ANGELES CO.—**Los Feliz Investment Co.,** 10845 Lindbrook Dr., W. Los Angeles — $70,000 for 1-story and mezzanine store bldg., 3339 W. 43rd St., Los Angeles—by self. 3-22

LOS ANGELES CO.—**Joshua H. Marks Co.,** 816 W. 5th St., Los Angeles—$256,000 for additions to Motion Picture Country House, 23350 Mulholland Dr., Los Angeles—by Motion Picture Relief Fund, Inc., Los Angeles. 3-25

LOS ANGELES CO.—**A. Markowitz & Sons,** 9237 Doheny Rd., Los Angeles—$80,000 for 48-room, frame and stucco hotel bldg., 2025 Argyle Ave., Los Angeles—by self. 3-22

LOS ANGELES CO.—**D. B. Martinoli,** 3434 Chesapeake Ave., Los Angeles—$55,360 for 3 3-family frame and stucco apartment bldgs., 4415-31 Exposition Blvd., Los Angeles—by self. 3-1

LOS ANGELES CO—**The McCarthy Co.,** 1138 S. Broadway, Los Angeles—$188,200 for 30 6-room, frame and stucco homes, 6200 block W. 96th St. and 9400 and 9500 blocks, Kellyfield, Venice.—by self. 3-22

LOS ANGELES CO.—**W. H. McCune, Jr.,** 315 E. Foothill Blvd., Monrovia—$65,000 for 1-story store bldg., Myrtle and Maple Aves., Monrovia — by Monrovia Plumbing Supply Co., Monrovia. 3-15

LOS ANGELES CO. — **Modern Builders Construction Co., Inc.,** 2812 Long Beach Blvd., Long Beach—$80,500 for recreation bldg., gunite constr., 3900-22 E. Ocean Blvd., Long Beach—by Howard E. Rogers and W. M. Gleason, Long Beach. 3-15

LOS ANGELES CO. — **Modern Builders Construction Co., Inc.,** 2812 Long Beach Blvd., Long Beach—$50,000 for 1-story and basement apartment, office and storage bldg., 2801-15 Elm Ave., Long Beach—by Richard C. Cheroske, Long Beach. 3-8

LOS ANGELES CO.—**Elmer D. Morse,** 2203 N. Beachwood Dr., Los Angeles—$100,000 for 2- and part 3-story, 60-room, 12-unit apartment bldg., Wilshire Blvd., near Glendon Ave., W. Los Angeles. 3-15

LOS ANGELES CO.—**The Murch Construction Co.,** 1044 S. Robertson Blvd., Los Angeles — $75,000 for 10-family, 50-room, conc. block apartment court, 901-15 Levering Ave., W. Los Angeles—by Marvin A. Kahn, Los Angeles. 3-8

LOS ANGELES CO. — **Murray-Kelso Corp.,** 13701 Riverside Dr., Van Nuys—15 6-room frame and stucco dwellings, Van Nuys—by self. 3-8

LOS ANGELES CO.—**Wm. P. Neil Co., Ltd.,** 4814 Loma Vista Ave., Vernon—$500,000 for 1- and part 2-story warehouse bldg., District Blvd. and 59th St., Central Manufacturing District, Los Angeles—by United Whelan Import Corp., Los Angeles. 3-8

LOS ANGELES CO.—**Wm. P. Neil Co., Ltd.,** 4814 Loma Vista Ave., Los Angeles—$120,000 for triangular shaped addition to grocery warehouse, 4433 E. 49th St., Vernon — by Central Manufacturing District, Vernon. 3-11

LOS ANGELES CO.—**Harvey A. Nichols Co.,** 936 E. Slauson Ave., Los Angeles—$76,208 for improvements to Pilgrimage Playhouse, 2580 Highland Ave., Los Angeles — by County Board of Supervisors, Los Angeles. 3-22

LOS ANGELES CO.—**C. L. Peck,** 223 H. W. Hellman Bldg., Los Angeles—$400,000 for 2-story, steel frame with brick filler-wall addition and alterations to mortuary bldg., 1712 Glendale Ave., Glendale — by Forest Lawn Co., Glendale. 3-22

LOS ANGELES CO.—**Charles W. Pettifer,** 703 W. 14th St., Long Beach—$200,000 for 2-story and basement furniture store bldg., 1969-79 American Ave., Long Beach —by Davis Furniture Co., Long Beach. 3-22

LOS ANGELES CO.—**Barnett C. Poles,** 432 S. Palm Dr., Beverly Hills—$50,000 for 4-unit apartment bldg. and garages, 212 S. Rexford Dr., Beverly Hills—by Louis Feldman, Los Angeles. 3-22

LOS ANGELES CO.—**C. E. Polikowsky,** 2088 Galbraith Rd., Pasadena—$65,000 for addition to bakery bldg., 469 W. 9th St., San Pedro—by DiCarlo's National Bakery Co., San Pedro. 3-8

LOS ANGELES CO.—**L. E. Shepard** and **Elder R. Morgan,** 2300 Huntington Dr., San Marino—$150,000 for 2-story store and office bldg., 2300-16 Huntington Dr., San Marino—by selves. 3-1

LOS ANGELES CO.—**Charles E. Shipp,** 1328 4th Ave., Los Angeles—$50,000 for 6-family, 20-room, frame and stucco apartment bldg., 419 Landfair Ave., W. Los Angeles—by Mildred and Harry W. Walker, Jr., Los Angeles. 3-22

LOS ANGELES CO.—**Standard Gypsum Co. of Calif.,** 1924 Broadway, Oakland—$280,500 for 2-story factory bldg., steam plant, trestle driveway to dock, altering storage bldg., and 2-story addition to calcining and bagging bldg., 1301 Water St., Long Beach—by self. 3-15

LOS ANGELES CO.—**Stanton-Reed Co.,** 816 W. 5th St., Los Angeles—$350,000 for 4-story medical bldg. with basement garage, S. Beverly Dr. and Gregory Way, Beverly Hills—by Victor Orsatti, Beverly Hills. 3-15

LOS ANGELES CO. — **Steed Bros.,** 714

PACIFIC WIRE ROPE COMPANY
LOS ANGELES 21, CALIF., U.S.A. *BRANCHES:*
SAN FRANCISCO HOUSTON PORTLAND

Date Ave., Alhambra—$200,000 for 1-story and basement store bldg., 421 E. Main St., Alhambra—by Liebergs', Inc., Alhambra. 3-8

LOS ANGELES CO. — **Steed Bros.,** 714 Date Ave., Alhambra—$165,000 for church plant: sanctuary, church school and social hall, N. Tyler Ave., betw. Montecito and Bryant Sts., El Monte—by First Methodist Church, El Monte. 3-15

LOS ANGELES CO. — **Steed Bros.,** 714 Date Ave., Alhambra—$250,000 for reinf. conc. and steel store bldg., 401 E. Main St., Alhambra—by Ashburn Furniture Co., Alhambra. 3-6

LOS ANGELES CO.—**C. T. and W. P. Stover,** 116 N. Alexander Ave., Claremont —$1,000,000 for factory and administration bldg., 10-ac. site, Reservoir St. and Lexington Ave., Pomona — by Salsbury Motors, Inc., Los Angeles. 3-1

LOS ANGELES CO.—**T-S Construction Engineers, Inc.,** 530 W. 6th St., Los Angeles — $400,000 for 3-story masonry and conc. office bldg., 446-60 Boylston St., Los Angeles—by Ford J. Twaits Co., Los Angeles. 3-22

LOS ANGELES CO.—**T-S Construction Engineers, Inc.,** 530 W. 6th St., Los Angeles—$135,000 for 1-story auto sales and restaurant bldg., Green St., Pasadena—by Pasadena Winter Gardens, Inc., Pasadena. 3-22

LOS ANGELES CO. — **Vinnell Co.,** 108 W. 6th St., Los Angeles—$190,000 for 2-story conc. and steel nose hangar bldg., 5901 W. Imperial Hwy., Venice—by Transcontinental & Western Air, Inc., Los Angeles. 3-8

LOS ANGELES CO.—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles—$700,000 for 4-story reinf. conc. and terra cotta telephone bldg., 434 S. Grand Ave., Los Angeles—by So. California Telephone Co., Los Angeles. 3-22

LOS ANGELES CO.—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles—$2,800,000 for 10-story, basement and subbasement office bldg., 2nd and Spring Sts., Los Angeles—by Times-Mirror Co., Los Angeles. 3-15

LOS ANGELES CO.—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles—$160,000 for 2-story steel and conc. telephone bldg., 14717 Van Owen St., Van Nuys—by So. California Telephone Co., Los Angeles. 3-6

LOS ANGELES CO. — **Samuel Widre,** 517 N. Orlando Ave., Los Angeles—$200,000 for four 32-room, 8-unit apartment bldgs., Oak St. and Euclid Ave., Santa Monica—by self. 3-8

LOS ANGELES CO. — **Willens & Bertisch Co.,** 6324 Santa Monica Blvd., Los Angeles—$110,000 for 2-story, steel frame and stucco factory bldg., 2100 S. Broadway, Los Angeles—by Globe Lighting Products Co., Los Angeles. 3-15

MARIN CO. — **Central California Construction Co.,** 116 Erie St., San Francisco —$69,987 for theater bldg., Fairfax — by Blumenfeld Theaters, San Francisco.. 3-28

MARIN CO.—**DeLuca & Son,** 1745 Filbert St., San Francisco—$60,000 for drive-in fountain and restaurant, Corte Madera Rd. intersection and Hwy. 101, Corte Madera—by E. C. Noon, Sausalito, and O. M. Leth-Weile, San Francisco. 3-22

MARIN CO. — **Joe Hornsby,** 135 Evergreen Ave., Mill Valley—$85,000 for supermarket and professional office bldg., Locust St. and Miller Ave., Mill Valley—by Manuel Azevedo, Mill Valley. 3-22

MONTEREY CO.—**Elio & Vassallo,** 201 Eardley, Pacific Grove—$350,000 for three reduction plants, Monterey—by San Carlos Canning Co., Monterey. 3-21

MONTEREY CO.—**Stolte, Inc.,** 8451 San Leandro St., Oakland—$52,521 for 1-story reinf. conc. bank bldg., Alisal St. E., Salinas—by Monterey Co. Trust & Savings Bank, Salinas. 3-26

ORANGE CO.—**Boulevard Improvement Co.,** 4157 W. 5th St., Los Angeles—$100,000 for 18 3-bedroom homes, 400 block Flower and 19th Sts., Costa Mesa—by self. 3-22

SACRAMENTO CO. — **James F. Butts,** 1312 Del Paso Blvd., Sacramento—$66,000 for 17-unit motel, office, apartment, recreation space, garages, Sacramento—by Chas. McGowan, Sacramento. 3-21

SACRAMENTO CO.—**A. E. Erickson & Sons,** 1932 El Monte Ave., N. Sacramento —$80,000 for reinf. conc. wood frame store bldg., 1324 J St., Sacramento—by J. Blumenfeld, Sacramento. 3-28

SACRAMENTO CO. — **Lawrence Construction Co.,** 3020 V St., Sacramento—$77,845 for Sacramento South office bldg., 2216 Stockton Blvd., Sacramento—by Pacific Telephone & Telegraph Co., San Francisco. 3-11

SACRAMENTO CO.—**H. W. Robertson,** 2917 T St., Sacramento—$100,000 for 2-story, conc. and frame bldg., 21st and J Sts., Sacramento—by Haven Saw & Tool Co., Oakland. 3-26

SACRAMENTO CO.—**Stolte, Inc.,** 8451 San Leandro St., Oakland—$85,000 for reinf. conc. bldg., showroom, office, parts dept. and tractor repair dept., 19th and Broadway, Sacramento. 3-25

SACRAMENTO CO.—**Transwestern Construction Co.,** 1402 Front St., San Francisco—$52,000 for 1-story reinf. conc. auto display bldg., 17th and K Sts., Sacramento—by Alison Ware and Assoc., Sacramento. 3-28

SAN BERNARDINO CO.—**McNeil Construction Co.,** 5860 Avalon Blvd., Los Angeles—$85,000 for 1-story masonry bank bldg., Barstow—by Bank of America, Los Angeles. 3-8

SAN BERNARDINO CO.—**J. N. Robertson,** 511 Base Line, San Bernardino—$50,000 for 2-story, reinf. conc. music studio bldg., 1172 E St., San Bernardino—by Harry Braviroff, San Bernardino. 3-22

SAN DIEGO CO.—**F. E. Young,** 2141 Main, San Diego—$74,850 for reinf conc. community center bldg., Santa Monica Ave., W. of Ebers St., Ocean Beach, San Diego—by City Council, San Diego. 3-15

SAN FRANCISCO CO.—**W C. Akard,** 225 Cervantes Blvd., San Francisco—$54,000 for 2-story and mezzanine, class C, industrial bldg., 9th St., between Mission and Howard Sts., San Francisco—by Julius Harband, San Francisco. 3-19

SAN FRANCISCO CO.—**Cahill Bros.,** 206 Sansome St., San Francisco—$70,000 for foundations of Merchandise Mart addition, 9th and Market Sts., San Francisco—by Western Merchandise Mart, San Francisco. 3-5

SAN FRANCISCO CO.—**Cahill Bros.,** 206 Sansome St., San Francisco—$460,000 for 5-story and basement reinf. conc. office bldg., Battery, California and Halleck Sts., San Francisco—by John R. Cahill, San Francisco. 3-8

SAN FRANCISCO CO.—**Gene Compton Corp.,** 144 Ellis St., San Francisco—$111,000 for 2-story, class C, reinf. conc. and frame laundry bldg., 18th and Folsom Sts., San Francisco—by Green Glen Dairy Corp., San Francisco. 3-22

SAN FRANCISCO CO.—**Dinwiddie Construction Co.,** Crocker Bldg., San Francisco—$700,000 for remodeling 9-story, reinf. conc., struct. steel department store bldg., Geary and Stockton Sts., San Francisco—by I. Magnin & Co., San Francisco. 3-22

SAN FRANCISCO CO.—**Dinwiddie Construction Co.,** Crocker Bldg., San Francisco—$540,000 for 7-story, reinf. conc. warehouse bldg., Howard and 5th Sts., San Francisco—by The Emporium, San Francisco. 3-22

SAN FRANCISCO CO.—**Dinwiddie Construction Co.,** Crocker Bldg., San Francisco—$1,250,000 for remodeling 8-story and basement, reinf. conc. and struct. steel store bldg., Stockton St., cor. O'Farrell St., San Francisco—by O'Connor, Moffatt & Co., San Francisco. 3-22

SAN FRANCISCO CO.—**Dinwiddie Construction Co.,** Crocker Bldg., San Francisco—$175,000 for 2-story, class B warehouse and office bldg., 17th and Harrison Sts., San Francisco—by Pacific Coast Aggregates, Inc., San Francisco. 3-8

SAN FRANCISCO CO.—**E. S. McKittrick Co., Inc.,** 610 16th St., Oakland—$151,500 for 2-story and basement class B warehouse for drugs, 4th and Clementina Sts., San Francisco—by S. E. Massengill Co., San Francisco. 3-18

SAN FRANCISCO CO. — **Swinerton & Walberg,** 225 Bush St., San Francisco—$235,000 for interior and exterior remodeling of 6-story and basement warehouse and garage, converting it to 4 floors of offices and 3 floors of garage, 115 Battery St., San Francisco — by Robert Dollar Co., San Francisco. 3-26

SAN FRANCISCO CO. — **Swinerton & Walberg,** 225 Bush St., San Francisco—$1,100,000 for 15-story and basement addition to office bldg., Main and Market Sts., San Francisco—by Matson Navigation Co., San Francisco. 3-1

SAN FRANCISCO CO.—**Ed Zinkand & Son,** 667 36th Ave., San Francisco—$52,000 for 1-story frame market bldg., 25th Ave. and Noriega St., San Francisco. 3-19

SAN JOAQUIN CO. — **Associated Refrigerating Engineers,** 2100 E. Vernon Ave., Los Angeles—$175,000 for ice manufacturing and cold storage plant, McArthur Dr., Tracy—by Tracy Ice & Development Co., Tracy. 3-5

SAN JOAQUIN CO.—**H. Mayson,** 9315 Hooper Ave., Los Angeles—$1,132,476 for 1- and 2-story reinf. conc. ward bldgs., Stockton State Hospital, Stockton — by Dept. of Public Works, Sacramento. 3-1

SAN MATEO CO. — **George Arthur & Sons,** 941 S. Claremont St., San Mateo—$60,000 for warehouse, 1743 S. El Camino Real, San Mateo—by Reliable Van & Storage Co., San Mateo. 3-15

SAN MATEO CO.—**David D. Bohannon,** 1182 Market St., San Francisco—$199,000 for 27 houses, Belle Haven City, betw. Redwood City and E. Palo Alto—by self. 3-25

SAN MATEO CO.—**Conway & Culligan,** Monadnock Bldg., San Francisco—$275,000 for 55 houses, Redwood Village Tract, Redwood City—by self. 3-25

SAN MATEO CO. — **Walton A. Gould Construction Co.,** 680 Laurel St., San Carlos—$2,000,000 for 2 subdivisions: 108 homes in Project 1, 100 homes in Project 2, Sunset Highlands, San Carlos—by self. 3-25

SAN MATEO CO. — **Arthur Greenbach,** 2704 Rheem St., Richmond—$168,000 for 28 residences, Newbridge Park, near E. Palo Alto—by self. 3-25

SAN MATEO CO. — **Wm. Horstmeyer Co.,** 23 Mars St., San Francisco—$150,000 for 5-department super-market, Laurel Ave. and Morse St., San Carlos — by Lester Jinkerson, Burlingame. 3-18

SAN MATEO CO. — **Alex Johnson,** 632 Belvedere St., San Francisco—construction of modern super-market, El Camino Real, S. San Mateo—by Lester Jinkerson, Burlingame. 3-18

SAN MATEO CO.—**C. F. Parker,** 1644 Monterey Blvd., San Francisco — $113,324 for 8-classroom, steel frame school bldg., Laurel School, San Mateo—by San Mateo Elementary School District. 3-4

SAN MATEO CO. — **Parker, Steffens & Pearce,** 135 S. Park, San Francisco—$150,000 for 5-story, reinf. conc. fireproof warehouse, N. side of Broadway, Burlingame—by Bekins Van & Storage Co., San Francisco. 3-5

SANTA BARBARA CO.—**Robert E. McKee,** 4700 San Fernando Rd. W., Los Angeles—$400,000 for steel frame and transite exterior warehouse bldg. and wood frame wash and locker room bldgs., Miguerlito Canyon, Lompoc—by Johns-Manville Products Corp., Los Angeles. 3-15

SANTA CLARA CO.—**O. E. Anderson,** 398 Menker Ave., San Jose—$69,167 for 1-story and mezzanine laundry plant with steel trusses, Delmas Ave., San Jose—by Exchange Linen Service Co., San Jose. 3-20

SANTA CLARA CO. — **Earl W. Heple,** 494 Delmas Ave., San Jose—$400,000 for 3 new units: machine shop and tool sheds, E. and W. sides of plant, Sunnyvale—by Wooldridge Mfg. Co., Sunnyvale. 3-22

SANTA CLARA CO.—**MacDonald, Young & Nelson,** 121 Montgomery St., San Francisco—$500,000 for 3-story and mezzanine store bldg., 1st and Santa Clara Sts., San Jose—by J. C. Penney Co., San Jose. 3-6

YOLO CO. — **Empire Construction Co., Ltd.,** 344 Harriet St., San Francisco—$50,000 for warehouse, 100 Main St., Woodland—by Locker Storage & Pioneer Distributors Co., Woodland. 3-21

YOLO CO. — **Empire Construction Co.,** 344 Harriet St., San Francisco—$200,000 for 1-story conc. quick freeze plant and freezing warehouse, N. of Marvin Landplane Co,. on Knights Landing-Woodland Hwy.—by Karl H. Koch, Woodland. 3-22

Idaho

BONNEVILLE CO. — **Arrington Construction Co.,** Rogers Bldg., Idaho Falls—$50,000 for tourist court, .5 mi. S. Wandamere, Yellowstone Hwy. 3-8

Montana

YELLOWSTONE CO.—**J. C. Boespflug Construction Co.,** 807 Securities Bldg., Seattle, Wash. — $65,000 for 2-story brick

service and office bldg., 29th and Montana Ave., Billings—by Northern Pacific Railway, St. Paul, Minn. 3-1

Nevada

CLARK CO.—**Nevada Construction Co.,** 421 W. Bonanza St., Las Vegas—$500,000 for 86-room hotel, swimming pool, riding stables, other sport facilities, Old Ferguson property, Las Vegas—by Nevada Desert Inn, Inc., Las Vegas. 3-8

CLARK CO.—**Del E. Webb Construction Co.,** Box 4066, Phoenix, Ariz.—$1,250,000 for 120-room resort hotel, dining room, cocktail lounge, casino, lobby, glassed-in swimming pool, 5 cottages, Las Vegas—by Billy Wilkerson & Associates, Las Vegas. 3-25

ELKO CO.—**Olsen Construction Co.,** 410 S. 7th St., Lincoln, Neb.—$750,000 for 68-unit motel and remodeling to commercial hotel, Idaho St., betw. 8th and 9th Sts., Elko—by Newton Crumley and Newton H. Crumley, Elko. 3-19

WASHOE CO.—**Walker Boudwin Construction Co.,** Box 2544, Reno—$250,000 for reinf. conc., 2-section, 4-story bldg., W. 1st St., Reno—by R. E. Hughes, Reno. 3-15

New Mexico

BERNALILLO CO.—**Lembke Construction Co.,** P. O. Box 144, Albuquerque—constr. of 2-story and basement addition to telephone bldg., N. 4th and W. Copper Sts., Albuquerque—by Mountain States Telephone & Telegraph Co., Albuquerque. 3-9

Oregon

COOS CO.—**Martin Construction Co.,** Bandon—erection of 25 to 30 homes for veterans, Bandon Heights, Bandon—by self. 3-19

LINN CO.—**The Northwest Fabricators,** East Albany—$250,000 for assembly of 48 "factory built" houses, Motley's Addition, Albany—by Kampfer Brothers, Albany. 3-9

MULTNOMAH CO.—**Mark B. Borchert,** Portland—$200,000 for 2-story, 100x200-ft. reinf. conc. addition to warehouse, Portland—by Oregon Grange, Portland. 3-25

MULTNOMAH CO.—**Donald M. Drake Co.,** 904 Lewis Bldg., Portland—$220,000 for car barn and office bldg., Portland—by Portland Traction Co., Portland. 3-15

MULTNOMAH CO.—**A. M. Hocken,** 1914 SE. 46th St., Portland—Betw. $100,000 and $150,000 for plant bldg., SE. 20th Ave. betw. McLoughlin Blvd. and Insley, Portland—by Nelson Equipment Co., Portland. 3-4

MULTNOMAH CO.—**Elmer E. Settergren,** Henry Bldg., Portland—$209,800 for grade school, Parkrose, Portland—by Board of Education, Portland. 3-25

UMATILLA CO.—**McCormick Construction Co.,** Pendleton—$50,000 for 100x100-ft. store bldg., SW. Emigrant and 1st Sts., Pendleton—by Stone's Stores, Inc., Spokane, Wash. 3-15

UNION CO.—**McCormick Construction Co.,** La Grande—$98,985 for girls' dormitory, Eastern College of Education, La Grande—by Ore. State Board of Higher Education, Portland. 3-14

YAMHILL CO.—**O. S. McCoy,** 506 S. First St., Newberg—$48,860 for brick bank bldg., 1st and School Sts., Newberg—by First Natl. Bank of Portland. 3-1

Texas

BANDERA CO.—**John L. Harwell,** 2618 E. Houston St., Bandera—construction of dude ranch: 12 cottages, dining room, community bldg., etc., Bandera — by Hangar Six, Inc., Bandera. 3-13

CAMERON CO.—**Noser Construction Co.,** Harlingen—$50,000 for 1-story brick and reinf. conc. bldg., Harlingen—by Ferguson Motor Co., Harlingen. 3-4

DALLAS CO.—**J. W. Bateson,** 1103 Irwin-Keasler Bldg., Dallas — $60,000 for office sales and service bldg., 218 Cedar Springs, Dallas—by Cont.-Tex. Petroleum Corp., Dallas. 3-12

DALLAS CO.—**S. J. Churchill Construction Co.,** 214 Constr. Bldg., Dallas—$125,000 for 1-story masonry stucco bldg., 3700 block, Haggar Dr., Dallas—by Geotechnical Corp., Dallas. 3-15

DALLAS CO.—**Leo F. Corrigan,** Dallas—$130,000 for store bldg., 5400 block, Lovers Lane, Dallas—by Retail Stores, Dallas. 3-7

DALLAS CO.—**Frazier & Davis Construction Co.,** 1319 Hackland Ave., St. Louis, Mo. — $180,000 for frame, metal-covered warehouse, 6211 Cedar Springs, Dallas—by Metal Goods Corp., Dallas. 3-16

DALLAS CO. — **Avery Mays,** 1138 N. Edgefield St., Dallas — $125,000 for brick and steel 16-alley bowling alley bldg., Lemmon Ave. and Mockingbird Lane, Dallas—by John Hall, Dallas. 3-5

DALLAS CO.—**P. O'B. Montgomery,** 913 S. Akard St., Dallas—$150,000 for 2-story and basement masonry stucco bldg., 6100 Lemmon Ave., Dallas — by Geophysical Service, Dallas. 3-20

DALLAS CO.—**J. E. Morgan & Sons,** Box 6029, Dallas — $100,000 for 5-story retail store bldg., 1412 Elm St., Dallas—by Walgren's Texas Co., Dallas. 3-15

DALLAS CO.— **McFadden, Miller and Smith,** 2801 Taylor St., Dallas—$50,000 for tile warehouse 2800 block Taylor St., Dallas —by selves. 3-8

DALLAS CO.—**A. J. Rife Construction Co.,** 2808 Inwood Rd., Dallas—$67,718 for remodeling and addition to airport administration bldg., Dallas — by City Council, Dallas. 3-12

DALLAS CO.— **C. E. Shaw & R. B. Barnes,** 1301 2nd Ave., Dallas — $100,000 for steel, brick and conc. stucco bottling plant, 2919 S. Haskell St., Dallas. 3-15

EL PASO CO.—**Robert E. McKee,** 1918 Texas St., El Paso—$800,000 for brick and reinf. conc. store bldg., El Paso—by Sears, Roebuck & Co., Chicago, Ill. 3-15

GRAYSON CO.—**Farnell Blair Construction Co.,** Box 1071, Hollywood Sta., Los Angeles—$235,915 for 3-story administration bldg. and redecorating Luckett Hall, Austin College, Sherman — by Board of Trustees, Austin College, Sherman. 3-15

LAMB CO.—**T. E. Eubank,** Littlefield—$45,000 for brick and tile 2-story hospital addition, Littlefield—by Payne & Shotwell, Littlefield. 3-11

LUBBOCK CO.—**B. M. F. P. Construction Co.** and **Capitol Steel Co.,** Oklahoma City, Okla.—1-story brick and hollow tile and reinf. conc. factory and warehouse bldg., Lubbock — by Lubbock Bag Co., Lubbock. 3-5

LUBBOCK CO.—**Sampson Brothers Construction Co.,** Lubbock—$147,985 for school bldg. in Whiteside Addition, and addition to McWhorter school bldg., Lubbock—by Lubbock Independent School District, Lubbock. 3-1

LUBBOCK CO.—**Max Tidmore,** Lubbock —$43,383 for 1-story brick, steel and reinf. conc. terminal and maintenance bldg., Lubbock—by Lubbock Bus Co., Lubbock. 3-5

TARRANT CO.—**Cain & Cain,** 406 Majestic Bldg., Fort Worth—$50,000 for 7-story brick and steel church addition, 408 Taylor St., Fort Worth—by Bible Baptist Seminary, Fort Worth. 2-26

TARRANT CO. — **Erwin-Newman Co.,** Houston — $67,000 for two prefabricated hangars, steel and corrugated metal, city airport, Fort Worth—by City Council, Fort Worth. 3-12

TARRANT CO.—**John Rizer,** Natl. Bank Bldg., Fort Worth—$58,000 for brick and tile church bldg., 2701 E. Belknap, Fort Worth—by Church of Christ, Fort Worth. 2-26

TAYLOR CO.—**G. C. Dunlap,** Abilene—$75,000 for 1-story brick cleaning plant bldg., 1402 Hickory St., Abilene—by J. A. Young, Abilene. 3-4

TAYLOR CO. — **Ross Construction Co.,** Abilene—$250,000 for chapel and administration and library bldg., Hardin-Simmons Univ., Abilene — by R. N. Richardson, Hardin-Simmons Univ. 3-1

TRAVIS CO.—**W. D. Foster,** Capital National Bank Bldg., Austin—$80,000 for addition and remodeling to bldg., 1071 W. 6th St., Austin—by self. 3-7

Utah

SALT LAKE CO.—**Christiansen Brothers,** Templeton Bldg., Salt Lake City—$144,172 for naval science bldg., University of Utah, Salt Lake City—by State Building Board, Salt Lake City. 3-1

SALT LAKE CO.—**Paulsen Construction Co.,** 55½ W. 1st St., Salt Lake City—constr. of ore dressing laboratory bldg., University of Utah, Salt Lake City—by State Bldg. Board, Salt Lake City. 3-9

SALT LAKE CO.—**Perkins Construction Co.,** 626 Dooly Bldg., Salt Lake City—$125,000 for 50 veterans' homes, 33rd S. and 5th E., Salt Lake City. 3-16

Washington

CLARK CO.—**George H. Buckler Co.,** 704 Lewis Bldg., Portland—$100,000 for 7-story bldg., 6th and Washington Sts., Vancouver—by Interstate Brewery, Vancouver. 3-8

COWLITZ C.—**K. T. Henderson,** 711 Commerce St., Longview—$150,000 store bldg., Longview—by S. A. Oversby, Longview. 3-9

KING CO.—**Balch & Setzer, Inc.,** 6800 48th Ave. NE., Seattle—$2,000,000 for 200 homes, 90 already under constr., Wedgewood Rock Addition, betw. E. 70th St. and E. 75th St. and 27th Ave. NE. and 30th Ave. NE., Seattle—by self. 3-22

KING CO.—**Olaf Boen,** 661 E. Northlake, Seattle—$90,000 for 1-story and basement bldg., Westlake and Denny Sts., Seattle—by Commercial Automotive Service, Seattle. 3-7

KING CO.—**Reimers & Jolivette,** Builders' Exchange Bldg., Seattle—$1,000,000 for remodeling 7-story and basement office bldg., SW. Pine St., Seattle—by Macabe Co., Seattle. 3-25

KING CO.—**O. E. Turnquist Construction Co.,** Orpheum Bldg., Seattle—$60,000 for brick church bldg., 24th Ave. NW. and W. 85th St., Seattle—by Redeemer's Lutheran Church, Seattle. 3-5

KING CO.—**O. E. Turnquist Construction Co.,** Orpheum Bldg., Seattle—$55,000 for 3-story reinf. conc. addition to bldg., Denny Way and Terry Ave., Seattle—by Utility Cartage Co., Seattle. 3-1

KING CO.—**Howard S. Wright & Co.,** Box 3106, Seattle—block long 2-story auto service and display bldg., Boren Ave., betw. Olive Way and Howell St., Seattle—by Smith-Gandy, Inc., Ford Agency, Seattle. 3-15

PIERCE CO.—**A. F. Gratzer,** Tacoma—$60,000 for public garage, 2101 S. Tacoma Way, Tacoma—by self. 3-16

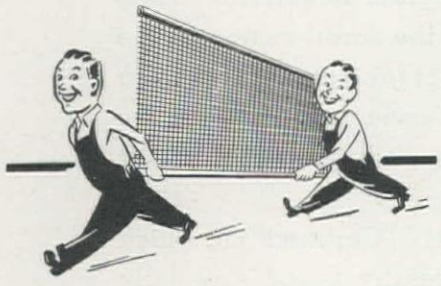
PIERCE CO.—**William Ostruske,** Tacoma—$200,000 for 3-story masonry rest home, 409 S. J St., Tacoma—by Mr. and Mrs. Ted B. Hill and L. L. Hess, Tacoma. 3-16

YAKIMA CO.—**William M. Yeaman,** Yakima—$100,000 for shop and sales bldg., exposed conc. struct., Yakima—by Hahn Motor Co., Yakima. 3-16

WHATCOM CO.—**The Austin Co.,** Dexter Horton Bldg., Seattle—$50,000 for conc. warehouse, Lynden—by Whatcom Co. Dairymen's Assoc., Lynden. 3-13

Territories

HAWAII—**Carroll Duncan & Co.,** 3044 Riverside Dr., Los Angeles—$1,000,000 for plastering new Tripler General Hospital,



under construction in Honolulu—by U. S. Army, Honolulu. 3-15

HAWAII — **Premier Tile & Marble Co.,** 1612 Mission, S. Pasadena—$750,000 for installation of marble, tile, struct. glass and terrazzo in Tripler General Hospital, under construction at Honolulu—by U. S. Army, Honolulu. 3-14

Canada

BRITISH COLUMBIA—**Dominion Construction Co.,** 150 W. 1st Ave., Vancouver—$160,000 for 2-story paper plant, Arbutus St. and 11th Ave., Vancouver—by St. Regis Paper Co., Vancouver. 2-23

BRITISH COLUMBIA—**Northern Construction Co. & J. W. Stewart, Ltd.,** 718 Granville St., Vancouver—$107,000 for steel frame and hollow tile by-product plant bldg., Braid St., New Westminster — by British Columbia Distillery Co., Ltd., New Westminster. 3-9

Miscellaneous . . .

California

KERN CO. — **Haddock Engineers, Ltd.,** 129 W. 2nd St., Los Angeles — $846,809 for miscellaneous bldgs., paving, utilities, hangar "K" and appurtenances, U. S. Naval Ordnance Test Sta., Inyokern—by Bureau of Yards and Docks, Washington, D. C. 3-20

LOS ANGELES CO. — **Burkett Fence Co.,** Los Angeles—$65,768 for removal of camouflage and gun positions, Douglas Aircraft Co., Inc., Long Beach—by Douglas Aircraft Co., Inc., Long Beach. 3-13

LOS ANGELES CO. — **Weymouth-Crowell Co.,** 2104 W. 15th St., Los Angeles—constr. of terminal facilities: warehouse, loading docks, machine shop, garage, offices, paving, fencing, landscaping, spur track, etc., Jefferson Blvd. near Fairfax Ave., Los Angeles—by Lyon Van Lines, Inc., Los Angeles. 3-15

LOS ANGELES CO.—**Zoss Construction Co.,** 1037 N. Cole Ave., Los Angeles—contract for site preparation at Roger Young Village, Griffith Park, Los Angeles — by City Housing Authority, Los Angeles. 3-1

SAN FRANCISCO CO.—**Chas. L. Harney Construction Co.,** 625 Market St., San Francisco — $420,932 for development of tracts, except grading and street lighting, Anzavista and Laurel Heights housing projects, Geary and Masonic Ave., Bush St. and Presidio Ave., San Francisco—by Mayfair Heights Corp., San Francisco. 3-15

SOLANO CO.—**Peter Kiewit Sons' Co.,** 442 Post St., San Francisco—$891,647 for pump house, steam plant, generating sta., conc. deck, 11 storage tanks, miscel. bldgs. and services, Reserve Fleet Berthing, Mare Island—by Bureau of Yards and Docks, Washington, D. C. 3-1

Oregon

KLAMATH CO.—**Henry George & Sons,** 425 Hutton Bldg., Spokane, Wash.—$398,000 for 530,000-bushel grain elevator, Worden—by Dick and Ben Henzel and Dave and Dan Liskey, Klamath Falls. 3-8

POLK CO.—**A. S. Fetterman Co.,** Spokane, Wash. — $50,000 for grain elevator, Dallas—by Farmers' Union Cooperative, Dallas. 3-5

UMATILLA CO.—**Henry George & Sons,** 425 Hutton Bldg., Spokane, Wash.—800,000-bushel grain elevator, Pendleton — by Ingleheart Bros., Inc., Pendleton. 3-19

Texas

SAN PATRICIO CO.—**Hess Drier & Elevator Co.,** Sinton — construction of steel grain elevator with storage capacity of 1,600,000 lbs. grain—by Sinton Grain & Elevator Co., Sinton. 3-4

Washington

DOUGLAS CO. — **Consolidated Steel Corp.,** Los Angeles—$575,000 for manufacture and delivery of nine 16x30-ft. penstock coaster gates, Grand Coulee Dam—by Bureau of Reclamation, Boise, Ida. 3-6

PROPOSED PROJECTS

Waterway . . .

Washington

KITSAP CO.—The Navy Bureau of Yards and Docks in Washington, D. C., is drawing up plans for 6 ship-mooring piers, 1,200-ft. long, at Bremerton at an estimated cost of $12,000,000.

Power . . .

Utah

SEVIER CO.—Telluride Power Co. plans to spend $150,000 in 1946 for power system expansion and improvements in the Richfield area. Among the major projects, some of which are under way, are: 1,500 kw. substation with circuit breakers, control house and operator's cottage at Richfield; substation and switching facilities at Milford; circuit breakers, reconstruction of dam, sections of pipe line, transmission line rearrangements and switching facilities at Beaver, and reconstruction of lines, Fillmore-Richfield.

Building . . .

California

SAN FRANCISCO CO. — University of California will reconstruct and expand its medical center at 3rd and Parnassus Aves., San Francisco, at a cost of $11,000,000.

Montana

CUSTER CO.—Plans for a 100-bed general medical hospital costing $1,050,312 to be built in Miles City by the Veterans Administration are in the hands of Army engineers in Seattle, Wash.

Oregon

DOUGLAS CO. — A 164-bed addition to the neuropsychiatric hospital at Roseburg will be built by the Veterans Administration. Army engineers are planning the structure, which will cost $1,125,567.

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

On March 15 stockholders of PARAFFINE COMPANIES, INC. voted 394,954 to 158 in favor of a merger with SCHUMACHER WALL BOARD CORP. and on March 18 stockholders of the latter company voted unanimously to join in the merger. Announcement of future operations will be made after the merger is completed.

* * *

D. D. Tripp, vice-president of PIONEER RUBBER MILLS, San Francisco, retired on April 1 after 46 years of service with the company. At the annual meeting of the company **G. S. Towne** was advanced to chairman of the board and **H. R. Mansfield** to the office of president. Three new vice-presidents were elected: **E. P. Coxhead, S. M. Suhr** and **F. W. Swain.**

* * *

Edmund T. Cadle has been granted sales rights in the eleven Western States for the products of INTERNATIONAL VIBRATION CO., Cleveland, O. He will personally handle the products in California and distributors will be appointed in other states to handle the power trowel manufactured by the company.

* * *

Two sales representatives have been added to the staff of CUMMINS SERVICE & SALES in Los Angeles. They are **Edward M. Bonette,** who will cover the territory between Los Angeles and Santa Maria, and **James R. Neal,** who will be in charge of the Los Angeles to San Diego district. Neal is just out of Navy service and Bonette has been with International Harvester Co. previously.

* * *

SOULE EQUIPMENT CO. has moved into larger quarters on Ferry St. near 7th in Oakland, occupying the site recently vacated by Macco Construction Co. The site covers about five acres, 31,950 sq. ft. being under roof, with a direct spur track into the property.

* * *

Edward G. English has been appointed executive assistant to the president of BETHLEHEM PACIFIC COAST STEEL CORP., San Francisco. He was formerly manager of commercial research and supervisor of mill scheduling. He is replaced as manager of commercial research by **Orin P. Walker,** a member of the research staff.

* * *

Marks Hyatt, San Francisco district sales manager for AMERICAN LUMBER & TREATING CO., has resumed his duties following 42 months of military service. He is responsible for sales operations for the company plants at Wauna, Ore., and Weed, Calif. He will be assisted by **Gordon M. Dewart,** acting manager while Hyatt was in service, and **Clinton T. Hallsted,** recently released from the Navy.

* * *

VARDS, INC., manufacturer of precision engineering equipment in Pasadena, recently took over from Reconstruction Finance Corp. property operated by Vards for the Government during the war, valued at $500,000 and the entire plant will now be devoted to the manufacture of precision and some larger equipment.

* * *

Because delivery has been so difficult, **J. C. Jaques** of the Jaques Power Saw Co., Denison, Tex., dispatches his own truck and trailer to the plant of GLADDEN PRODUCTS CORP., in Glendale, Calif.,

to pick up engines manufactured by the latter company which are used to power many Jaques saws. Jaques is also industrial engine distributor for Gladden in the Southeast territory.

* * *

The J. D. ADAMS CO. will hereafter operate under the name of the parent company—THE J. D. ADAMS MANUFACTURING CO. The San Francisco branch of the company has moved to 230 Seventh St., where it will be better enabled to serve Adams customers in California and Nevada.

* * *

EARLE M. JORGENSEN CO., steel distributors, are practically doubling their warehouse facilities at Oakland, by building an additional warehouse 70 ft. wide and 526 ft. long, adjoining their present facilities. Their office space is being tripled. All types of tool and specialty steels will be handled in the new plant.

* * *

BASALT ROCK CO., INC., Steel Production Division, Napa, Calif., which during the war engaged in shipbuilding operations, is now manufacturing butane and propane tanks, hot water and water pressure tanks, under and above ground storage tanks.

* * *

Joseph B. Peebles, until recently general manager of GLADDING McBEAN COMPANY'S central division, has been named sales manager of the Stran-Steel Division of KRAFTILE COMPANY, Niles, Calif. He will work under **James Crawford,** vice-president, who has been promoted to the post of general sales manager.

* * *

Changes in the District Sales Offices at Los Angeles and San Francisco are announced by JONES & LAUGHLIN STEEL CORP. as follows: **R. G. Scoggins** has been appointed district sales manager in Los Angeles, succeeding **T. C. Bell** who becomes a special sales representative in the same area. **W. S. Wainright** has been appointed district sales manager in San Francisco, being transferred from the Pittsburgh, Pa., office.

* * *

GENERAL ELECTRIC CO. announces two appointments in the San Francisco District. **Hughes W. Ogilvie** has been named sales engineer in the federal and marine section, and **Marion S. Barnes** has been appointed assistant manager of the Central Station Division. Barnes is a former sales engineer and has been with General Electric for over 30 years.

* * *

SHAW SALES & SERVICE CO., Los Angeles, has been appointed by BLAW-KNOX CO., Pittsburgh, Pa., to represent it in Los Angeles and surrounding territory. Equipment handled will include road building machinery, truck mixers, buckets, sheepsfoot rollers and other items.

* * *

INTERMOUNTAIN

RHEEM RESEARCH PRODUCTS, INC., a subsidiary of RHEEM MANUFACTURING CO., manufacturers of building supply and construction materials, has announced plans for mining and processing Perlite into bricks, concrete blocks and lightweight insulation. The first commercial unit has been set up in Phoenix, Ariz., and is known as Builders Supply Co. This will be both a retail and wholesale outlet for Rheem products.

* * *

The Denver, Colo., branch of FRUEHAUF TRAILER CO. placed second in the company's annual safety contest, and the Fresno, Calif., branch ranked third. First place was tied for by Detroit and Syracuse.

* * *

Alvin F. Franz has been appointed works manager of the Pueblo, Colo., plant of COLORADO FUEL & IRON CORP. He was formerly general superintendent of the Buffalo, N. Y., plant of WICKWIRE SPENCER STEEL, a division of C. F. & I.

* * *

F. S. RAY CO. has been appointed distributor for products of the KOEHRING CO., C. S. JOHNSON CO. and the PARSONS CO. in the Houston, Tex., area. **F. S. Ray** is associated in the distributor company with his son. **F. Wayne Ray.**

STEEL CONVERSION CORPORATION, Sparks, Nev., has opened new Western State headquarters at 35 N. Raymond Ave., Pasadena. **James P. Walsh** of San Marino is vice-president in charge of sales and export manager. **Karl Wilkenson** is sales engineer at the new office.

* * *

King D. Boyd has been appointed district manager of the petroleum industry sales of DETROIT DIESEL ENGINE DIVISION of GENERAL MOTORS CORP. and will be located in Houston, Tex.

* * *

Glen R. Gunderson has joined the J. T. JENKINS CO., distributors of Kenworth trucks and busses in California, Nevada and Arizona, as sales engineer. He will make his headquarters in San Francisco.

* * *

Carroll Agrelius, formerly a service engineer for KELITE PRODUCTS, INC. of Los Angeles, has been appointed regional manager for the company at their new Salt Lake City regional office and will have jurisdiction over Utah, Idaho and parts of Colorado and Nevada.

* * *

PACIFIC NORTHWEST

W. E. Collins, Jr. has been appointed manager of the Seattle District Explosive Sales Office of ATLAS POWDER CO. Returning after two years in the Navy, Collins was sent to Seattle on January 1 as assistant manager. **W. T. Mahood,** who served as manager at Seattle during the war, will be associated with the San Francisco District Sales Office.

* * *

JAMESON ENGINEERING CO. SALES, Fairbanks, Alaska, has been appointed sales agent for shovels, cranes and draglines manufactured by LIMA LOCOMOTIVE WORKS, INC. for the Alaska territory. The Jameson company also has an office in Seattle, Wash. **Dick Jameson** and **William Caldwell,** owners of the company, will cover the territory in their own planes.

* * *

Jack Bess, formerly zone manager at St. Louis, Mo., for the Industrial Power Div. of INTERNATIONAL HARVESTER CO., has been transferred to Portland, Ore., as zone manager for the territory, which includes Montana, Washington and Oregon.

* * *

AMONG THE MANUFACTURERS

The name of the Pittsburgh Equitable Meter Co. has been changed to ROCKWELL MANUFACTURING CO. The main office remains at the same location in Pittsburgh, Pa. Various operations of the company will function as divisions of the Rockwell organization. These include the Pittsburgh Equitable Division, the Nordstrom Valve Co., Rockwell International Corp., Edward Valves, Inc., Crescent Machine Co., Delta Manufacturing Co., V. & O. Press Co., Rockwell Machine Co., and Monessen Foundry & Machine Co.

* * *

William B. Kennedy, formerly commercial engineer for SYLVANIA ELECTRIC PRODUCTS, INC., in Salem, Mass., has been appointed Pacific Coast sales engineer. He joined the company in 1944.

Five executives of the PITTSBURGH PLATE GLASS CO. have recently been promoted. **Joseph G. Thompson, Jr.,** has been named assistant general paint manager. **Fergus A. O'Connor** has been appointed supervisor of dealer sales in the paint division. **Nelson A. Mason** is now supervisor of maintenance-painter sales. **Leonard W. McGarrity,** after three years with the Navy, has been appointed supervisor of paint department sales to company stores. **Kenneth E. Whitekettle** has been appointed supervisor of brush sales. All will be headquartered in Pittsburgh.

* * *

A new department conducting asphalt and road oil business has been created in GENERAL PETROLEUM CORPORATION coincident with dissolution of the Gilmore Asphalt & Road Oil Co. and transfer of its assets to General Petroleum. **W. J. Julier,** vice-president and director of the former company, will head sales and service in the new department for General Petroleum, and **Howard M. Loy** will continue as his assistant.

* * *

The Ideal Commutator Dresser Co., a partnership, was terminated on Feb. 1 and after that date, in order to better provide for expansions now under way, a corporation was formed known as IDEAL INDUSTRIES, INC.

* * *

A. W. Fulton, who since January, 1943, has been a commissioned officer in the U. S. Navy, has returned to the sales staff of the ATHEY PRODUCTS CORP. He has been with Athey since 1936 in the advertising and sales departments and for the past fourteen months has been transportation officer, supervising maintenance and repair of construction and automotive machinery at Lake City Naval Air Station.

Note: In the March issue of *Western Construction News* the following two items and pictures were confused. As a correction they appear herewith properly arranged.)

* * *

Lt. Robert Maynard has returned to his position as export manager for the OSGOOD CO., manufacturers of Osgood and General Excavator shovels, cranes, draglines and similar equipment. He was recently discharged from the Navy after serving three years in the Pacific theater of war.

* * *

Following his release from the Naval Air Forces, **Eugene T. Scott** has joined TEMPLETON, KENLY & CO., Chicago, manufacturers of Simplex industrial jacks, as product application engineer, with headquarters in Chicago.

* * *

R. J. Nymberg has been named sales manager of the Hoist & Body Division of GAR WOOD INDUSTRIES, INC., Detroit. He has been with the division since 1921. Other appointments are: **Henry Husbands,** named to assist **Amos E. Heath,** district manager in Washington; **Ross Miller,** district manager at Philadelphia; **Charles J. Hoffman,** in charge of Gar Wood's newly formed export department; and **William F. Keeton,** in charge of the newly created advertising department.

* * *

F. B. Hornibrook, authority on concrete and concreting materials, has been appointed assistant director of research for the MASTER BUILDERS CO., Cleveland, O. He had previously been on the staff of the National Bureau of Standards since 1930.

* * *

Kenneth F. Park, sales development manager for CATERPILLAR TRACTOR CO., Peoria, Ill., has been advanced to the newly created post of engineering consultant on all matters pertaining to the earthmoving field. In his new capacity he will serve Caterpillar's three sales divisions. The start of the postwar construction program, with its vastly increased highway work, has made the creation of this new post necessary.

* * *

The resignation of **George P. Torrence,** president, and **John S. Clark,** vice-president and treasurer of the CLEVELAND PNEUMATIC TOOL CO. have been announced by **Walter E. Schott,** chairman of the board. Schott stated that the posts will not be filled at the present time.

* * *

The annual report of CATERPILLAR TRACTOR CO. for 1945 has been issued in an attractive, color printed booklet. The financial statement shows that the volume of business in 1945 was $230,599,818, a decrease of approximately 11½ million dollars from the preceding year, the decrease being principally a resultant of cancellation of wartime contracts. The decrease re-

sulted in a profit reduction of $817,000. Common stock profit of $3.46 per share was announced, this being a reduction of 43c from 1944. A total of $3,667,031 was expended during the year for land, buildings, machinery and equipment.

* * *

George R. Wernisch, recently discharged as a lieutenant commander, has been made assistant manager of the Concrete Engineering Div. of CECO STEEL PRODUCTS CORP., Chicago, Ill. Before entering the Navy he was a designer, sales engineer and assistant division manager with the company, and while in the Navy spent two and a half years in charge of the steel section of the Bureau of Yards and Docks.

* * *

Paul J. Bastian has been named vice-president in charge of manufacturing for TYSON BEARING CORP., Massillon, O. He has for many years been identified with various phases of production and resigned a position as production manager of Watson Flagg Machine Co., Paterson, N. J., to assume his duties with Tyson.

* * *

Martin J. Monahan, a member of the technical staff of AMERICAN MARIETTA CO., Chicago, Ill., since 1929, has been named technical director of all trade sales divisions of the company. He will be located at the Kankakee, Ill., plant.

* * *

Since virtually all military explosives production has been completed, the division of E. I. DUPONT DE NEMOURS & CO. devoted to that work has had its name changed to the Nitrocellulose and Sporting Powder Division and **F. W. Bradway** has been named manager. **J. M. Skilling,** manager of the former department, will be director of production. **P. J. Kimball** becomes manager of the explosives division, **F. R. Wilson** becomes director of production, **T. R. Carlson** becomes production manager of the high explosives section and **H. C. Peinert** becomes production manager of the black powder division.

* * *

H. Malcolm Priest has been appointed manager of the Railroad Research Bureau of the UNITED STATES STEEL CORPORATION SUBSIDIARIES. He will supervise research and design in the field of light-weight railroad equipment and other mobile structures. He has been with the bureau since 1933.

* * *

Through an error an item appeared in the February issue of *Western Construction News* announcing the appointment of **R. J. Cleary** as Western District sales manager for BUFFALO-SPRINGFIELD ROLLER CO. This was not correct, the position being filled at the present time by **J. P. Griffin,** as previously announced in the January issue.

* * *

Francis H. Beaupre and **Bruno H. Ramthun** have been appointed to the application engineering department of WHEELCO INSTRUMENTS CO., Chicago, Ill. Beaupre has recently been engaged in instrument departments at several ordnance plants and Ramthun has just been discharged from active duty in the Navy, where he held the commission of lieutenant. The men will serve in a liaison capacity with the sales application, engineering design, research and production departments of Wheelco.

* * *

All stock held by **W. B. Straub** and family in the STRAUB MANUFACTURING CO., INC., manufacturers of crushing and milling machinery, has been bought by **J. R. Kueneman,** president and general manager, **C. P. Kenville,** vice-president, **Don Kueneman,** vice-president, and **Alma Harrell,** secretary. The company will continue under the same firm name.

* * *

Henry Garnjobst, who organized and operated the news bureau of AMERICAN LUMBER & TREATING CO. in 1940, has returned to the general office in Chicago and in the future will be responsible for national publicity. After Pearl Harbor he was transferred to Washington, to handle relations with the Government.

* * *

J. F. Harrison, chief engineer and works manager of BUFFALO-SPRINGFIELD ROLLER CO., Springfield, O., has been promoted to vice-president in charge of engineering and manufacturing. He has been with this company since 1941 and in the engineering field for more than 23 years.

* * *

According to the annual report of the GARDNER-DENVER CO., Quincy, Ill., net profit for the year 1945 was $877,414, as compared with $1,005,947 during 1944. Profits applicable to common stock were $1.39 per share. The decrease in earnings reflects lower sales volume and higher factory costs. Sales were 22 per cent less than in 1944.

NEW EQUIPMENT

Torsion Bar Springs

Manufacturer: Fruehauf Trailer Company, Los Angeles, Calif.

Equipment: Spring suspension of heavy vehicles by torsion bar units.

Features claimed: The gravity suspension tandem operates on the basic principle of leverage. Spring action is achieved through the twisting action of torsion bar arms acting upon longitudinal torsion bar springs fixed in shackles at one end and terminating in gear boxes forward of the front axle. Spring yield is proportional to the load applied. As the load increases, the twisting force applied by the torsion bar lever increases, resulting in greater resistance on the part of the spring. However, increasing loads shorten the leverage of the arm so that regardless of the load applied—either from payload or road shock—it is impossible to "bottom" or reach the limit of spring action.

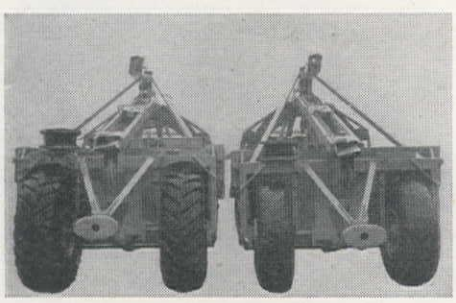
The two gear boxes each contain a pair of one-to-one load-equalizing gears. They function as a torque divider so as to load each torsion bar equally, regardless of the movement of wheels with respect to each other.

Standard Tires for Carryall

Manufacturer: R. G. LeTourneau, Inc., Peoria, Ill.

Equipment: 21.00 x 24 tires standard for scraper units.

Features claimed: Rubber scarcity and other wartime conditions prevented an earlier change of all Tournapull-drawn carryall scrapers from 18.00 x 24 tires to 21.00 x 24 size. The increased tire size has resulted in many added advantages. Maximum loads can now be transported with lower pressure in the tires. This is an appreciable advantage in off-the-road operation. With lower pressure in the tires, flotation is increased and rolling resistance reduced, resulting in better and faster loading, hauling and spreading. Flotation contact area of the new tire is 24 per cent greater than the old—373 sq. in. as compared to 300 sq. in., at rated pressures of 40 and 50 lbs. respectively.



Clog-proof Water Jet

Manufacturer: Jaeger Machine Company, Columbus, Ohio.

Equipment: Improved transit mix water system.

Features claimed: Jaeger 1946 model truck mixer units are provided with an improved water system which insures fast, uniform distribution of the specified mix-water to the batch under all operating conditions. This is accomplished by the development of a positively clog-proof water jet

which solves a long-standing problem in high discharge truck mixers where the water outlet is submerged in the material and subject to clogging by grout. By providing in a minimum of time the complete delivery of batch water which is necessary before proper mixing can take place, this insures thorough mixing and uniformity of the concrete even on shortest hauls.

Sheave Puller

Manufacturer: Owatonna Tool Company, Owatonna, Minn.

Equipment: V-groove sheave puller.

Features claimed: A sheave puller attachment No. 679 that can be used with OTC Grip-o-matic or Push-pullers. It simplifies the removal of both single and multiple drive sheaves without distorting the sheave. It is clamped down in the V-groove and thus distributes the pulling strain evenly around a large part of the periphery of the sheave.

Paver

Manufacturer: Foote Company, Inc., Nunda, New York.

Equipment: Dual drum paver.

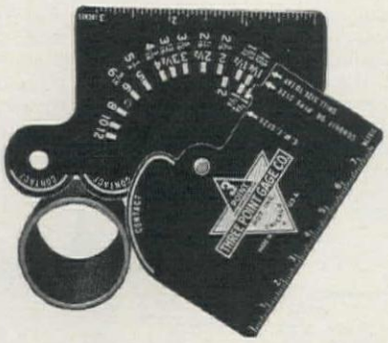
Features claimed: The Multi-Foote Duomix, a 34-E dual-drum paver which incorporates a number of new features in a paver of this size. It is fully automatic controlled to cut down charging, transfer and discharging time to a minimum. On a pilot test the paver turned out from 60 to 80 batches (37.4 cu. ft.) per hour. It is equipped with a traveling mechanism driven from a single main shaft, which also provides power for the drums and skip hoist. Drive gears are fully enclosed and run in oil. There are two speeds forward and reverse. The transfer and discharge chutes are rotary type, requiring only a quarter turn from completely shut to wide open positions.

Pipe Gage

Manufacturer: Three-Point Gage Co., Chicago, Ill.

Equipment: Contact pipe gage.

Features claimed: The new gage provides a simple, practical method of determining the nominal size of pipe and conduit by placing the gage in contact with a portion of the outside periphery of the tubing. In this manner the gage registers



the correct size of pipe which may vary in size from ⅛ to 12 in. in diameter. In addition, the same gage indicates on concentric scales the electrical metallic tubing (thin-wall tubing) and the corresponding tap drill size for each size of pipe measured. The gage is compact when not in use, so that it fits easily into a shirt pocket.

Portable Rock Plant

Manufacturer: Pioneer Engineering Works, Inc., Minneapolis, Minn.

Equipment: Two-unit rock and gravel plants.

Features claimed: A newly engineered two-unit rock and gravel processing plant of high capacity, completely portable, flexible and light enough in weight to pass state highway limits. It is designed to require low headroom to simplify and increase its maneuverability. Two types of plant are available, one for rock, the other for gravel. The primary unit differs to meet the requirements of rock or gravel, but the secondary units are the same for both types of plant. The rock primary unit includes an apron feeder, a primary jaw crusher and a power unit, all mounted on a 3-axle truck. Three options are available in size of jaw crusher, namely, 10x36 in., 15x36 in., and 20x36 in. The gravel primary unit includes a feeder conveyor, a scalping screen, a primary jaw crusher and a power unit, all mounted on a 3-axle truck. This is a complete, self-contained unit with mechanical feeder and shovel hopper. The secondary unit for both types of set-up includes a feeder conveyor, a 4 ft. x 10 ft. vibrating screen, a 40x22 in. roll crusher, a return conveyor, and a power unit, all mounted on a 3-axle truck.

Masonry Cutting Blade

Manufacturer: Champion Manufacturing Co., St. Louis, Mo.

Equipment: Abrasive masonry cutting blades.

Features claimed: The new "Jade" blades have been designed and field tested to provide users with a cutting blade of longer life, lowest cost per cut, and quick cutting on all types of masonry. The Jade blades are available in 12 and 14-in. sizes to fit any type masonry saw. Blades are equipped with blotters for safety and steel centers for efficient operation and protection of machine shaft.

Welder

Manufacturer: Lincoln Electric Company, Cleveland, Ohio.

Equipment: Engine-driven portable welder.

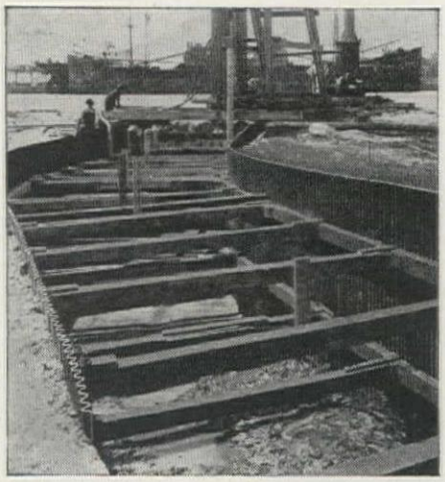
Features claimed: Especially designed to bring to the welding industry a portable welder of the gasoline engine-driven type is this light weight, inexpensive unit. It is of particular value for welding applications in areas where electric power is not readily available such as farms, oil and gas fields, construction work. With a current range from 40 to 250 amperes, the machine can be used for the welding of light or heavy gauge metal, for the repair of cast iron structures such as engine blocks, for the construction of various contrivances or the repair or fabrication of tools and machinery parts, and for hard facing of worn parts.

Corr-Plate Steel Piling

Manufacturer: Caine Steel Co., Chicago, Ill.

Equipment: Steel sheet piling.

Features claimed: Corrugated steel sheet piling has been renamed by the manufacturer "Corr-Plate Steel Piling." This is the only corrugated piling made cold-rolled and it comes in two types, the inter-lock



applied by raising each sheet high enough above the completed section of piling to hook in from the top, and the standard type arranged so that the section being applied is hooked into welded clips from the side, thereby making its use possible in situations where head room is low.

Diaphragm Pumps

Manufacturer: Marlow Pumps, Ridgewood, N. J.

Equipment: Power driven diaphragm pumps.

Features claimed: The manufacturer announces that Marlow Mud Hog pumps are now available in 3 and 4-in. single and 4-in. double sizes, with capacities ranging from 3,000 to 9,000 gal. per hr. They have the following features: non-clogging ball valves, accessible valve changes, renewable valve seats, powerful steel walking beams, double bushings, long-life diaphragms, over-sized pump bodies and extra heavy gearing. They are suitable for pumping water, mud, sand, slush, grit and any other liquid material.

Speaking of Employment . . .

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LITERATURE FROM MANUFACTURERS . . .

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the *Western Construction News*, 503 Market Street, San Francisco, California.

Tourist Court Journal, Temple, Tex.—A tourist court plan book, complete with plans for varied types of tourist courts, and illustrations, has just been published by Tourist Court Journal.

Peninsular Chemical Products Co., Van Dyke, Mich.—An illustrated bulletin gives complete information on the new Pen-Kote 500 chemical-resistant maintenance paint. Typical jobs illustrate how this quick-drying, odorless protective coating is readily applied to heated, wet and porous surfaces of all kinds; unretouched photographs of test strips demonstrate the protection it gives against hot acids, alkalis and water.

Wickwire Spencer Steel, New York, N. Y.—A new chain link fence erection manual just out is an aid to contractors, fence superintendents and others responsible for the installation and maintenance of chain link fences. It is the first time a complete instruction guide covering all points in the erection of this type of steel fence has been published.

Bucyrus-Erie Co., S. Milwaukee, Wis.—The Dozer-Shovel for International Trac-TracTors is described in a 24-page bulletin just issued. Colorfully illustrated with numerous large photographs and pen drawings, it graphically depicts actual operating conditions on a variety of digging, earthmoving and material-handling jobs. Low overhead clearance and compact design for high maneuverability, high visibility, maintenance of tractor balance and smooth hydraulic control make the Dozer-Shovel unique among tractor loaders.

United States Steel Corp., New York, N. Y.—The role the steel industry played in the war is ably described and photographed in the 164 page book just published by this corporation. "Steel in the War" has been made available to thousands of libraries where it may be used as an industrial reference volume. It assembles for the first time facts and figures which show the importance of steel to national security, and it traces the development of many new steels and new uses of steel which were invaluable to our armed forces and are now available for postwar needs.

Food Machinery Corp., Los Angeles, Calif.—Sixty types and styles of vertical and horizontal pumps manufactured by the Peerless Pump Division of this firm are presented in a new bulletin (B-136). Photographed illustrations of all types are shown including deep and shallow well pumps, Hi-Lift pumps and domestic water systems.

Marlow Pumps, Ridgewood, N. J.—A pamphlet on Marlow self-priming centrifugal diaphragm and plunger pumps is one of the latest publications from the company. Numbered Bulletin G-45, it is amply illustrated and full of descriptions explaining the advantages of the Marlow product. Another bulletin which may be obtained along with the first more fully tells how the self-priming centrifugal pumps work, and is written by A. S. Marlow, Jr.

Acme Tank Manufacturing Co., Los Angeles, Calif.—"Special Shaped Wood Tanks and Specialties" is the subject of a bulletin newly published by the company. It gives complete engineering data and illustrates a wide variety of tanks, including rectangular tanks, acid pickling tanks, ice can filler tanks, film tanks and accessories, beverage tanks, vinegar generators and storage tanks, chemical industry tanks, acid tanks, tanners' tanks, pulp and paper industry tanks, aerator and fume stack, wood pipe, tank truck and many more. The bulletin also contains reference tables for computing U. S. gallons in different shaped tanks.

Eitel-McCullough, Inc., San Bruno, Calif.—Eimac, as this firm is called, has published a booklet describing its line in vacuum tube manufacturing, with latest additions and improvements. Eimac long ago adopted a serial-numbering system, dating each tube for the buyer's protection. The booklet is artistically illustrated with photoraphs.

Walter Motor Truck Co., Queens, N. Y.—"Walter Record" is the title of a folder the firm has released on Walter snow fighting equipment. Pictures show the different Walter Snow Fighters and text describes how they function. Also a list of special precautions before starting snow clearing is given.

G. H. Tennant Co., Minneapolis, Minn.—This manufacturer of industrial floor maintenance equipment has issued a new bulletin describing electric, self-propelling model "J" Tennant floor machine with 12-in. drum-type accessories. Applications include dry cleaning, sweeping, polishing, burnishing and sanding industrial floors and removing incrusted grime from them.

OPPORTUNITY SECTION

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