WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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DECEMBER • 1941

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$2.00 PER YEAR

IN THIS ISSUE

Ammunition Depot at Hermiston

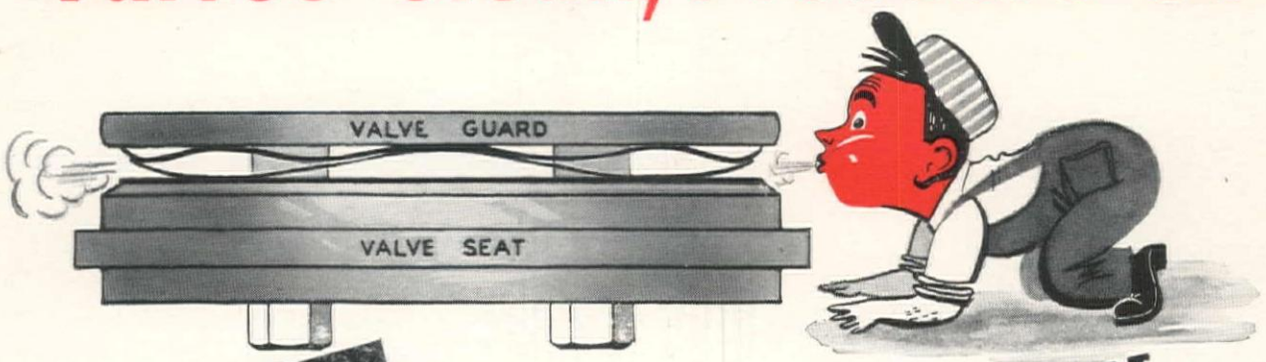
Alpine Dam Crest Raised 30 Ft.

Construction Project Lighting

Revised List of Steel Sections

A THOUSAND ammunition storage magazines have been completed at the Umatilla Ordnance Depot near Hermiston, Ore., in 119 days by J. A. Terteling & Sons working under the direction of the Construction Division of the Quartermaster Corps

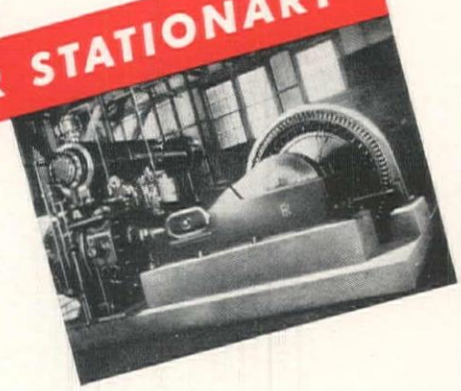
Valves Clean, Pressure UP!



CARBON JUST BLOWS AWAY

SULLIVAN "Dual-Cushion" valves securing variable spring tension by the use of wave-shaped springs and reaction plates. Valves of every design stay carbon-free, in compressors lubricated with Texaco.

PORTABLE OR STATIONARY



VALVES will stay clean longer and air pressures will stay up . . . regardless of the size or type of compressors you operate when you use *Texaco Alcaid, Algol or Ursa Oils.*

Using *Texaco Alcaid, Algol or Ursa Oils* the little carbon that may form will be *soft* and *fluffy* . . . will be carried away with the compressed air. Highly resistant not only to carbon formation, but also to gumming and sludging, these oils assure efficient valves, longer service between inspections and cleanings.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

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

THEY PREFER TEXACO

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

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

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

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

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

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FRED ALLEN every Wednesday night. See your local newspaper for time and station.

METROPOLITAN OPERA. Complete broadcasts of great operas every Saturday. See your local newspaper for time and station.

TEXACO REG. T.M.

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense

THREE NORTHWEST ROCK SHOVELS for GEO. POLLOCK CO.

SACRAMENTO, CALIFORNIA

ANOTHER Northwest for a firm that has proved Northwest ability to get things done under the toughest conditions. Geo. Pollock Company at Sacramento, Calif. has bought its third Model 80 shovel.

Let us emphasize again to you who are going to be in the market for shovels in the future—orders from responsible concerns like this are based on performance.

Northwest design and Northwest advantages have been proved by the leading contractors of the country. You can't have *too* much dependability. Plan ahead to be a Northwest owner.

NORTHWEST
ENGINEERING COMPANY
1736 Steger Bldg., 28 E. Jackson Blvd.
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GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

IF IT'S A REAL ROCK SHOVEL—YOU WON'T HAVE TO WORRY ABOUT OUTPUT IN DIRT!

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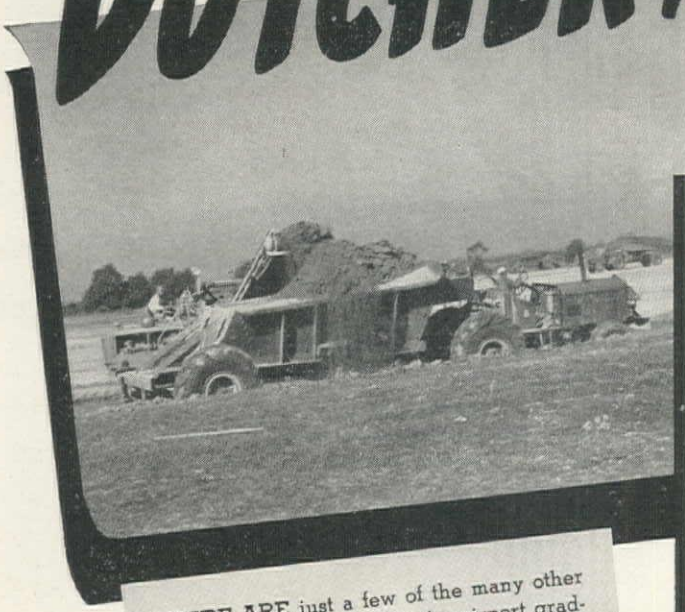
Northwest Sales Agents: ARNOLD MACHY. CO., INC., 149 W. 2nd St., Salt Lake City, Utah; MINE & SMELTER EQUIPMENT CO., P. O. Box 788, Phoenix, Arizona

DUTCHER makes the dirt FLY!



18,000 Cu. Yds. PER DAY

Yes, sir! Bottom-Dump EUCLIDS are making the dirt fly for Dutcher Construction Corp. at the New Castle County Airport near Wilmington, Delaware — 18,000 cu. yds. every 20-hour working day.

The entire 2,500,000 cu. yds. on this job is being moved with eight 13-yard and six 10-yard Bottom-Dump EUCLIDS and three 48" elevating graders. These fourteen Euclids are hauling approximately 1500 loads a day, 1800 feet each way.

There are good reasons why Euclids are at work on most defense projects. Be sure to check Euclid dependability and low hauling costs for your next job. We'll be glad to supply the facts and figures.

The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO

HERE ARE just a few of the many other contractors using Euclids for airport grading: Frank Mashuda and Laub & Collins — Johnstown Airport, Pa. . . . C-G Construction Co. — Wright Field, Dayton, Ohio . . . R. W. Briggs & Co. — Mission Airport, Texas . . . Hardaway Contracting Co. — Moultrie Flying School, Georgia . . . J. L. Sigretto & Sons, Inc. — Morristown Airport, New Jersey . . . Merveldt & Lawson — Bethany Airport, Oklahoma.

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SELF-POWERED
EARTH • ROCK • COAL • ORE
HAULING EQUIPMENT
And—CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

EUCLID THE PIONEER

CONTRACTORS' EQUIPMENT & SUPPLY CO., Albuquerque; INTERMOUNTAIN EQUIPMENT COMPANY, Boise; HALL-PERRY MACHINERY COMPANY, Butte; F. W. McCOY COMPANY, Denver; CROOK COMPANY, Los Angeles; THE RIX COMPANY, INC., San Francisco; LOGGERS AND CONTRACTORS' MACHINERY CO., Portland; A. H. COX & CO., Seattle.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

The National Magazine of the Construction West

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D. F. STEVENS, Editor

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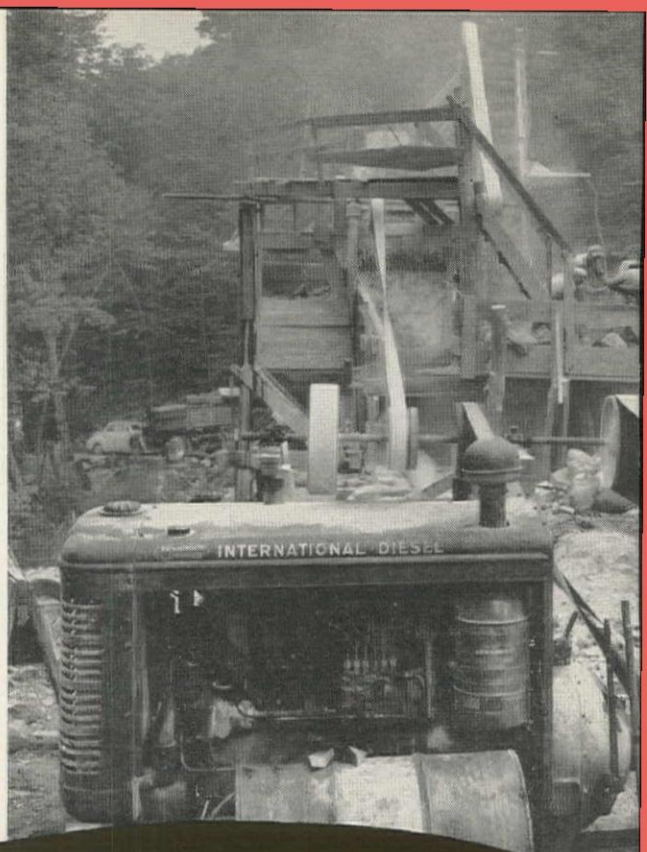
Please address correspondence to the executive offices, 503 Market Street San Francisco, California

WHEN AN INTERNATIONAL TD-18 Diesel TracTracTor bores into a mountain side and meets up with hard, weathered Nevada granite, the tractor *comes through,* ready for more! There's no doubt about it—the rocks (far right) are taking a beating. These rocks, destined for roadbed fill, are all in the day's work for Tony Marazzo's TD-18 and bullgrader combination, working out of Boise, Idaho. This is the kind of power that contractors all over the country are using to lick the toughest going.

The UD-18 Power Unit at the right is another International product having a set-to with solid rock. The UD-18 is furnishing steady, dependable power at low cost for a rock crusher on the Skyline Drive development in Virginia. The outfit is owned by Lambert Bros., Knoxville, Tenn.

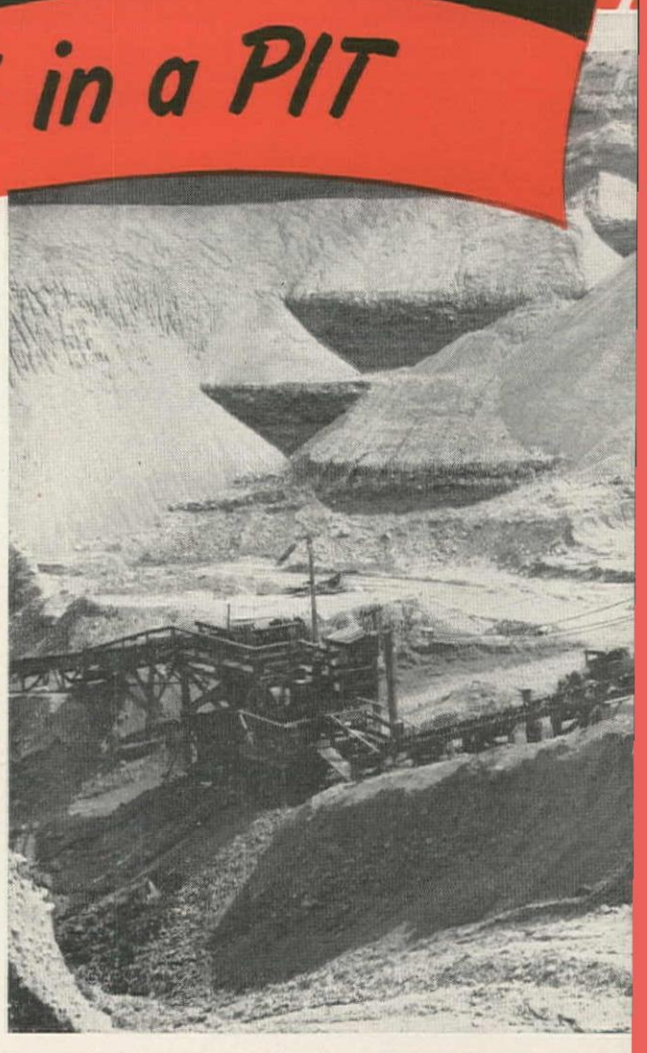
Fuel economy, the right power for the job, and a variety of tractor and engine sizes make the International Industrial Power line *a sure winner for your work.* Write for information.



CRACKING ROCK for ROADBEDS or LAYING PIPE in a PIT

INTERNATIONAL Fills the Bill

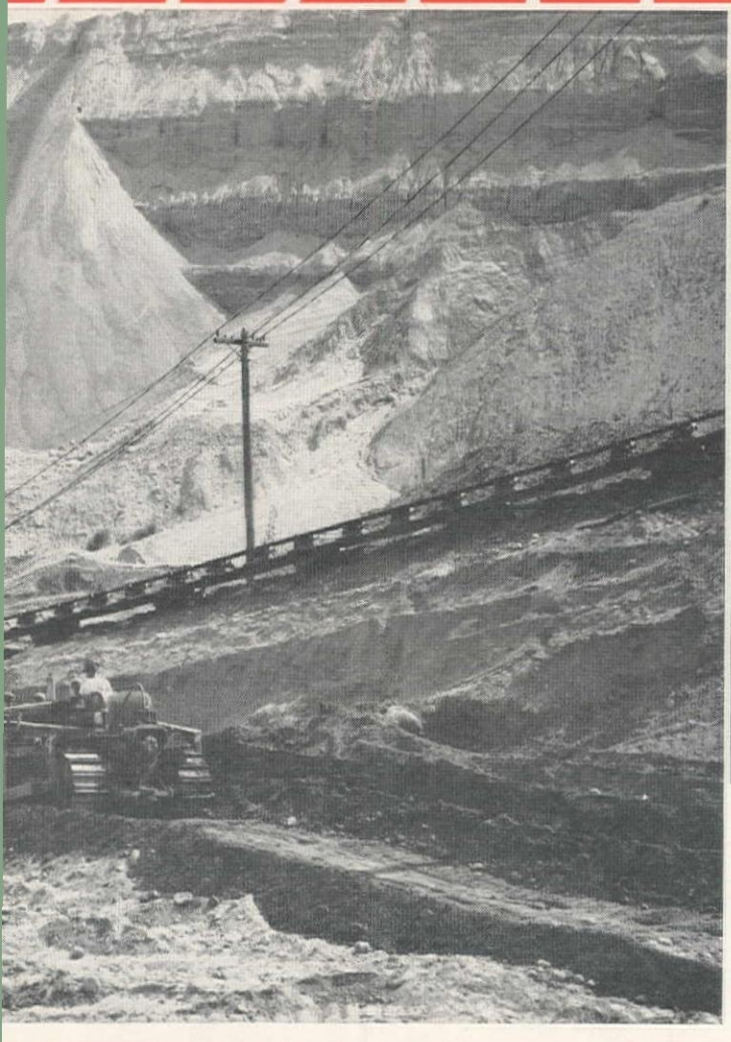
A CALIFORNIA gravel pit provides the setting for this International TracTracTor operation—another example of the varied application of International Industrial Power. In this 200-foot deep, 40-acre man-made canyon, the TD-18 Diesel, with bulldozer, owned by Graham Bros., Roscoe, Calif., is shown routing out a channel for a pipeline to carry accumulated water up and out of the pit. In the scene at far right, the TracTracTor is making quick work of covering pipe.



Ask the nearest International Industrial Power dealer or Company-owned branch about the full line of International TracTracTors, Wheel Tractors, and Power Units. Models for both Diesel and gasoline fuel. *Every one's a winner in its power size.*

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL



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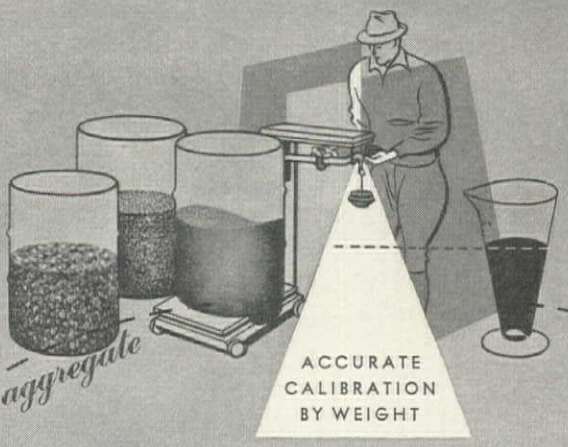
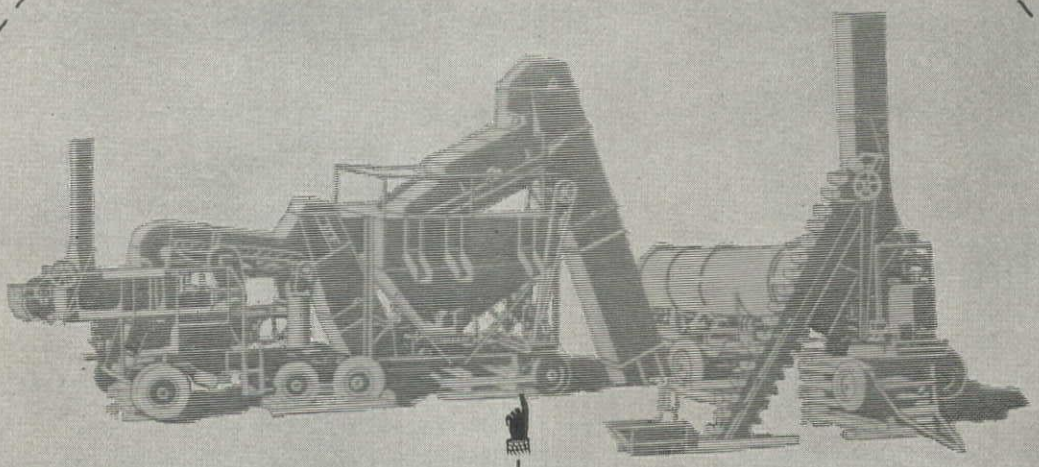
International Harvester Branches at San Francisco, Los Angeles, Portland, Seattle, Spokane, Salt Lake City, Cheyenne.

Industrial Power

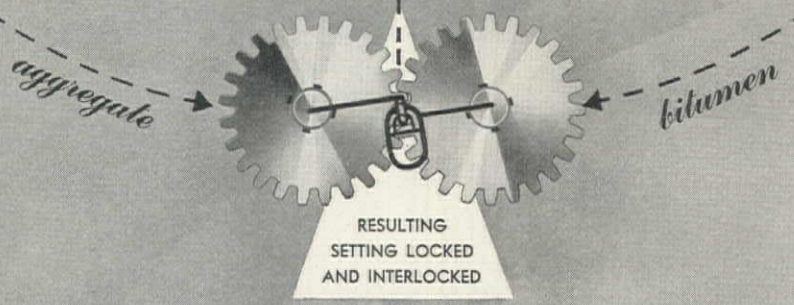




Only

WITH A BARBER-GREENE

Continuous Mixer



The simple procedure illustrated above accounts for the untiring accuracy of the Barber-Greene. The desired quantity of each size aggregate is weighed, and the feeder gates locked at this setting. The bitumen metering pump is set for the desired ratio, and mechanically interlocked with the aggregate feeder. The Barber-Greene achieves POSITIVE PROPORTIONING in bituminous mixing. Feeding these accurately proportioned materials into the twin pugmill in a proportioned continuous stream, the Barber-Greene easily delivers a uniform mix, ton after ton—mile after mile. The Barber-Greene has set entirely new standards for short inexpensive moving and set-up time. Investigate this ingenious machine. Complete literature on request. Barber-Greene Company, Aurora, Illinois.

41-16

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Brown-Bevis Equip. Co., Los Angeles, Phoenix; Columbia Equip. Co., Portland, Spokane, Seattle, Boise; Contractors Equip. & Supply Co., Albuquerque; Jenison Machinery Co., San Francisco; Lund Machinery Co., Salt Lake City; Western Construction Equip. Co., Billings; Ray Corson Machinery Co., Denver.

EXTRA Tough . . .
EXTRA Flexible . . .
MONARCH PRE-FORMED
made from
2 KINDS OF WIRE

INNER WIRES ARE EXTREMELY FLEXIBLE. They're drawn in a special way to make them extra strong, extra pliable. They're improved plow steel too. They bend easily over your sheaves and drums. These wires are the reserve strength of Monarch Whyte Strand PREformed.

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And then to provide for EXTRA long life, every wire in Monarch Whyte Strand is thoroughly covered with a special lubricant which protects unseen, inside surfaces against corrosion and friction. This better wire rope is available from stock in the correct size, grade and construction.

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PIONEER

Foto Facts

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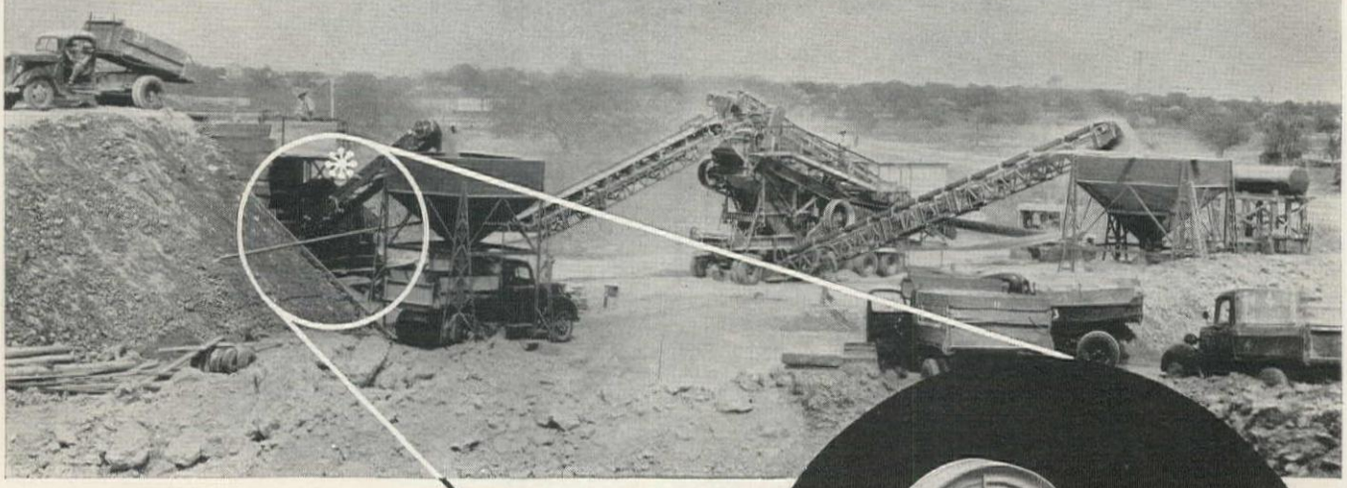
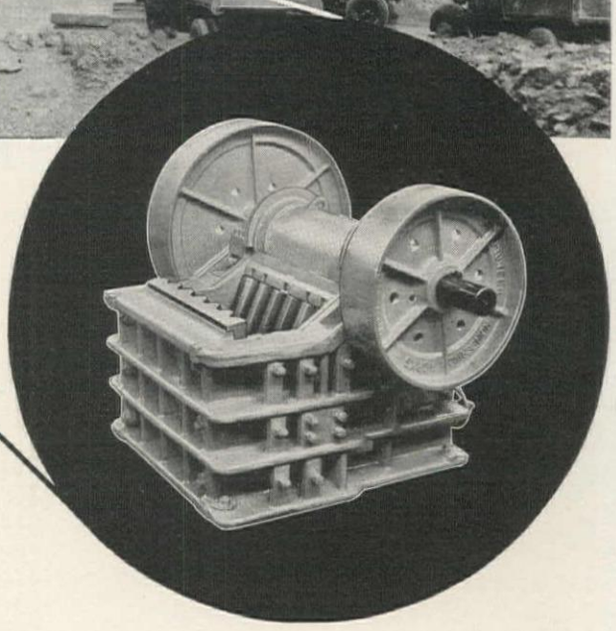
THE FIRST FACTOR IN PROFITABLE PRODUCTION





The Primary Crusher is the First Factor in Determining the Output of Your Quarry Plant.

A primary crusher with too small an opening will only take small rock and requires more blasting and sledging. A primary crusher with small capacity holds back the production of the whole plant — as a plant can only produce as much rock as is fed to it.

On this job, the producer selected the Pioneer 2036 Jaw Crusher for his primary crushing. It has a large opening — 20" between the jaws — and will take rocks up to 18" without hesitation. The jaws are 36" wide which gives ample capacity for this plant. Furthermore the jaws have wide, deep corrugations that break up the slabs.

To maintain constant feed and to handle the rocks from the trucks to the crusher, he uses a Pioneer Traveling Grizzly Feeder.

The combination of the Traveling Grizzly Feeder and the Pioneer 2036 Jaw Crusher makes an ideal primary unit. They require a minimum of labor and operating cost — yet insure the maximum of production.

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Give me a smooth hydraulic job every time!

—almost any tractor operator will tell you that. Smooth, single lever, fatigueless control is the answer. Direct blade lift *plus* greatest down pressure, exclusive to Baker hydraulic operation, guarantees *positive blade control—a smoother grade—a faster cut—a bigger load handled.*

On any job, clearing, land leveling, stripping, backfilling or grading, Baker Hydraulic Bulldozers and Gradebuilders are time savers and profit makers. On the toughest going or the smoothest leveling, hydraulic blade control makes the difference.

On defense and housing projects—in fact, every job today—you need faster dirt moving. Bakers will do it for you. Get the facts from your dealer and send for Bulletin 834 that tells the story of Baker superiority.

Lowest cost dig, haul, level and dump is provided by Baker 2-wheel Hydraulic Scrapers. Bulletin 822.

Don't get stuck in the snow — Baker Plows will see you through. Straight and "V" blade models for truck and tractor mounting. Bulletin 829.

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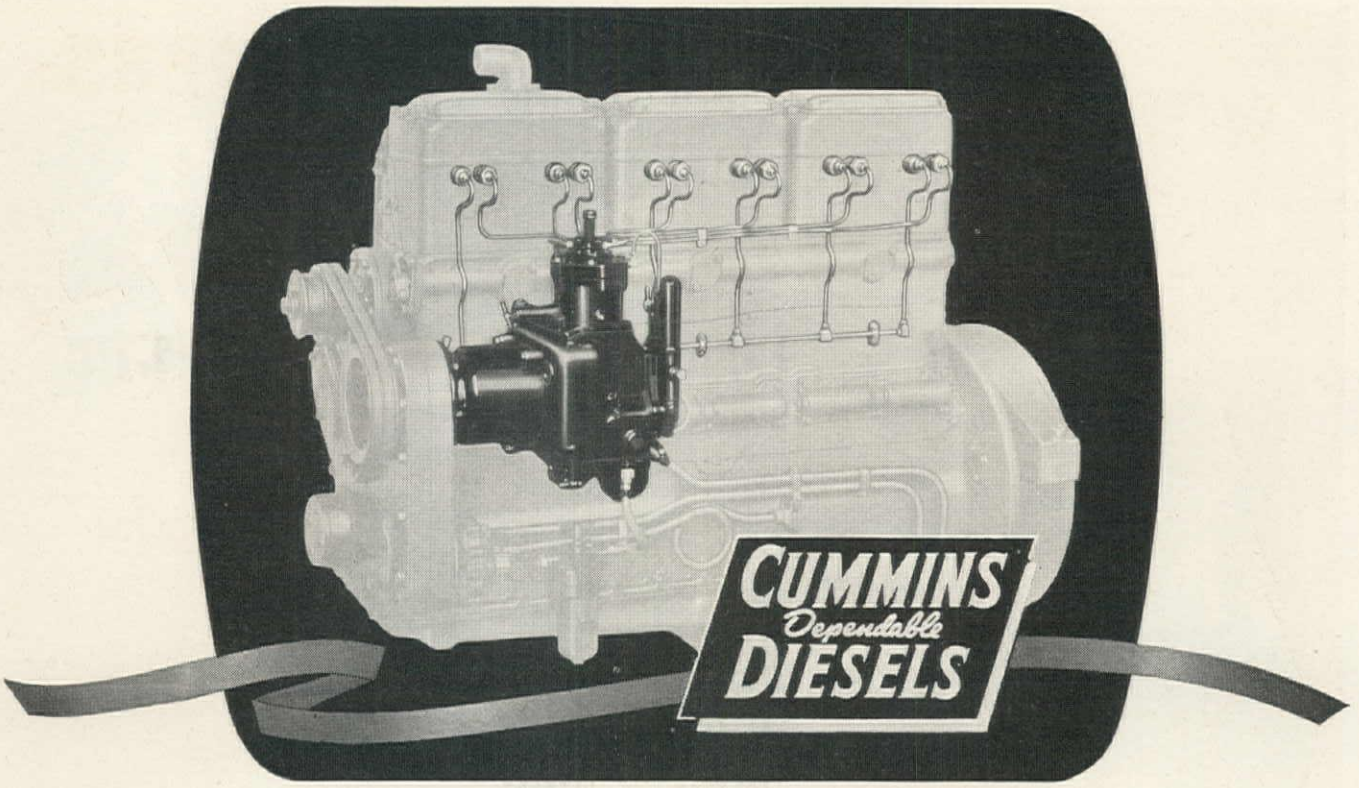

Exclusive . . . in design and manufacture . . . in performance and protection

The Cummins Diesel's outstanding record is a perpetual demonstration of the value of the *Exclusive Cummins Fuel System* . . . without it, the Cummins Diesel would be just another diesel. But because it is fundamentally different from all other fuel systems . . . every Cummins Diesel owner enjoys these three *exclusive* advantages:

1. *Efficient distribution* because fuel is under low pressure and controlled from one point.

2. *Efficient combustion* because fuel is gasified before injection and controlled during injection.

3. *Efficient service* because neither pump nor injectors need be sent to the factory for overhaul . . . but can be serviced in the field by a competent mechanic with the aid of the Owner's Manual.

The Cummins Fuel System was designed *exclusively* for the Cummins Diesel . . . it is manufactured *exclusively* by the Cummins Engine Company . . . it is used *exclusively* in the Cummins Diesel . . . it gives you that dependable performance which is your protection against interrupted operation . . . it is your assurance of increased production and profits on your job. Bulletin FS-101 tells the whole story. Write for your copy.

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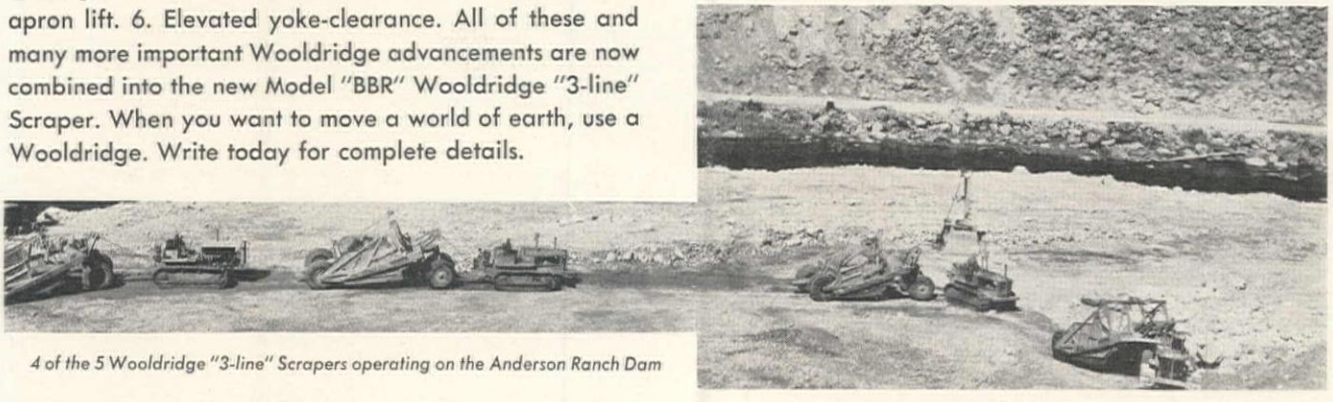
ARE BACKED BY A WORLD OF EARTH MOVING EXPERIENCE

Over a period of many years, Wooldridge Scrapers have profitably moved veritable mountains of dirt and rock. They have handled more yardage per load, more loads per hour, trip after trip and shift after shift. From this world of earth-moving experience, Wooldridge engineers have evolved such outstanding major improvements as 1. Boiling bowl loading. 2. Pivot-dump load ejection. 3. Rear-draft leverage. 4. Individual "3-line" control. 5. Higher front apron lift. 6. Elevated yoke-clearance. All of these and many more important Wooldridge advancements are now combined into the new Model "BBR" Wooldridge "3-line" Scraper. When you want to move a world of earth, use a Wooldridge. Write today for complete details.

Tons and tons more yardage are being added to Wooldridge's proven background of earth-moving experience by five new Wooldridge Model "BBR's" out of a total of seven scrapers now working on the Anderson Ranch Dam project. When it's 5 out of 7 and 2 bulldozers in favor of Wooldridge equipment, you can be sure there's truly no substitute for Wooldridge performance.



4 of the 5 Wooldridge "3-line" Scrapers operating on the Anderson Ranch Dam

WOOLDRIDGE
MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA
SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

3-line SCRAPERS

"'Caterpillar' Diesels

One of the West's busiest contractors as well as one of the major general engineering firms in the nation, is Morrison-Knudsen Co., Inc., of Boise, Idaho. Their name is linked with many of the biggest defense and reclamation projects in the Pacific Basin—Anderson Dam in Idaho; Alaska Airports; Pacific Islands fortifications; Fort Ord, Camp Roberts and Camp Bradley in California; and Fern Ridge Dam at Eugene, Oregon.

Their operations at Fern Ridge Dam are a splendid example of the way Morrison-Knudsen organize a job with experienced and capable personnel backed by plenty of good equipment. Whether they bid alone or in conjunction with other contractors, their projects calling for tractor work are always liberally powered by "Caterpillar" Diesels. On the Fern Ridge Dam job they regularly use 18 "Caterpillar" D8 Tractors and from 2 to 5 "Caterpillar" Engines! The California military camp projects required more than 100 tractors, road machines and engines. Three barge loads of "Caterpillar" Machines were shipped to the Alaska Airports project.

Read the statement of J. L. Morrison, Tractor Superintendent for the firm which subbed the tractor work on Fern Ridge Dam, and you'll see why Morrison-Knudsen Co., Inc., their co-bidders and their subcontractors use "Caterpillar" Diesels so extensively.

WHAT TO DO WHEN YOU NEED POWER

Government priority ratings are regulating shipments of most of today's record production of "Caterpillar" Products. Therefore, your "Caterpillar" Dealer offers the following suggestions which may help you relieve any difficulties caused by the machine shortage:

1. If your job is important to defense, have your "Caterpillar" Dealer help you obtain proper priority ratings.
2. Keep the "Caterpillar" Machines you now own in first-class mechanical condition by following your maintenance program more carefully than ever.
3. Call on your "Caterpillar" Dealer for suggestions on training operators and servicemen to help you get more work from your "Caterpillar" Equipment.
4. Whatever your power problem, when you need a new machine see your "Caterpillar" Dealer as far in advance as possible.

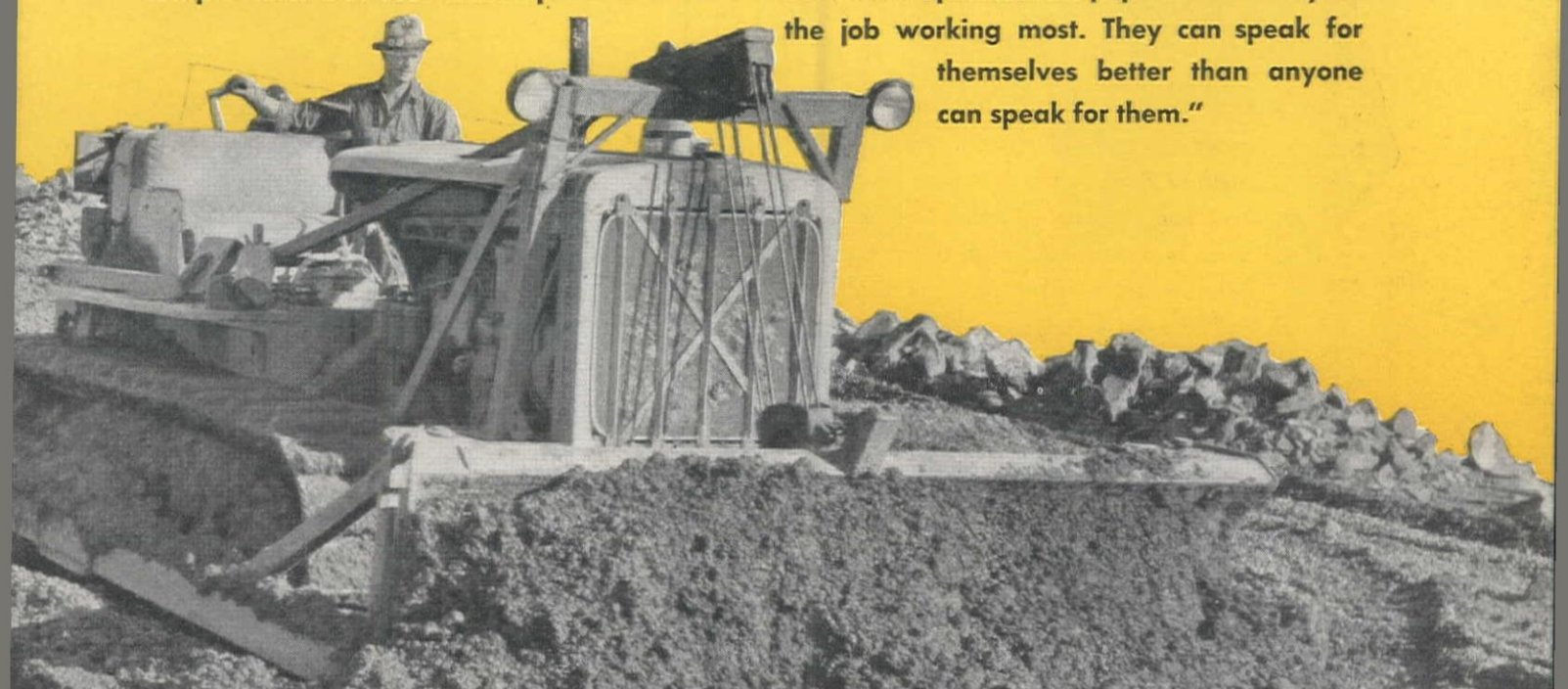
CATERPILLAR TRACTOR CO. · SAN LEANDRO, CALIFORNIA · PEORIA, ILLINOIS

TRACK-TYPE TRACTORS · DIESEL ENGINES AND ELECTRIC SETS · ROAD MACHINERY

our most dependable Equipment"

SAYS J. L. MORRISON, TRACTOR SUPERINTENDENT, FERN RIDGE DAM

"At Fern Ridge Dam we are 100% 'Caterpillar' in tractors and have 5 'Caterpillar' Engines in compressors. Our fuel consumption is at the minimum, and repairs and upkeep are as low as anyone can expect. 'Caterpillar' Diesels are our most dependable equipment and stay on the job working most. They can speak for themselves better than anyone can speak for them."



CATERPILLAR

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You'll use this practical wire rope information often. 96 handy pages of facts, tables, illustrations. Send for your free copy *today!*

The boy with a mechanical turn of mind, playing with toy shovel or crane, may even now be constructing his future career. And whether he becomes a general contractor, road builder or industrial engineer, he will employ giant power equipment, as you do, to create better living for everyone.

In the serious real-life business of keeping construction under way, Yellow Strand Preformed Wire Rope is one of the mainstays. Its rugged *endurance* especially fits it for heavy duty on shovels, draglines, scrapers and other machines. Through skillful balancing of elasticity, toughness, strength, it keeps them in *productive* service by reducing shutdowns.

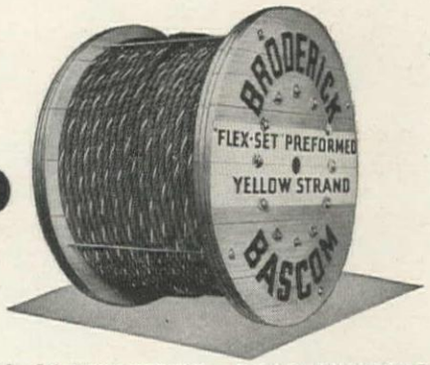
With Yellow Strand on the job, you can speed up faster under full load, handle more pay-tons or pay-yards, because every reel is practically pre-broken-in. The preforming makes a limber, smooth-running line that's easy to socket and splice; one that protects hands and sheaves from wickering, that resists kinking, drum crushing and bending fatigue.

Put these premium qualities to work for you by installing Preformed Yellow Strand the next time you need wire rope. Its long life, its low *final* cost, will loom up when you figure the profits.

BRODERICK & BASCOM ROPE CO., SEATTLE

Branches: New York, Chicago, Houston, Portland, St. Louis • • *Factories:* St. Louis, Seattle, Peoria

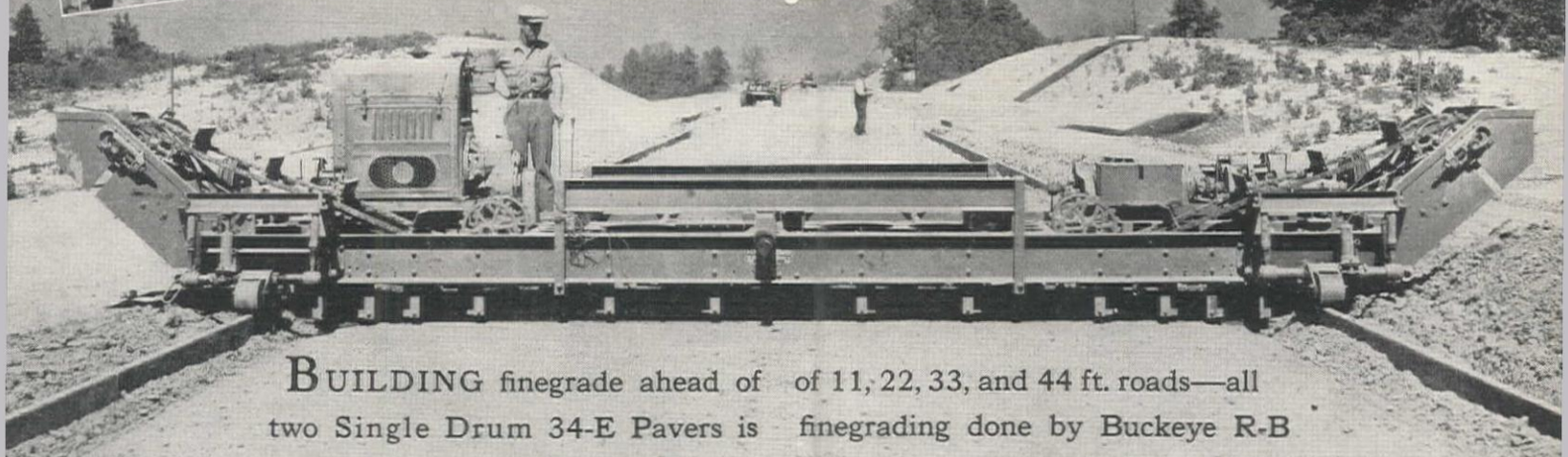
YELLOW STRAND
Preformed WIRE ROPE



A Mainstay of Industry, Which Benefits the Public Through Its Service to GENERAL CONTRACTORS • ROAD BUILDERS ROTARY DRILLERS • PLANT ENGINEERS • LOGGERS • MINERS • QUARRY OPERATORS and OTHER INDUSTRIAL SERVANTS

Setting a Pace FOR Two 34E PAVERS at FORT KNOX, Kentucky

Buckeye R-B POWER FINEGRADER



BUILDING finegrade ahead of two Single Drum 34-E Pavers is a job that demands speed and more speed, but the R-B Power Finegrader illustrated here is doing that in its stride. It's leading the parade with a clean, smooth accurate grade well out ahead of the pavers. The job is at Fort Knox, Ky., with the Breslin Construction Co., Louisville, and White Consolidated, Inc., Chicago, putting in 245,000 sq. yds. of 11, 22, 33, and 44 ft. roads—all finegrading done by Buckeye R-B machines. On hundreds of similar paving jobs—roads, airport runways, proving grounds — Buckeye R-B Power Finegraders are cutting the grade right on the payline, saving time, money and material. . . . . You'll profit by putting Buckeye R-B Finegraders on your paving jobs. Write *for new Bulletin Today!*

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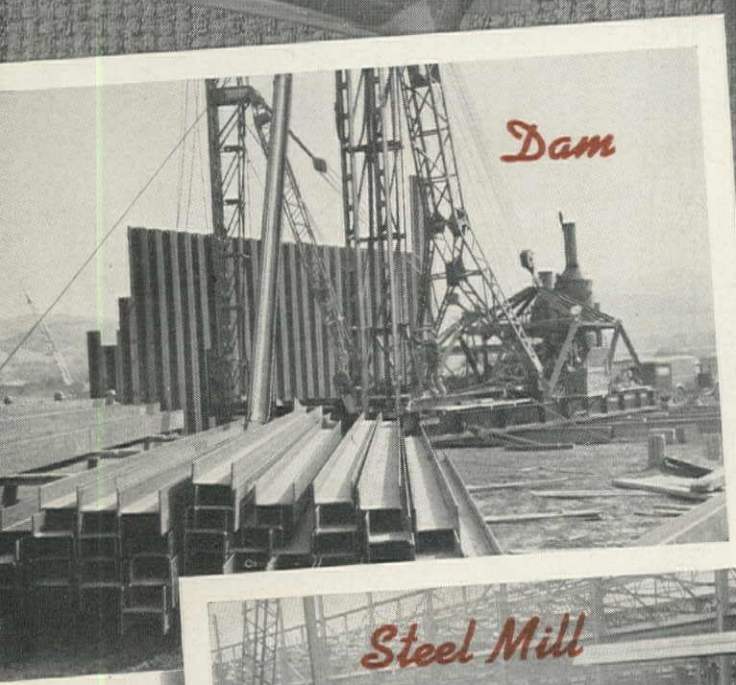
Foundation engineers:

There is no priority on service!



We wish we were able to offer you all the Steel Bearing Piles you could use right now. But, because they are playing such an important role in national defense, that's impossible. We can, however, offer you immediate engineering assistance and advice in the use of bearing piles that will help you side-step both trouble and delay.

WHETHER you are busy on defense construction or planning for the post-war period, the cooperation and advice of our Piling specialists can be of real value. It places at your disposal a thorough knowledge of steel bearing piles and the latest developments in their application. Some of this information is nowhere else available.

In the last seven years we have produced more than twelve million feet of U·S·S Steel Bearing Piles. They have been applied on 1006 foundation projects of every size and kind. Included in this list have been some of the toughest, most unusual Piling jobs ever undertaken. And because our Piling engineers have worked closely on these jobs from start to finish, they have learned a lot about foundation problems that you won't find in the books. It is this practical, down-to-earth knowledge of the latest advances in foundation engineering that we gladly make available to you.

We don't pretend to have all the answers, but in this rich reservoir of accumulated experience, you may find the correct solution for many problems that face you at present. This service costs nothing—it is available immediately. After all, there is no priority on service or ideas. For prompt action, write to the nearest Columbia Steel office.

COLUMBIA STEEL COMPANY, *San Francisco*

Pacific Coast Distributors for U·S·S Steel Bearing Piles Manufactured by

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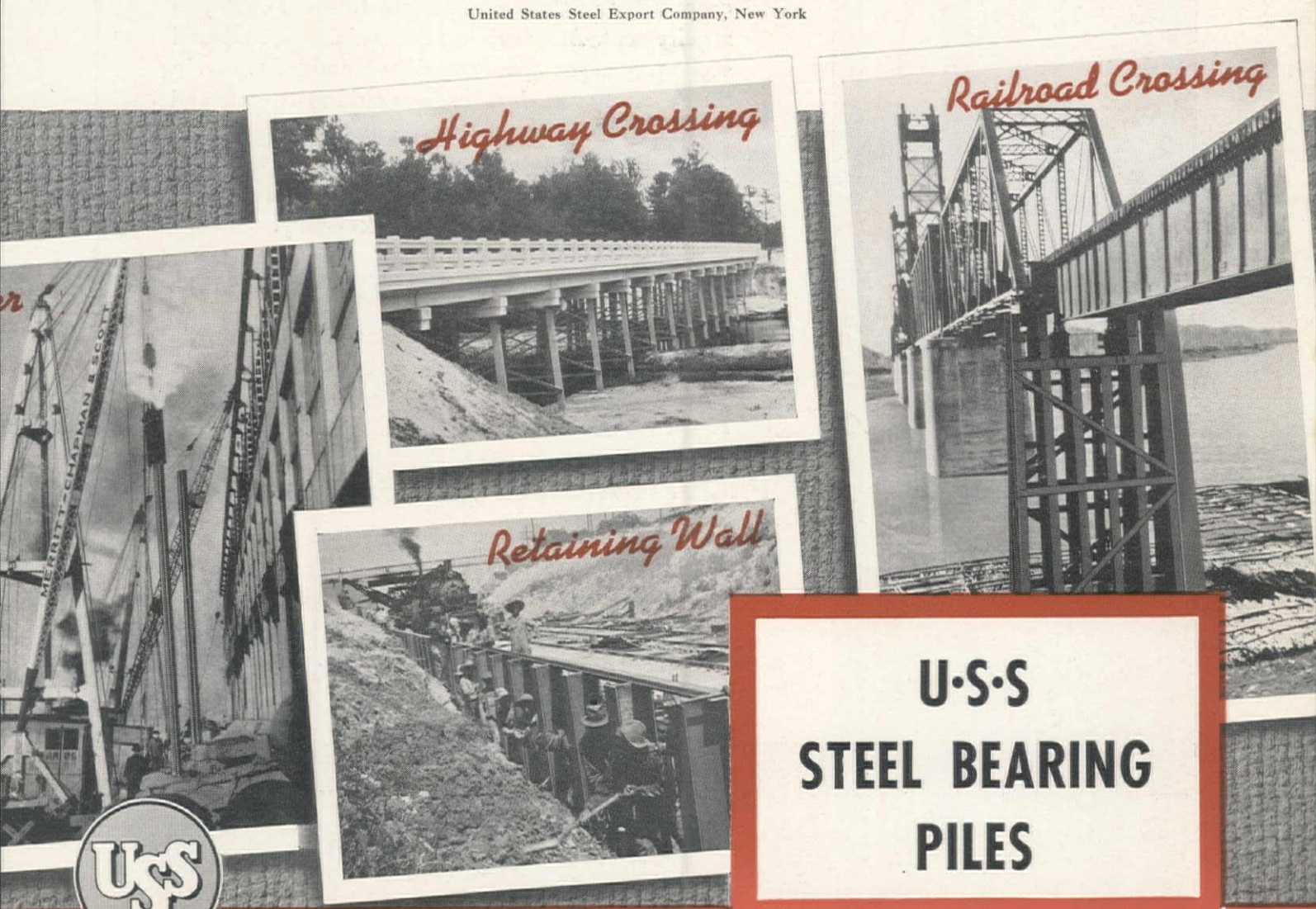
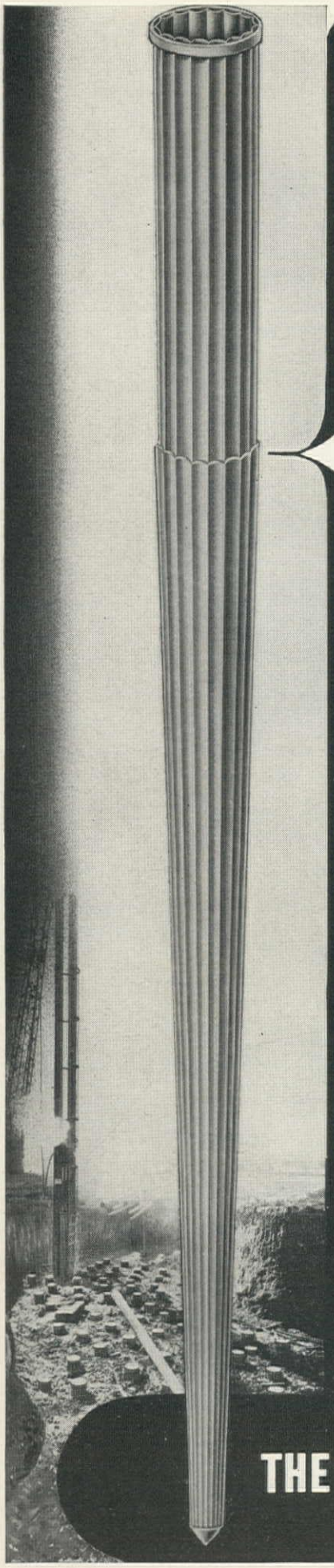


UNITED STATES STEEL



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ELIMINATE WASTE

The Monotube Method provides cast-in-place concrete piles of the exact length to meet each job requirement. After driving the main lower tapered section, constant taper extensions are added to obtain the necessary total length. Installation is simple and speedy. Any number of extensions, which are available in 12″, 14″, 16″ and 18″ diameters, can be added in this manner. Extendable Monotubes up to 125 ft. in length have been installed successfully.

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Low headroom presents no problem with Extendable Monotubes. Installation in two or more sections, as described above, permits fast, efficient driving in restricted areas.

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Extendable Monotubes are light weight for easy handling, require no core or mandrel, can be driven with standard crane, leads and hammer, and lend themselves to thorough inspection after driving. Write today for complete information.

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CANTON, OHIO

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than any excavator you ever ran. Try P&H's new hydraulic control.

Experience behind more than two thousand P&H rolled steel excavators has established the superiority of this modern construction under all job conditions. That's why more and more experienced users are insisting upon it . . . because these days equipment must last longer.

P&H originated all-welded excavators. P&H is still 5 years ahead of the field with the only excavator which has both upper and lower structures completely welded of rolled alloy steels.

If *more* proof is needed, the new P&H's are delivering it—with greater strength, faster production and lower operating costs.

2000 1900

OF THE TOUGHEST EXCAVATORS EVER BUILT — THAT'S P&H ROLLED STEEL DESIGN

General Offices: 4490 West National Avenue, Milwaukee, Wisconsin

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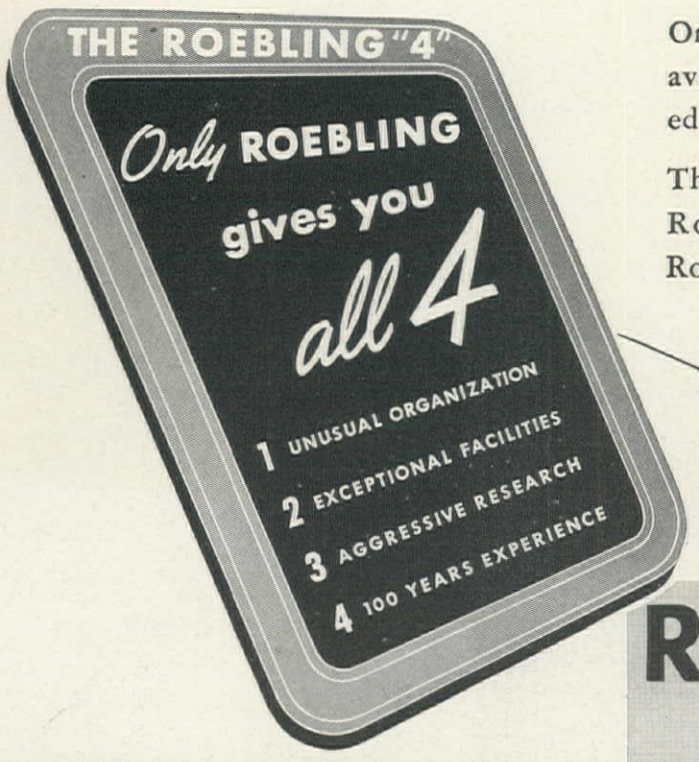
tland, Oregon, Loggers & Contractors Machinery Co., 240 S. E. Clay St.; o, Nevada, R. D. Jenkins & Son, 202 E. 2nd St.; Willows, Calif., Willow or Sales Co.; Albuquerque, N. M., Mr. Floyd Ames, P. O. Box 372; Great s, Mont., Midland Implement Co.; Salt Lake City, Utah, National Equip- t Co., 101 West Second St., So., Seattle, Wash., Glenn Carrington & Co., Columbia St.; Spokane, Wash., F. M. Viles & Co., 1007 Second Ave., West.

4=1

IN ROPE MATHEMATICS!



Only one wire rope manufacturer makes available to you all four advantages listed to the left—and that is Roebling.

The "Roebling 4" are the reasons why Roebling "Blue Center" Steel Wire Rope gives unexcelled service. You can use this rope with complete confidence that it will assure you of lowest possible *general average* rope operating cost.

ROEBLING

"Blue Center" STEEL

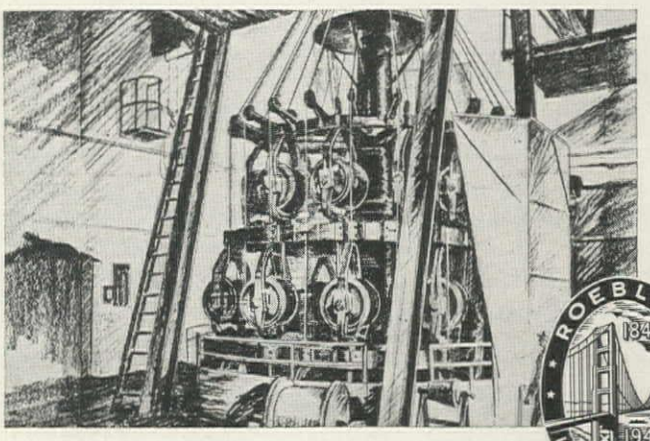
WIRE ROPE

PREFORMED AND NON-PREFORMED

A CASE OF THE BIGGER—THE BETTER!

This is one of many Roebling stranding machines of various sizes. It makes possible the production of highly efficient, large diameter ropes, such as mammoth dredge ropes, possessing an exceptionally high degree of pliability.

Each of its 36 bobbins holds over half a ton of wire! Here is a typical example of the exceptional rope-making facilities available at Roebling—of the great lengths to which Roebling goes to engineer into every Roebling rope a maximum of suitability, safety and stamina.



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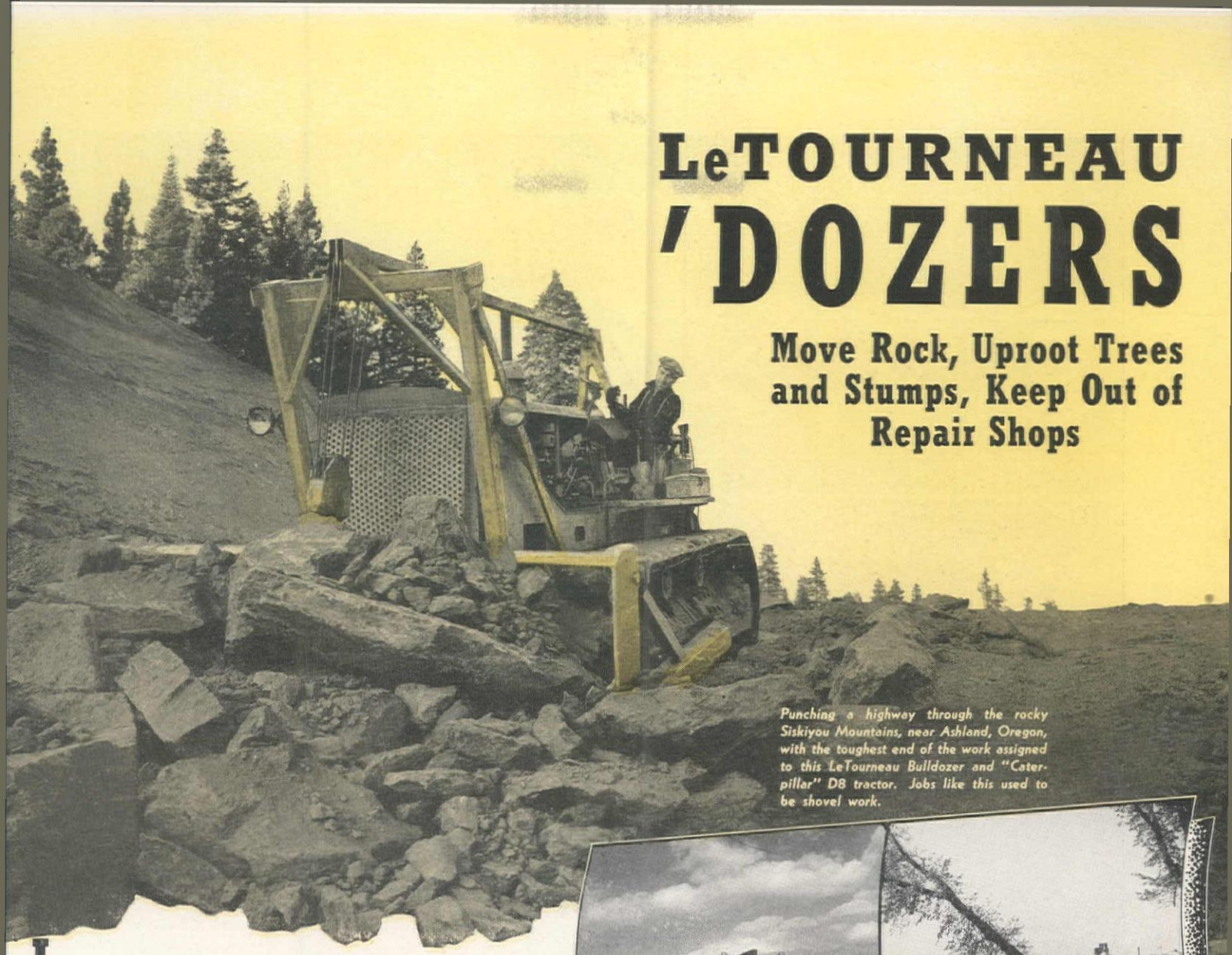
LeTOURNEAU 'DOZERS

Move Rock, Uproot Trees and Stumps, Keep Out of Repair Shops

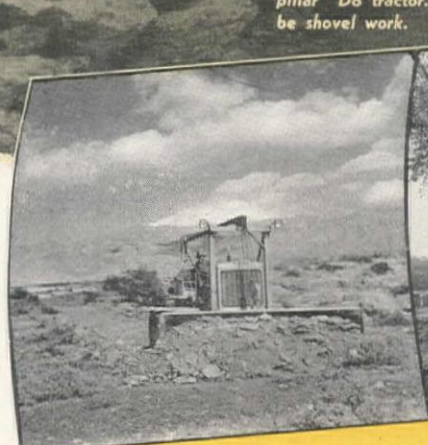


Punching a highway through the rocky Siskiyou Mountains, near Ashland, Oregon, with the toughest end of the work assigned to this LeTourneau Bulldozer and "Caterpillar" D8 tractor. Jobs like this used to be shovel work.

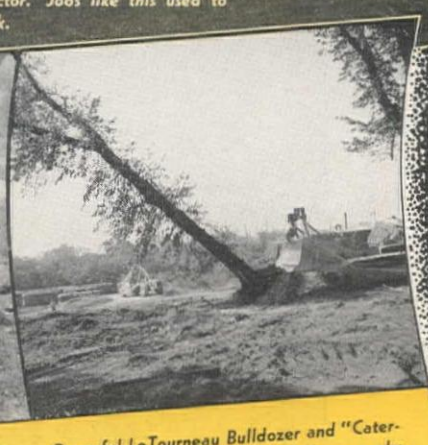
Le TOURNEAU Angledozers and Bulldozers enable you to profitably handle tough jobs like these because they're built for punishing conditions. LeTourneau alloy steel construction, are welded throughout, gives them maximum strength, minimum weight. Reversible cutting edge, replaceable tips, special heat-treated and hard-faced, further cut maintenance costs and lengthen equipment life. Result: LeTourneau 'Dozers today are the choice of contractors for the toughest jobs.

Operators like the fast response of LeTourneau 'Dozers . . . like the powerful high lift for clearing, uprooting stumps and pushing over trees . . . the instant low drop that enables the 'Dozer blade to follow loads over steep banks. LeTourneau cable control gives trigger-quick operation in any temperatures, whether it's in sizzling summer heat, or the sub-zero winter weather ahead of you.

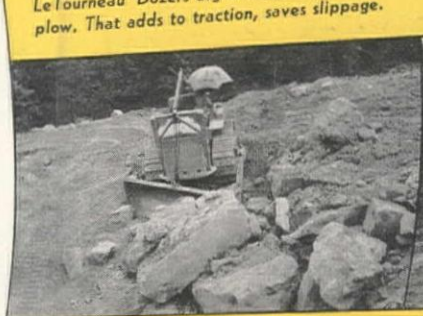
Job proved by more than 8,500 LeTourneau 'Dozers now working on some of the toughest jobs throughout the United States, Canada and abroad. Models for all size "Caterpillar" tractors from the D4 up. See your LeTourneau-"Caterpillar" dealer NOW!



Montgomery and Conkey used this rugged LeTourneau Angledozer and "Caterpillar" D7 to carve truck roads through rocky terrain, near Coachella, California. In shale like this, LeTourneau 'Dozers dig in naturally—like a plow. That adds to traction, saves slippage.



Powerful LeTourneau Bulldozer and "Caterpillar" D8 tractor uprooting full-grown elm trees for public utility in Peoria, Illinois. Upward blade lift can be applied simultaneously with forward tractor shove for added leverage to dig out stumps, trees, boulders.



Sidecasting rock on D. B. Hill's highway job, near Huff, Arkansas. Blade can be set straight for bulldozing—no extra bowl to mount. This is but one of three Angledozers Hill is using to handle rock, clay and sand. Two LeTourneau Carryalls handle the longer hauls.

LeTourneau Angledozer clearing stumps and side-hill rock for logging railroad grade, near Shevlin, Oregon. In the logging woods, where work like this is the toughest, LeTourneau 'Dozers outnumber all other makes combined!

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

CABLE ADDRESS: "BOBLETORNO"

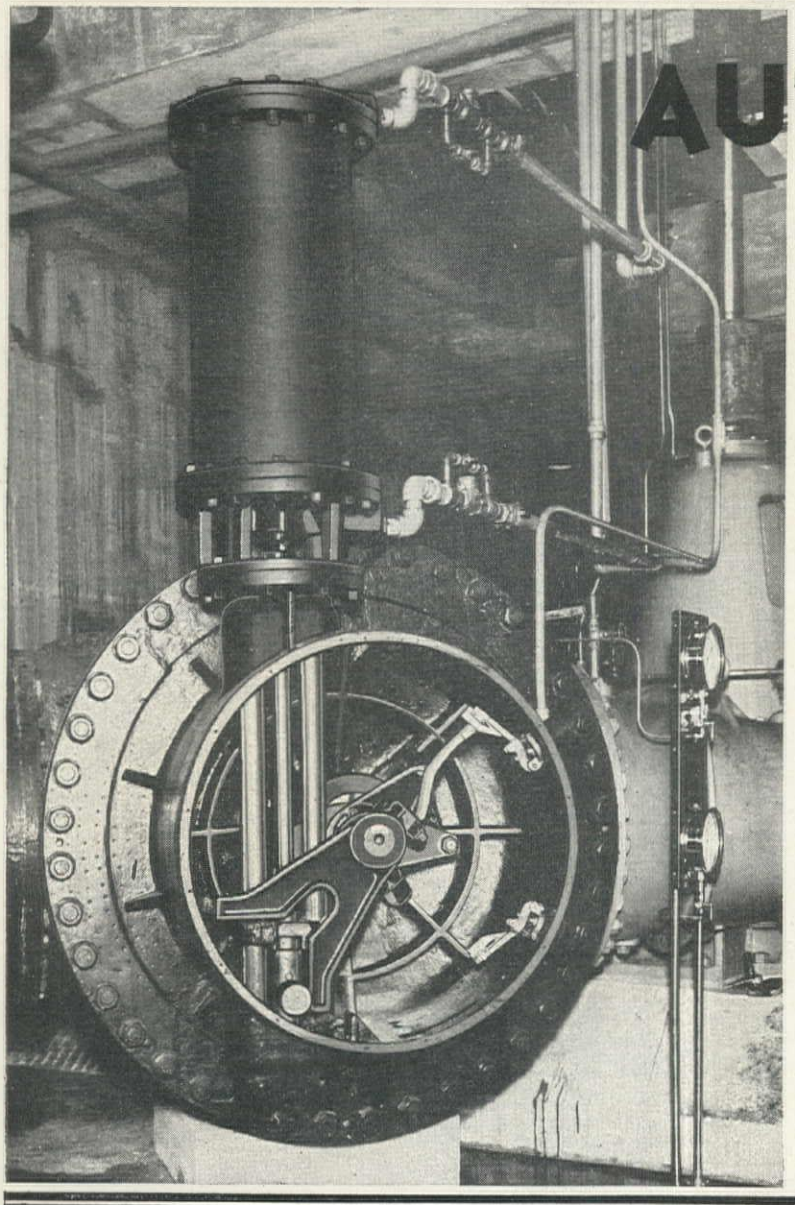
For Lowest Net Cost per Yard—CARRYALL* SCRAPERS, ANGLEDOZERS*, POWER CONTROL UNITS, BULLDOZERS, ROOTERS*, TRACTOR CRANES, PUSHDOZERS, TOURNAPULLS*, SHEEP'S FOOT ROLLERS, TOURNATRAILERS*, TOURNACRANE. *Name Reg. U. S. Pat. Off.

Efficient, Economical, Automatic!

OPEN — SHUT

CHAPMAN

Unwedge — Rotate — Rewedge



AUTOMATIC CONE VALVES

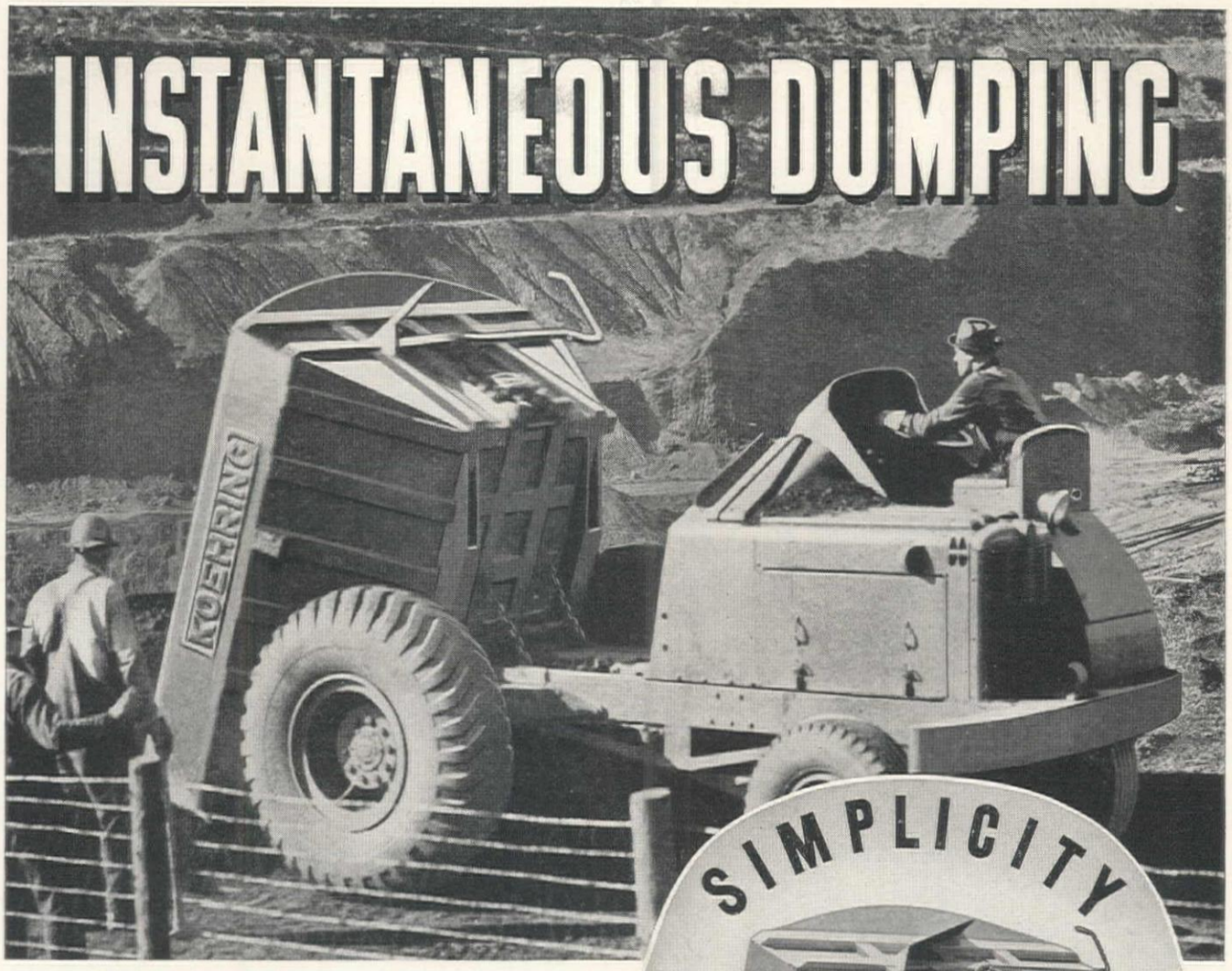
For many important applications in water supply and sewage disposal service, the Chapman Automatic Cone Valve is the most efficient and economical valve we know of. This plug-type valve, with its pipe-line waterway, self cleaning seats, and unique operating mechanism, is equally efficient for air, water, gas or sewage. It is built in sizes from 6″ to 48″ for manual, hydraulic or electric operation, with various types of automatic control. For such uses as stop-check, altitude and liquid level control, pressure regulating, etc., the Chapman Automatic Cone is the outstanding valve in this field.

At left:
Chapman Automatic Cone Valve
Sewage Pump Discharge Check
Showing Operating Mechanism

THE CHAPMAN VALVE MANUFACTURING COMPANY

INDIAN ORCHARD, MASS.

INSTANTANEOUS DUMPING



SECONDS SAVED
...with Every Load

Being without mechanical operating parts for hoisting and dumping, the Koehring Dumptor has the important second-saving advantage of dumping the load . . . *instantaneously.* The dumping action is gravity controlled. A lever is tripped, body latch released and the load is dumped . . . no complicated body hoist arrangement to consume time. And the load is dumped exactly where wanted . . . *immediately.* Every load is dumped instantaneously and completely... leaving a clean body for every load. Sticky material is loosened by the automatic kick-out pan. The balanced body returns to loading position by force of momentum. Instantaneous gravity dumping cuts round trip time, increases production.

KOEHRING CO • *Milwaukee, Wis.*

Simplicity...no mechanical body hoisting machinery...dumping by gravity, instantaneously . . . saves seconds with every load. Body is dumped by releasing body latch with lever.

KOEHRING HEAVY DUTY

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WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

December, 1941 Vol. 16, No. 12

D. F. STEVENS . . . . . Editor

A. H. GRAHAM . . . . . Field Editor

ARNOLD KRUCKMAN . . Washington Editor

The West Goes to War

AS THE December issue of *Western Construction News* goes to press, Pacific Ocean possessions of the United States have been attacked by the armed forces of the Japanese Empire. With a state of war existing between this country and Japan, the Pacific Coast and island territories are in a particularly important position, and must be protected so far as possible by withholding from publication information which might be of aid to the enemy. Thus, it must be realized that *Western Construction News* will not be able to present full information concerning construction methods and costs on many defense projects that are vital to the Nation's war plans. The staff is desirous of aiding the war effort in every possible way. The services of the staff and the pages of the publication will be available to the Army, the Navy and the Federal Bureau of Investigation to serve any purpose which may be of assistance in the successful prosecution of the war. In the meantime, we shall continue to serve all of our subscribers in the eleven western states as effectively as possible.

Planning Disdained

IN REPORTING the signing, by the President of the United States, of the Defense Highway Bill, press services in Washington, D. C., indicated that the President objected strenuously to the inclusion in the bill of an authorization amounting to $10,000,000 for surveys and plans on the grounds that the surveys and plans were not needed immediately in the interest of defense. It is to be hoped that the reports were inaccurate and misleading to say the least. Any slighting of the importance of planning not only shows a complete disregard for proven facts, but indicates a dangerous lack of foresight.

Capable engineers who are accurately informed as to the state of affairs in England at the present time have repeatedly warned that proper planning is vital to the defense of a country. Lt.-Col. Lacey V. Murrow, former state highway director for Washington, immediately following a visit to England early this year told engineers attending the Western Association of State Highway Officials convention, "Too much importance cannot be placed on the value of planning. . . . Planning surveys should be continued and extended."

Furthermore, there is the matter of the post-war period to be considered. There will have to be a change, ultimately, from a war economy to a peace economy. The change will bring with it a certain amount of distress and it is expected that relieving measures will include a considerable quantity of public works improvement. In this case, preliminary planning will not only save millions of dollars in costs, but will permit a speedy transition from the manufacture of guns and powder to the construction of highways, bridges, water and sewer systems, dams and irrigation canals.

Spending for planning can be justified more readily than any other type of expenditure intended for the benefit of the nation. It can be justified still more readily in the West where so many different factors must be considered in preparing construction programs.

Measuring Earthquakes

ONE OF THE principal difficulties in the investigation of earthquakes has been the lack of inexpensive equipment to record exact areas affected and strengths of the shocks. Seismographs have been installed in a number of locations and have furnished valuable records, but they are expensive and delicate machines and cannot be installed in large numbers which would permit the discovery of variations throughout a relatively small area when an earthquake takes place.

A possibility for the development of an inexpensive recorder is suggested by a development which followed the last earthquake in southern California on Nov. 14. A valve has been developed which is automatically closed by the motion of an earthquake of a given intensity. Such valves have been installed in public schools throughout southern California to prevent the possibility of fires started by broken gas lines following shocks. After the earthquake of Nov. 14. maps were prepared showing the valves which had been closed and those which remained open, outlining in a general way the affected area.

The suggestion then comes up: Why not build small and inexpensive recorders on the general principles of the automatic gas valve, and install them in large numbers in areas where earthquakes often occur. The valve is a relatively simple machine and it seems possible that a great deal of useful information might be obtained by the installation of large numbers. Of course the machines could not be as accurate as the more sensitive machines, but at least installations of large numbers would provide a certain amount of information which is not now available.

It is with great regret that we announce the conclusion, with this issue of *Western Construction News*, of one of our oldest and most popular features—Professor Griffith's Construction Design Charts. Since December of last year, Professor Griffith has been on active duty with the U. S. Navy as a lieutenant commander in the Civil Engineer Corps, and his new duties have not permitted sufficient time for the preparation of a series of charts for publication during 1942. We hope that it will be possible to resume the series after the war has been brought to a successful conclusion. In the meantime, there are still available a few copies of the book which contains reprints of the first forty-eight Construction Design Charts.—Editor.

"UNDER THE WIRE"

"We had to get the job done before the rains — so we put five Austin-Western "99M's" to work, and NOW WE ARE UNDER THE WIRE."

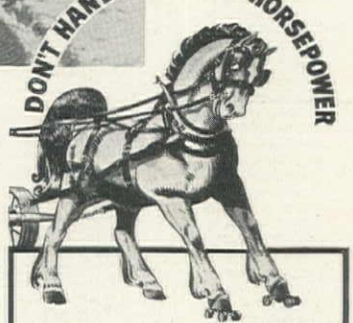
Charles L. Harney

(Contractor—San Francisco)

This $1,500,000 contract is a vital part of the Government Defense Housing Project at Vallejo, California. It covers the grading and paving of 7½ miles of streets and roads . . . requiring an estimated 178,000 cubic yards of excavation and dirt moving.

● The value of the "99M's" greater working weight . . . demonstrated so effectively at Vallejo . . . quickly makes itself felt on any job. In addition to handling all types of construction or maintenance jobs in record time, the "99M" assures substantial savings in power and operating costs . . . savings made possible by the live pulling power on front wheels, which eliminates the drag on engine power caused by 3 to 4 tons of front end dead weight.

Ask for a demonstration and see for yourself what the "99M's" greater working weight means in terms of capacity, power saving and extra range of usefulness. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Ill.



A motor grader without power on the front wheels is like a draft horse with roller skates on his front feet.

Highway Equipment Co., San Francisco, Calif.; Columbia Equipment Co., Portland, Ore., Spokane, Seattle, Wash., Boise, Idaho; Smith Booth Usher Co., Los Angeles and Phoenix, Ariz.; The Harry Cornelius Co., Albuquerque, N. M.; Liberty Truck and Parts Co., Denver, Colorado; Western Machinery Co., Salt Lake City, Utah; C. D. Roeder Company, Reno, Nevada; Wilson Equipment & Supply Co., Cheyenne, Wyoming; Western Construction Equip. Co., Billings, Montana.

Austin-Western

WESTERN CONSTRUCTION NEWS

DECEMBER • 1941

Igloo Concreting Record Set

J. A. Terteling & Sons pour twenty-four ammunition storage magazines in 24 hours and 1,000 in 119 days at Umatilla Ordnance Depot near Hermiston, Ore.—Largest army ordnance depot nears completion under direction of Construction Quartermaster

By J. KENNETH HALLORAN
Progress and Estimates Engineer
J. A. Terteling & Sons
Umatilla Ordnance Depot

IN JUST 119 days after the first igloo was poured on the Umatilla Ordnance Depot, Hermiston, Ore., being constructed by J. A. Terteling & Sons, general contractors, Boise, Idaho, for the War Department, the one thousandth igloo was completed. In terms of cubic content, this is an average rate of 75 cu. yd. per hour for 119 consecutive days. When it is considered that this concrete was poured in 1,000 individual structures, scattered over 16,000 ac., the scope of the work and organization involved is apparent.

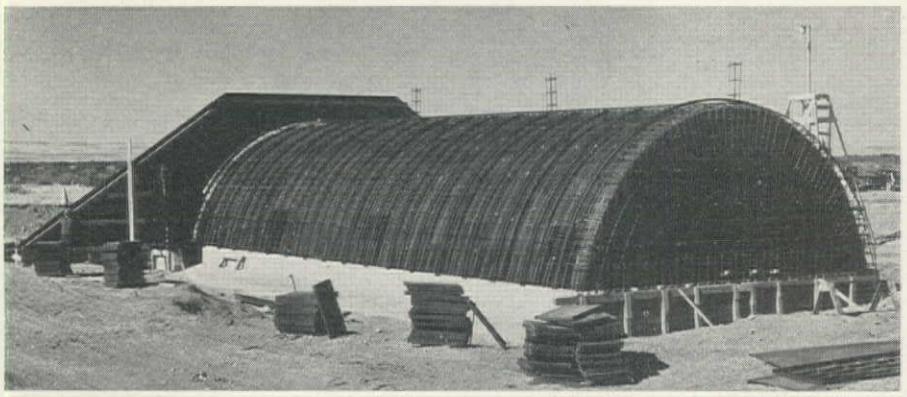
The Umatilla Ordnance Depot is located in Oregon 200 mi. east of Portland and 3 mi. south of the Columbia River. Hermiston, with a population in normal times of about 800 people, is the nearest town, approximately 5 mi. east of the Depot. The new location of U. S. Highway 30 and of the Union Pacific railroad, parallel the south boundary.

Description of project

The depot area is a large rectangular plot of sandy, desert country, sparsely covered with sage brush. Temporary headquarters and construction camp were established until facilities could be constructed on the Depot Area. Headquarters buildings were subsequently erected on the area for the use of the constructing quartermaster and staff, for J. A. Terteling & Sons, general contractor, and for the architect-engineer.

A variety of different types of construction was necessary in completing the construction of the Umatilla Ordnance Depot. The largest single item was the building of 1,000 underground magazines (igloos) but this comprised only 65 per cent of the total project. Other major items of construction were (1) the building of 135 mi. of bituminous macadam highways and 1,000 aprons on connections from igloos to those highways; (2) 23½ mi. of standard gauge railroad, with 50 spurs or sidings and 38 railroad loading platforms; (3) 14 large above-ground magazines of concrete and tile construction, 52 x 220 ft. in size; (4) 2 inert storage warehouses 67 x 202 ft. in size, constructed of concrete and brick.

In the administration area, a number of permanent buildings were constructed, including headquarters build-



SIZE OF IGLOOS, or ammunition storage magazines at the Umatilla Depot is standardized in two lengths of 81 and 60⅔ ft. All are 26½ ft. wide with a maximum height from floor to the crown of the arch of 12¾ ft. Wall thicknesses vary from ½ to 1 ft.

ings; non-commissioned officers' quarters; machine shop; garage; locomotive house; carpenter shop; paint shop; fire and guard house; 150,000-gal. elevated water tank equipped with two 700 g.p.m. deep well pumps; sewerage and water system; street lighting and many other necessary appurtenances; also 100,000 ft. of 5-ft. chain link fence enclosing the entire area, and a lighting system installed along the fence.

Some of the principal quantities involved in the work are 4,000,000 cu. yd. of excavation and backfill; 1,400,000 cu. yd. of crushed rock including concrete aggregate, oil rock and gravel base; 260,000 cu. yd. of concrete and 9,500 tons of reinforcing steel.

Design of igloos

The construction of an igloo is divided into two separate steps, namely, the construction of the footings and construction of the arch separated only by the time necessary to cure the foundation. From the rough grading of the foundation site, through the setting of forms, pouring and laying of foundations, and through the setting of the arch forms, pouring and curing, 32 separate crews of men, each headed by a foreman and each with but a single operation to perform, handled the various steps of construction.

The igloos consisted of two standard sizes, 26½ x 81 ft. and 26½ x 60⅔ ft., inside dimensions. Of the 1,000 igloos constructed, 642 are of the 60-ft. length and 358 are 81 ft. in length. Both types of igloos are identical in construction except for the added length, and were constructed according to standard plans furnished by Construction Division of the Quartermaster Corps with modifications to suit local conditions.

The inside height of the igloo from floor to the top of the arch or barrel is 12¾ ft. The wall thickness varies from 1 ft. at the spring line of the arch to 6 in. at the top; the foundation consists of typical spread footing designed to bear all the load of the arch and backfill with no load on the floor. In most of the igloos, the floor slab was 6 in. thick, reinforced with mesh and some tie steel to the foundation.

Igloo footings of different depths were used, varying from shallow type with a depth of 1½ ft. to deep type with a depth of 5 ft., depending on soil condition and the slope of the terrain.

Lightning protection installation includes a conducting cage of steel, supplemented by copper wire inside the concrete, providing effective grounding of lightning to eliminate possible destruction of the igloo.

A waterproofing membrane of five layers of saturated felt covered with hot coal tar pitch between each layer, covers the barrel portion of the igloo as protection against any chance moisture entering the igloo.

Steel forms for igloos

The quantities of materials used in the igloo varied according to the type of footing used. In the 60-ft. size, the concrete varied from 172 cu. yd. to 360, and steel from 6.2 tons to 12.5 tons. In the 81-ft. igloos, concrete varied from 215 cu. yd. to 440 cu. yd., and steel from 8.0 tons to 15.5 tons.

The foundation forms were all of natural wood design, lined with Masonite and made up in panels, easily knocked down and set up with a minimum of work. All arch forms were of steel, prefabricated by the manufacturer. These forms consisted of trusses, ribs and panels, bolted and clamped in place. The steel forms were used throughout the entire job, being set up, stripped, cleaned and re-set, for use in the construction of each igloo.

Location and development of an adequate source of crushed rock was made and suitable pits located on the project. Aggregate was stock-piled near the central batching plants. Three batch plants were built on railroad sidings so that plants could be served directly from cars. All aggregate and cement was dry-batched and mixed at the structure site.

Steel was received in stock lengths and bending handled in steel yards set up on the depot.

Three wells were drilled with depths of from 300 to 450 ft. and with a total capacity of 2500 gal. a minute. Miles of pipe line were laid to serve points of construction with an adequate supply of water at all times. As all curing of concrete was done by water, in such a dry country enormous quantities were consumed, reaching upwards of 3,500,000 gal. per day.

Crew organization

Originally the construction contract included only 750 igloos besides the other features of work described, and a completion date of Jan. 21, 1942, for the entire project. Shortly after the com-

CONSTRUCTION of the igloos was organized on an assembly line basis with crews moving from one magazine to the next. Thirty-two crews, each under the direction of a foreman, performed as many separate operations on each ammunition magazine.

mencement of igloo construction, the War Department issued a change order which included 250 additional igloos and other items of work with no additional time allowed for the additional work. The necessary increase in working efficiency and speed was accomplished on an assembly line basis, in reverse, the crews and materials being moved from one structure to another rather than the work being carried to the worker. Under this method, excellent teamwork and efficiency were developed by the crews, and close attention to the timing of operations was required on the part of foremen and field superintendents in order to maintain a continuous flow of labor and materials for the early completion of the principal feature of construction on the project.

Igloo construction continued without interruption for twenty-four hours per day by the use of portable generator sets for illumination and power, over 70 being in use on the depot at one time.

Close contact was maintained between the general superintendent, the Office of the Constructing Quartermaster and the Architect-Engineer by means of two-way radio sets installed in the cars of the field superintendents and key men of each unit.

Progress records

A partial list of the equipment used in the construction of the Umatilla Ordnance Depot includes 24 shovels and draglines, 32 90-h.p. tractors, 28 scrapers, 13 motor patrols, 3 batch plants, 250 trucks of various sizes, 16 electric welders, complete oiling equipment, 42 vibrators, 19 floor finishers and 175 transportation units for personnel.

In the construction of this project, all existing records for speed in igloo construction were broken repeatedly. The climax was reached on September 24, when 24 igloo arches were poured in 24 hours. The record pour for foundations was 28 in 24 hours.

The record average weekly pour was 18.4 foundations and 14.7 arches per day. In the last thirty-one days of construction, the crews poured 492 foundations for an average of 15.9 per day and 396 arches for an average of 12.8 per day.

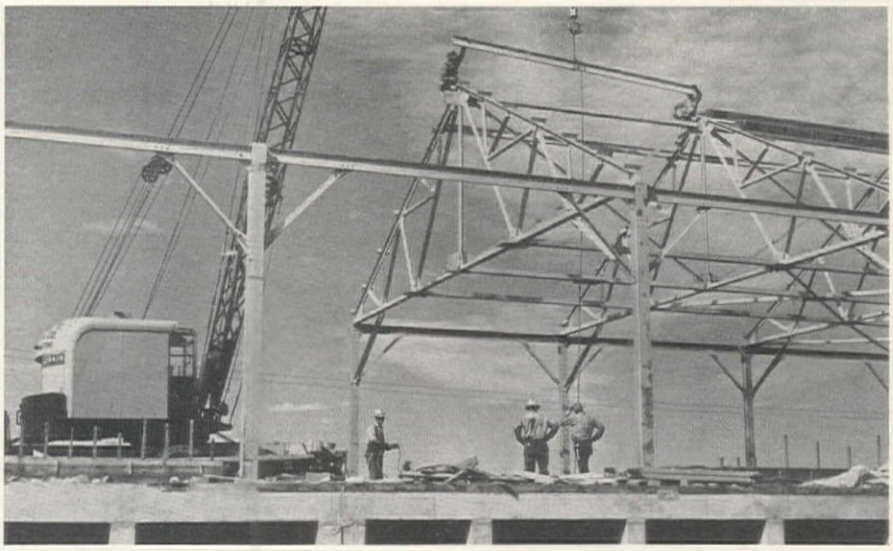
The largest volume of concrete poured in one day was approximately 4,000 cu. yd. on Oct. 16.

Organization

All construction on the Umatilla Ordnance Depot has been under the supervision of Major Harry P. Schuppner, constructing quartermaster for the Quartermaster Corps. The nucleus of the contractors' office force was brought here as part of the going concern but other key men have been added.

Among those in administrative and executive positions who have been closely associated with the depot job are the following:

William C. Foss, contractors' representative and general superintendent, a veteran of the firm's organization; C. L. Fry, project manager, another superintendent, previously engaged in construction work for the firm in Nebraska, during the past few years; Francis B. Burger, assistant general superintendent, and L. C. Stenger, for many years office manager for the firm.



IN ADDITION to the igloos, which constituted 65 per cent of the contract, construction work included fourteen large, above-ground magazines, two inert storage warehouses, 35 mi. of bituminous surfaced highway and 23 mi. of standard gauge railroad.

Superintendents in charge of various phases of the work are Norris P. Cushing, buildings; M. H. Farnsworth, chief engineer, H. E. McWaters, crushing operation; M. F. Moulton, excavation and grading; F. V. Buttervich, surfacing operations, and D. R. Weber, railroad.

The architect-engineers were Stevens and Koon, of Portland, Ore., with R. F. Koon, resident partner, his principal assistant engineer being F. A. Koehler.

At the peak of construction approximately 7,000 men were employed on the project. To date, the job has accumulated some 4,750,000 man-hours.

A. I. S. C. Annual Bridge Design Contest Opened

AN ANNUAL bridge design competition, open to registered students of structural engineering and architecture in recognized schools in the United States and its possessions, has been announced by the American Institute of Steel Construction. Cash prizes of $200, $100 and $50 will be made for the designs placing first, second and third. The subject of the competitive design is to be a steel highway bridge crossing a river. The structure must provide a clear width of 42 ft. between curbs, a vertical clearance of 25 ft. above water level, and a 75-ft. clear span. Drawings must be received at the office of the American Institute of Steel Construction, 101 Park Avenue, New York City, not later than February 10, 1942.

Deer Creek Dam Completed in Utah

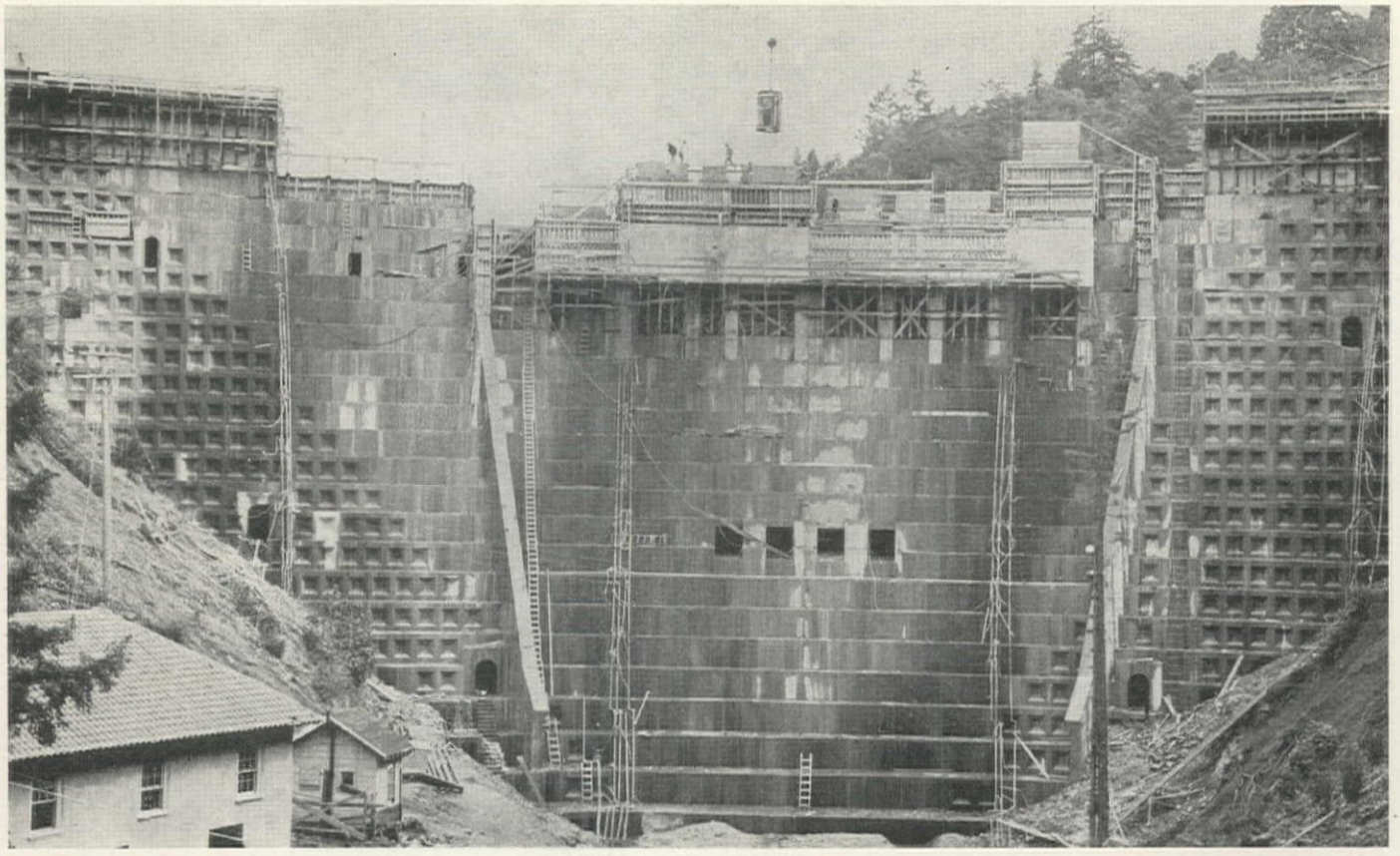
DEER CREEK DAM on the Provo River project in Utah has been completed, placing in operation the 81st water storage reservoir on reclamation projects in the West. Contract work on the dam was finished six months ahead of schedule by Rohl-Connolly Co.

The dam has a total volume of 2,835,000 cu. yd. consisting of 2,495,000 cu. yd. of earth embankment and 340,000 cu. yd. of gravel and rock in fills and protective riprap. It is 1,300 ft. long at roadway elevation, rises 155 ft. above streambed, is 240 ft. high above lowest foundation and over 1,000 ft. thick at the base. (See *Western Construction News*, Nov., 1939, for a description of the work.)

Coulee Reservoir Lowered To Permit Bridge Removal

SURFACE of the longest man-made lake in the world, impounded by Grand Coulee Dam, will be lowered 13 to 14 ft. within the next month to permit removal of an abandoned railroad bridge, now partly inundated. A unique method will be employed by Bureau of Reclamation workers to remove the old Great Northern Railway span near Marcus, replaced last summer by a permanent structure near Kettle Falls. When the lake has been lowered to a point 5 or 6 ft. below the deck, now awash, two barges will be placed under each of its seven trusses and the individual sections floated downstream to the dam for dismantling. The longest span is 253 ft.

Water will be allowed to flow into the hulls of the barges to lower them into position. When in place, this water will be pumped out and the vessels will rise until their natural buoyancy will carry the heavy load. The dismantling is expected to take 6 or 8 weeks. About 305,000 BF. of lumber, 1,000 tons of structural steel, and 150 tons of miscellaneous metals must be handled.



Enlargement of Alpine Dam

Marin Municipal Water District raises crest of 27-yr. old structure 31 ft., doubling capacity—Unique sliding joints devised to permit movement of the new slab during cooling and settlement without stressing existing structure—Contractor manufactures all aggregates including sand at quarry on job

IN RAISING the crest of Alpine Dam for the second time, the Marin Municipal Water District has developed and used a unique sliding joint to avoid the development of excessive stress of the original structure during the shrinkage and settlement of the new concrete slab. Foundation problems proved to be serious when basalt spheroids surrounded by clay seams were uncovered at one abutment during the last winter season when rainfall was nearly 50 per cent above normal.

History of Alpine Dam

Located on the north slope of Mount Tamalpais, Alpine Dam forms the largest and principal reservoir of the four utilized by the Marin Municipal Water District. The District supplies water to all the principal cities in Marin County, of which San Rafael is the largest. Marin County is located across the Golden Gate from San Francisco on the peninsula bounded by San Francisco Bay on the east and the Pacific Ocean on the west. Alpine Dam was built by the District on Lagunitas Creek in 1917. The late A. R. Baker designed and supervised construction of the original dam. It is a gravity concrete structure, arched in plan. As originally constructed, it was 100 ft. high, and formed a reservoir of 1,000,000,000-gal. capacity. The spillway consisted of six siphons, 4 x 7½ ft. in size, and placed in the center of the structure.

In 1924, the height of the dam was increased 8 ft. by the addition of the required concrete to the crest. Re-examination of the design at that time had shown the structure to be capable of carrying the added load without increasing the mass of the entire dam. The increase in height raised the capacity of the reservoir to 1,500,000,000 gal.

Second raise design

By 1939 it had become apparent that additional capacity was needed by the water district, and design work was begun which contemplated increasing the height of Alpine Dam for the second time. The new plans contemplated an increase in height of 31 ft., which required that the mass of the entire structure be greatly increased in order to support the additional load. As rebuilt, the crest length has been increased from 390 ft. to 550 ft. Spillway capacity has been increased from 5,000 cu. ft. per sec. to 7,500 cu. ft. per sec. by building eight new siphons.

In addition, the new design provides for a 7½ x 4-ft. cleanout opening on each side of the spillway siphons. Without some sort of surface outlet from the reservoir, it was found that the water surface collected undesirable debris which could not be removed by the action of the siphons.

The principal addition to the structure consisted of a slab of concrete extending from rock foundation up the downstream face on an 0.8:1 slope, constituting a slab of about 25 ft. average thickness. (See accompanying drawing.) The downstream face of the slab was

stepped, as had been the face of the old structure to provide for a possible third addition to the height in the future.

In order to provide for shrinkage and settlement of the new slab without imposing additional loads on the old structure, precast concrete ribs were designed, and built on the face of the old dam. The new slab was then poured against the ribs, with special precaution taken to avoid formation of bond. After the concrete of the new slab had been cooled, the 3½-ft. slot between the new slab and the old structure was filled with concrete, and plans finally contemplate grouting to insure a final monolithic structure. Cooling of concrete was utilized both in pouring the new slab and in filling the slot between the old and the new.

In order to provide a better final bond between the old and new concrete, the under side of the new slab was notched in the forming and the old structure notched by the use of jack hammers. Anchor bars 1¼ in. square were embedded 5 ft. into the old structure on 30-in. centers laterally and 5-ft. centers vertically. The bars extended across the slot and about 5 ft. into the new slab. A provision for plugging the existing siphons after completion of the high dam was made by embedding 18-in. steel pipe from the top of the old siphon through the concrete of the new spillway section.

The design of the addition was similar in many respects to that prepared for the raising of O'Shaughnessy Dam on the San Francisco Hetch Hetchy project. (See *Western Construction News*, Dec. 1936.)

Foundation problems

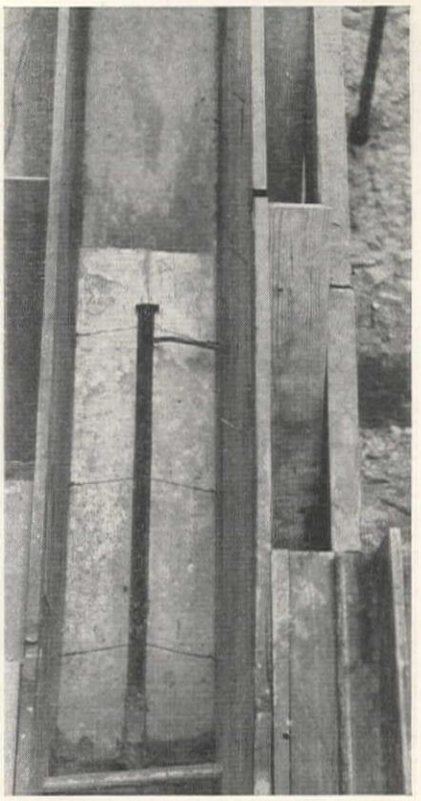
Bids were called during the summer of 1940, and a contract was awarded to Engineers, Ltd., San Francisco, on the basis of a $469,397 bid. Work was begun on Aug. 4 by Parish Brothers, who subcontracted for the excavation. The major part of the foundation stripping was carried on with tractors, scrapers and bulldozers, and finally excavation was limited largely to hand work. The use of powder was limited to very light blasts in order to avoid any possibility of damage to the existing structure.

At the north abutment, no particular problems were encountered during foundation excavation which uncovered a good quality of the local blue basalt. At the south abutment, where it had been predicted that good foundation conditions existed, excavation uncovered a pillow formation consisting of weathered basalt spheroids and a number of deep clay seams. It was found necessary to carry the excavation considerably farther back than had first been anticipated and excavation work continued until late in Feb. 1941. During this period the rainfall was unusually heavy, exceeding the annual average by about 50 per cent. Until suitable foundation conditions were found, considerable fear was held for the safety of the structure.

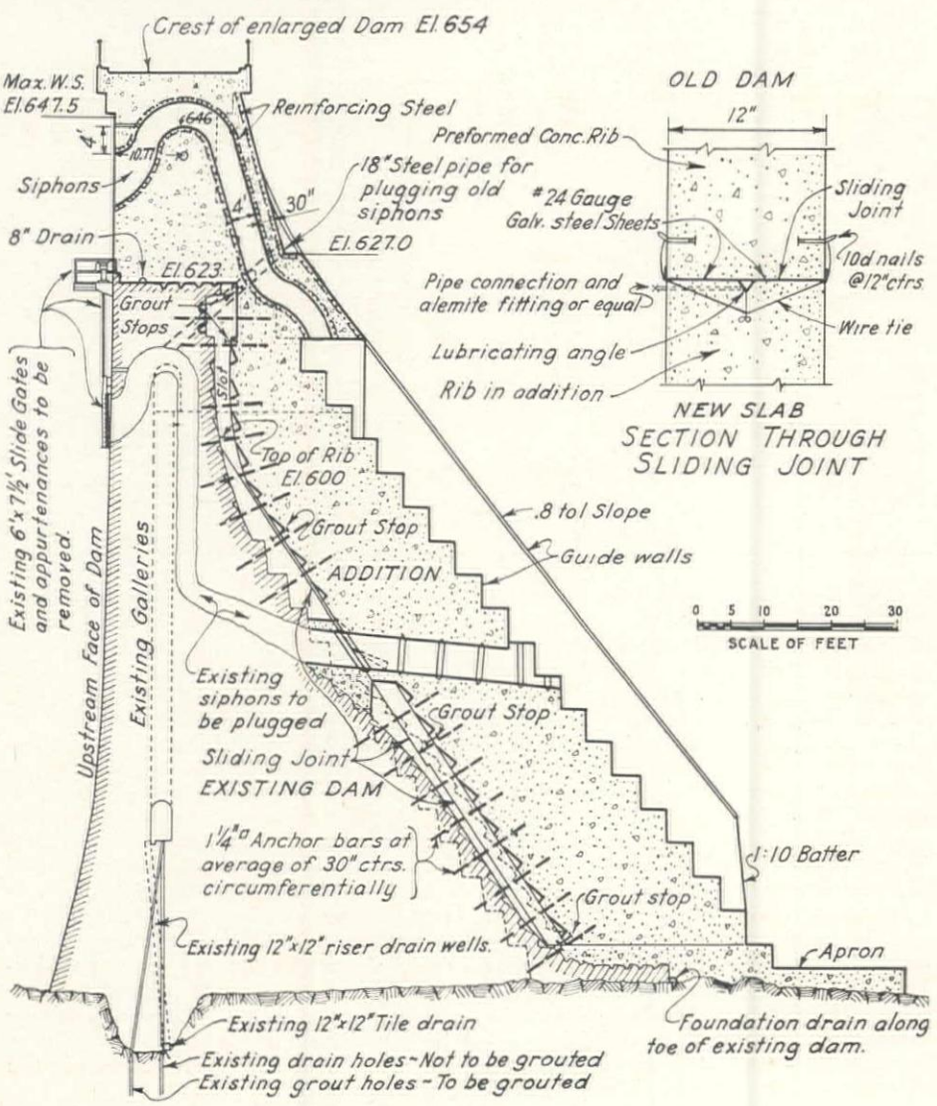
Excavation

Suitable foundation which could be reinforced by grouting was finally uncovered, and concreting began late in February. Provisions were made for washing a clay seam in the south abutment after completion of the concreting, by drilling holes on 5-ft. centers, and installing 1-in. pipe. After clay has been washed from the seam through a temporary gallery left in the south abutment, the seam will be grouted through the same pipes, and the temporary gallery plugged.

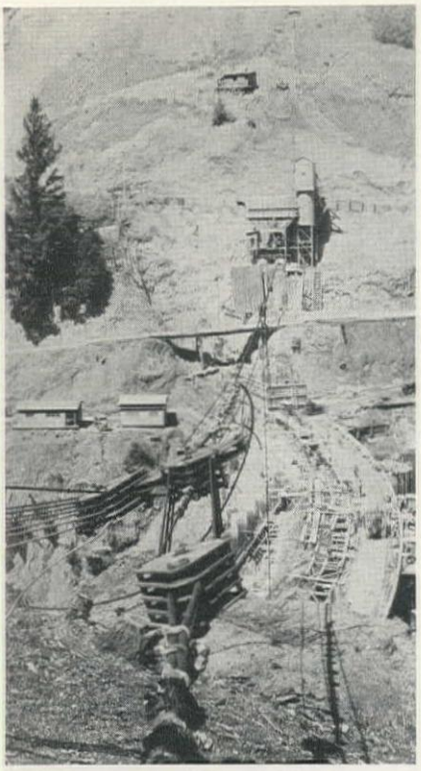
Also at the south abutment, a large overhanging rock was uncovered and it was found necessary to place additional concrete between the foundation and the overhanging rock in order to assure that no future movement would take place. At both abutments, the foundation excavation uncovered high rock ledges at the downstream toe of the dam, which provided excellent anchorage for the base of the structure. Good rock foundation was found in the streambed section



SLIDING JOINTS consist of a precast concrete rib faced with sheet metal on which is placed a small angle iron. In the picture above the rib is shown looking through the forms from above. At the left is a sectional drawing of the rib.



ENLARGEMENT SLAB is tied to the existing dam by keying notches on both sides of the slot and by 1¼-in. square anchor bars spaced on about 30-in. centers laterally and 5-ft. centers vertically. The sliding joint is illustrated at the right.



TAIL TOWER at Alpine Dam is semi-fixed, but can be moved by anchoring to any of several deadmen. During the moving process, a tractor takes up some of the slack while the anchor is transferred.

ENLARGEMENT OF ALPINE DAM

(Contractor—Engineers, Limited, San Francisco, California)

No. Units		Unit Price
18,000	cu. yd. excav. for dam found.—com.	$1.60
2,000	cu. yd. excav. for dam found.—rock	4.75
20,000	cu. yd. excav. for roads and misc. common	.55
1,000	cu. yd. excav. for roads and misc.—rock	1.10
35	cu. yd. excav. of conc. from crest and spillway below 525	9.00
45	cu. yd. excav. of conc. 615-623 and on steps	10.00
100	cu. yd. excav. of conc. 585-615, spillway 525-567	15.00
4,600	s. f. roughen surf. on crest and on spillway below 525 incl. walls	.21
13,000	s. f. roughen surf. of steps and between 615 and 623	.21
9,100	s. f. roughen surf. 585-615 and on spillway 525-567	.33
10,000	s. f. roughen inside surf. of siph. cond.	.37
100	cu. yd. removal of conc. surf.	8.00
44,000	lb. rem. and dispose of 4 slide gates and appurtenances and store same	.03
200	ft. drill grout holes in found. not over 30 ft. deep	.85
400	ft. drill grout holes in found. over 30 ft. deep	1.55
300	ft. drill drain holes in found. not over 30 ft. deep	1.15
500	ft. drill drain holes in found. over 30 ft. deep	1.55
200	ft. drill holes in dam, from faces of dam	.95
100	ft. drill grt. holes in dam, from galleries	.95
50	ft. drill dr. holes in dam, from galleries	1.60
6,000	ft. drill 2¼-in. holes for anchor bars on steps and 615-623 and grout bars	.75
5,000	ft. drill 2¼-in. holes for anchor bars on spill below 567 and 585-615	.65
350	ft. drill 1¾-in. holes for anchor bars on spill below 567 and 585-600	.60
800	ft. drill 1¾-in. holes for anchor bars on crest and grout bars	.55
2,300	ft. calk joints in concrete	.50
100	ea. connec. to grout pipes in found. and on faces of dam	2.30
50	ea. connec. to grout pipes in galleries	2.30
300	ft. clean out 3-in. grout and drain pipes and drain wells in galleries	.75
18	ea. provide 1½-in. pipe connections to 3-in. grout pipes	2.50
500	c. f. press. grt. joints, etc., in exist. dam	4.50
500	c. f. press. grt. joints, etc., in enlarge.	4.50
200	c. f. press. grt. 3-in. grt. holes and other grouting	4.00
20,000	c. y. mass concrete in the dam	7.45
5,000	c. y. conc. to form imperv. surf. in the dam	8.20
3,800	c. y. conc. in slots in the dam	6.80
850	c. y. conc. to plug siphon spillways and extension and access openings	9.00
300	c. y. conc. in intake tower, spillway gate platforms and curbs	18.00
750	c. y. conc. for siphon spillways and walls downstream from siphons	18.50
200	ft. 8-in. holes through masonry	.90
1,500	ft. 15 to 18-in. holes through masonry	1.80
1,000	ft. 30-in. holes through masonry	4.20
32,000	bbl. Portland cement	1.67
140,000	lb. reinforcing steel	.04
160,000	lb. anchor bars	.025
1,400	s. f. sliding joints in ribs	.75
1,300	ft. furn. and pl. ½-in. wrt. steel pipe	.35
4,700	ft. furn. and pl. 1-in. wrt. steel pipe	.45
100	ft. furn. and pl. 1½-in. wrt. steel pipe	.60
1,400	ft. furn. and pl. 2-in. wrt. steel pipe	.75
200	ft. furn. and pl. ½-in. metal tubing	.40
40,000	ft. furn. and pl. 1-in. metal tubing	.14
30,000	lb. furn. and pl. w. s. pipe larger than 2-in. and not larger than 4-in.	.17
300	ea. furn. and pl. ¾-in. gate valves	2.10
200	ea. furn. and pl. 1-in. gate valves	2.50
200	ea. furn. and pl. 1½-in. gate valves	3.50
200	ea. furn. and pl. 2-in. gate valves	4.25
1,300	lb. furn. and pl. valves larger than 2-in. and not larger than 4-in.	1.00
1,000	lb. furn. and pl. pipe fittings for w. s. pipe not larger than 4-in.	1.20
1,000	lb. furn. and pl. metal tubing fittings not larger than 1-in.	.75
2,000	lb. rem. and reinst. pipe and fittings	.50
800	ea. connec. from head. to cooling coils	3.75
2,000	lb. furn. and inst. galv. rail. in galleries on downstream face	.25
700	lb. furn. and inst. galv. rail. in galleries of existing dam	.25
3,500	lb. furn. and inst. galv. rail. on downstream face enlarged dam	.25
3,000	lb. furn. and inst. galv. rail. on crest of enlarged dam	.25
2,000	lb. furn. and inst. copper water stops	.60
25,000	lb. furn. and inst. sht. met. grout stops	.30
16,000	lb. furn. and inst. corr. met. drains	.10
18,000	lb. furn. and inst. stairs, lad. & grat.	.13
200	lb. furn. and inst. misc. steel work	.25
7,000	lb. furn. and inst. cast iron covers, gratings and frames	.15
100	lb. furn. and inst. misc. brass & bronze	1.25
2,200	lb. furn. and inst. valve stem ex. shafts	.20
1,500	lb. furn. and inst. valve stem guides and end connections	.30
5,700	lb. furn. and inst. 18-in. C.I.P., fittings	.10
5,000	lb. furn. and inst. 24-in. C.I.P., fittings	.10
Lump Sum	furn. and inst. two 24-in. gate valves and two operating stands	1,500
14,000	lb. furn. and inst. met. grt. system	.60
20,000	lb. galvanizing	.03
9,000	lb. rem. misc. equip. from exist. dam and install in new location	.05
22,000	lb. rem. two spillway gates and reinstall in new locations	.03
70	ft. rem. staff gauge from present to new location and extend it	1.50
500	lb. inst. misc. metal work furn. by the District	.25
500	cu. yd. crusher run base	3.00
4	ton liquid asphalt SC-1A	25.00
10	ton liquid asphalt SC-6	20.00
180	cu. yd. screenings	4.50
2,000	lb. furn. and inst. C.M.P. culverts	.15
1,000	lb. rem. exist. corr. culv. and reinstall in new locations	.06
1,400	ft. furn. and inst. 8-in. half round tile	.50
Lump Sum	furn. and inst. a cooling plant	5,500
2,400	hr. oper. the refrig. plant	3.25
1,000	FBM furn. and install Redwood sills and caps	.11
1,600	FBM furn. and install Douglas Fir posts and caps	.07
3,000	FBM furn. and install Douglas Fir stringers	.07
4,000	FBM furn. and inst. Douglas Fir flooring and all bracing	.07
200	FBM furn. and inst. Douglas Fir wheel guard	.11
400	FBM furn. and inst. Douglas Fir bridging and hand rails	.11
600	ft. furn. and inst. 1-in. elec. rigid cond.	.20
2,500	ft. furn. and inst. No. 8 copper wire	.03
Lump Sum	furn. and inst. two safety switches and caps	60.00
6	stand. inst. light. stand., furn. by the District	30.00

where the continual wearing action of the water had removed all poor material. Excavated material was removed from both abutments by bulldozer and was carried to the spoil banks by means of tractors and scrapers.

While excavation of the foundation was in progress, the downstream face of the old structure was roughened and notched. On the stepped sections, notches 9 in. deep and about 30 in. square were cut in a vertical plane, and on the smooth sections, they were cut in a horizontal plane. The entire surface of the dam was roughened by chipping hammers.

After concrete pouring was started, two of the six siphons were plugged and the 6 x 7½-ft. slide gates removed in order that they might be installed later at the cleanout openings.

Construction plant

The principal difficulty facing the contractor throughout the entire period of the work was a lack of storage space. The terrain in the immediate vicinity of the dam is extremely rugged and the only available level spaces were formed by the county road which approached the structure from both sides. Equipment which was required for the construction was brought to the job site only when needed, and taken away as soon as it was no longer required. This problem dictated the layout of all of the construction plant.

A quarry of hard blue basalt was located only a few hundred yards above the north abutment of the dam, but no fine aggregate was available in the vicinity. As a result, sand was manufactured in the aggregate production process. Between the quarry and the concreting plant which was located above the north abutment of the dam, Hein Brothers, subcontractors for aggregate production, installed a crushing plant consisting of a primary jaw crusher, gyratory crusher, sand rolls, and a double-deck vibratory screen. After shooting in the quarry, rock is loaded into 1½-ton dump trucks by a 3-yd. shovel and hauled downhill a few hundred feet to the hopper feeder over the primary jaw crusher. From the primary crusher, all material was taken by conveyor belt to the screens, where surplus material under 3 in. was removed and returned to the secondary gyratory crusher. From the secondary, material was carried by conveyor belt to the sand rolls, and then returned to the screens. The top deck retained 6 in., 3-in. and 1½-in. aggregate, while the bottom deck separated the ¾ and No. 4 material.

Rock dust included

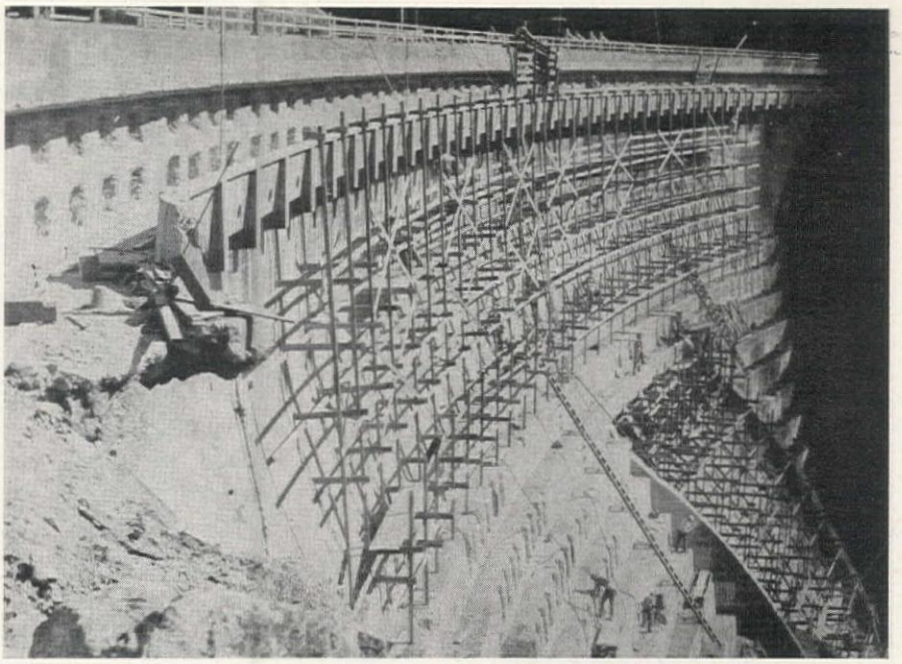
Processing of the aggregate produced a quantity of rock dust, capable of passing a 200-mesh screen, amounting to about 6 per cent of the sand. Early concreting operations showed that additions of fine material up to about 2 per cent improved the workability and increased the strength of the concrete. In order to remove the surplus 4 per cent of 200-mesh material, District engineers recommended installation of a blower underneath the sand screen. Excessive fine material was simply blown out of the sand and onto the adjacent hillside as the sand dropped from the screen to the collecting hopper.

Very little aggregate storage space was available either at the crusher or at the concreting plant due to the character of the terrain. The crushing plant was able to produce sufficient material to keep the concreting plant in operation, but total storage capacity amounted to about 50 cu. yd. of each type of material. Aggregates were hauled from hoppers at the crushing plant to bunkers above the concreting plant, a distance of several hundred feet, by 1½-ton dump trucks.

The concreting plant consisted of a pneumatically-operated automatic batching plant, built especially for the job, and two 1-cu. yd. tilting mixers. Each batch was automatically recorded by a printing scale. Cement was hauled to the job in 100-bbl. bulk lots, and stored in a 520-bbl. silo at one side of the concreting plant. From the silo, cement was fed to the batcher by screw conveyor.

Concrete placing was carried on by means of a cableway system operating from a fixed headtower on the north abutment and a semi-fixed tail tower on the south abutment. The south end of the cableway was held by a block and tackle arrangement which could be anchored to any two of several deadmen. A tractor was used to slack off or take up on the blocks in order to move the cableway up or down stream. A snatch block and tractor was also used to deflect the main cable. Below the mixers, the contractor built a V-shaped timber bulkhead, resembling a ferry slip, to receive the cableway concrete bucket. Because the cableway was relatively immobile, it was necessary to have some sort of arrangement which would bring the concrete bucket under the mixer hopper. With the V-shaped slip, the bucket was brought in at the open end and rolled down the bulkhead on either side to the loading position under the mixers.

OUTLINE of the enlargement can be seen in the white lines painted on the rock at the south abutment. Final excavation required removal of considerably more material than had occurred here.



ROUGHENING of the entire downstream face of the existing structure was one of the first steps in the enlargement work. Vertical notches were cut in the steps on the dam's slope and horizontal notches on the vertical sections near the crest.

Forms

Timber forms were prefabricated as much as possible at a carpentry shop located on the side of the canyon several hundred feet downstream from the dam. Forms for the downstream face were made up in 8 x 5-ft. panels, and faced with plywood. The underside of the slab which was built against the old structure was formed in place with sheathing. Forms for the upstream face were also built of sheathing, and were built in place. Since it was contemplated that the dam might be raised again in the future, the downstream face was stepped back 4 ft. between 5-ft. vertical risers. From the quarter points of the arch to each abutment, notches were cast into the risers at regular intervals by inserting a prefabricated form in the riser forms.

Sliding joints

To permit shrinkage during curing of the concrete and settlement of the new slab, a special sliding joint was designed and installed at intervals between the face of the old structure and the new slab. Before pouring of the new slab was begun, concrete ribs 12 in. wide and 8 in. high were built vertically on the face of the old structure at intervals of about 20 ft. The ribs were faced with 24-ga. galvanized steel strips to eliminate any possibility of bonding between the new slab and the ribs. After the ribs had cured sufficiently to carry the load of the new slab, construction was begun, forming the underside of the slab about 2½ ft. from the face of the old dam. Corresponding to the precast ribs on the old structure, monolithic ribs 12 in. by 1 ft. 10 in. were formed into the new slab.

A 1 x 1 x ⅛-in. angle was embedded in the butting face of the monolithic rib by placing the angle longitudinally on the face of the precast rib as the forms were built. At intervals, the angle was fitted with a small pipe connection which extended through the sides of the rib form and terminated in a pressure grease fitting. Just prior to the pouring of concrete in the new slab, the space between the angle and the sheet metal on the precast rib was filled with liquid soap by operating a soap-filled lubricating gun on the grease fittings. During the period in which shrinkage and consolidation took place in the new slab, the liquid soap in the sliding joints of the rib insured a freedom of movement without inducing stress in the existing structure.

Concrete was poured in the customary block formation and 5-ft. lifts. Blocks were 40 ft. wide, and at the base of the structure about 50 ft. long, narrowing to 8 ft. wide near the top of the existing structure, and widening to 15 ft. above the existing structure. At the bottom of each lift, 1-in. cooling pipe was installed, with a maximum spacing of 5 ft. between pipes. Four to five hours after the pour had been completed in a block, the surface was blasted with air and water to remove all laitance, and the lift was then permitted to cure for a minimum of 72 hr. At the beginning of a new lift, after cooling pipes had been placed, a thin grout was brushed over the surface of the block.

Cooling concrete

During the early part of the construction work, cooling water was taken from the bottom of the reservoir and pumped

through the system at the rate of about 4 gal. per min. per coil. Temperature of the water varied from 54 to 58 deg. F. A cooling plant was installed at the dam and refrigerated water, at a temperature of about 38 deg. F. was circulated through the cooling system after the concrete had been cooled to approximately the reservoir water temperature.

When concrete in the slab had been poured to El. 615 (about 8 ft. below the crest of the existing structure), pouring of concrete was started in the slot between the new slab and the existing structure. Hoppers were installed at the top of the slot, with elephant trunks extending down the slot to the concreting elevation. As was the case with the main slab, the slot was filled in 5-ft. lifts, with a minimum of 2 hr. required between lifts and a maximum of 15 ft., or three lifts, poured per day. Cooling coils were installed in the slot longitudinally on 5-ft. centers prior to pouring, and the concrete was cooled in the same manner as the slab. When concrete in the slab and in the slot had been cooled to 56 deg. F., the contractor was permitted to begin pouring on top of the entire structure.

Although construction work was started in August, 1940, the difficult foundation problems encountered delayed concreting operations until late in February, 1941, and heavy rains during the late winter did not permit rapid progress during the first few months of concreting. In the latter stages, concrete could not be poured rapidly because of the 72-hr. interval required between lifts, and the fact that the relatively small structure did not offer any great number of pouring locations. The crushing plant was able to turn out sufficient material to maintain continuous operation of the concreting plant at all times. Although the concreting plant was rated at a capacity of 60 cu. yd. per hr., in actual operations, it averaged about 40 cu. yd. per hr., being held to a production rate which could be handled by the single 3-cu. yd. concrete bucket of the cableway.

Organization

All work of the Marin Municipal Water District is under the general supervision of J. S. Peters, general manager and chief engineer, and J. J. Downey, assistant general manager and engineer. The enlargement of Alpine Dam was designed by Ray L. Allin, hydraulic engineer, and construction of the enlargement has been supervised by Howard C. Platt, resident engineer for the Marin Municipal Water District. Joe Williams is field construction engineer.

Continuous inspection of all foundations and construction work has been made by George W. Hawley, deputy state engineer in charge of dams, and his staff. All designs, drawings and specifications were submitted to the California Division of Water Resources for approval before the contract was awarded. During consideration of the foundation problems, John L. Savage, chief designing engineer of the Bureau of Reclamation, was called in as consultant by the Division of Water Resources.

The contract was awarded to Engineers, Ltd., whose operations have been under the supervision of Oscar Thompson as general superintendent.

SPAB Construction Policy

Comment from Wyoming

This comment from C. F. Seifried, chief engineer of the Wyoming Highway Department and president of the Western Association of State Highway Officials, was received too late to be published in the November issue in connection with other comments on the article discussing SPAB's ruling against priorities for non-defense construction.

Sir:

Commissioner Thomas H. MacDonald of the Public Roads Administration stated in a press release dated Oct. 27, that the country is already teetering on the edge of a transportation shortage. Highway travel is up from 10 to 15 per cent this year over last year in the western states at least. While there may be a decrease in so-called peacetime traffic next year, all indications point that there will be considerable increase in wartime traffic in the way of transportation of materials and supplies for the army and munition works.

The reconstruction and maintenance of highways is definitely a defense activity. It is encouraging to note that Donald Nelson's press release lists defense highways, or the matter of the construction of highways, as a defense activity. Aside from the fact that the stopping of highway construction would throw a great many men out of work and would render useless a large number of contracting organizations, it is essential that highway work be continued.

The highway construction industry, both engineers and contractors, on the other hand, realize that it will be impossible to go ahead according to previous accepted practices and policies. It is definitely in the picture that equipment cannot be replaced to the extent that it was in the past. It will be necessary in some cases to lease or pool equipment in order to get the more important construction jobs finished. It will be also necessary to repair older equipment. The use of this older equipment will necessarily increase the cost of the work. The ingenuity of engineers and contractors is going to be taxed to the limit. Makeshift must be used. The situation we are in is somewhat similar to that of a truck-coal mine operator in Wyoming who for several months tried in vain to get the State Highway Department or County Commissioners to give him an old snow plow to clear the road to his mine.

When asked some time later what he had done, he said, "I have my snow plow and it is working." He was asked how he did it, and he said he picked up a few planks, went to a junk pile and got a little iron and managed to get together odds and ends and made it. And he was glad the Highway Department did not give him a snow plow because he had made a better one himself.

The construction industry can comply with the spirit back of the various promulgations and the OPM Highway administrators also are concentrating their efforts on highways important for defense and eliminate just as fast as possible the less important roads, at least so far as any immediate improvement on them is concerned.

The truck industry, the Army transportation agencies and the motoring public in general have a right to expect full co-operation from Federal agencies dealing in priorities so that their transportation system will be happily maintained. Certainly no one wants the railroads to buy a lot of new rolling stock and bring into operation a lot of discarded rolling stock and then let the tracks and road beds go to pieces and carry on no betterment work on it. And so it is with the highway.

Some months ago it was realized that the OPM could not carry on all the detail work in connection with priorities from one office in Washington. It was suggested that the Highway Departments be given some authority and responsibility in connection with priorities. This suggestion has been acted upon, and the matter of issuing priorities for highway projects is getting on a systematic basis. The Highway Departments should accept responsibility, and not ask for priority for projects which are not important to national defense or for keeping up the usual peacetime health and safety activities. This includes the proper maintenance and reconstruction of highways.

Last but not least. Those who are interested in highway construction and maintenance must continue and with ever increasing vigor, impress upon the public the facts in regard to highway construction and maintenance. The mere fact that some eminent members of Congress refer to highway construction as a pork barrel activity indicates the need for more and more education.

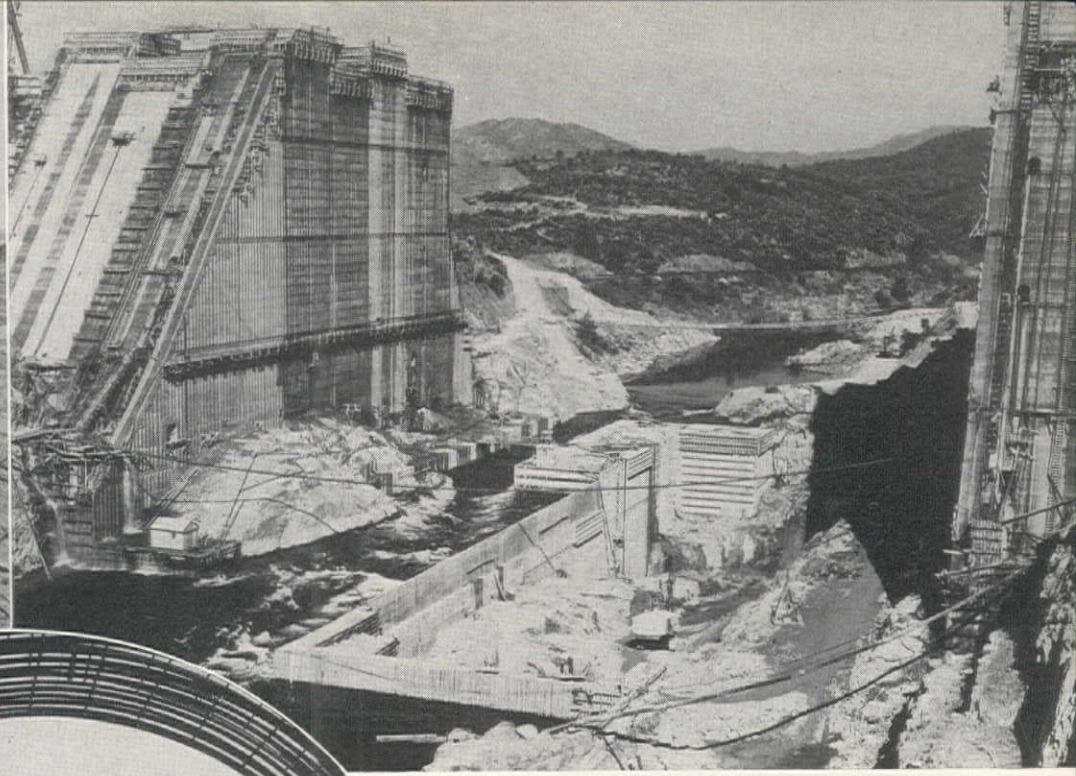
We know we are in this war. We know that all must co-operate and change methods of doing work. We know we may even have to change our manner of living, but we know that the improvement of highways must not stop. The highway industry will co-operate with all agencies so as to get the most use out of each piece of steel, and will substitute other materials for steel whenever at all possible.

Construction engineers and the construction industry in general, including contractors and material men, have the brains and ability and also the broad-minded attitude so that they can change and meet the problem as it comes up.

C. F. SEIFRIED, Chief Engineer
Wyoming State Highway Dept.

Cheyenne, Wyo.
Nov. 7, 1941.

CONTRA COSTA canal work is progressing well toward completion (right) with only about two sections remaining to be placed under contract. Lining is in progress here near Concord.



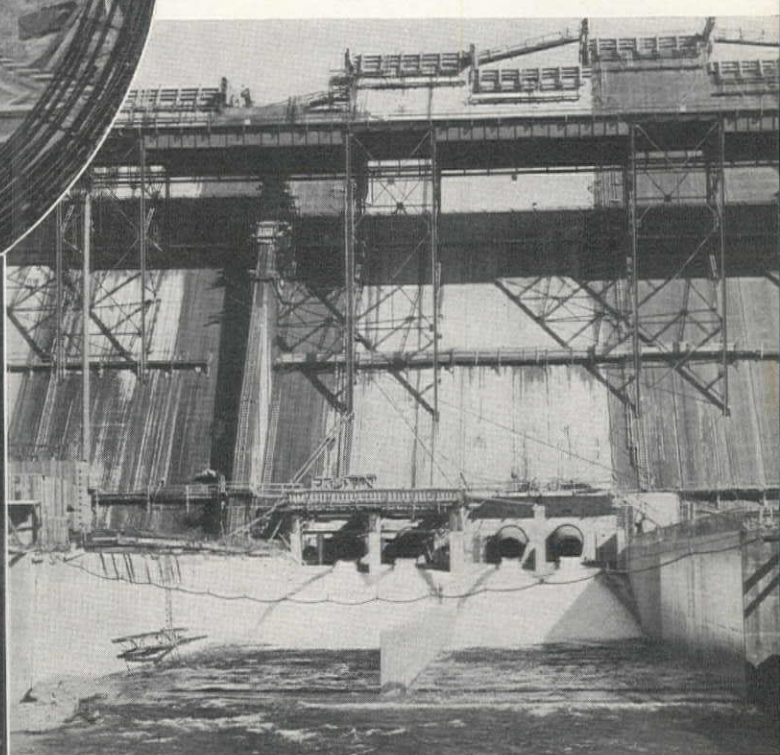
REINFORCING steel is placed (lower right) for a 12-ft. siphon on the Madera Canal near Friant.

Central Valley Project

BEFORE WINTER RAINS begin in northern California the old diversion channel of the Sacramento River at Shasta Dam (above) will have been concreted. At present the river is flowing over low blocks at the west side.

FRIANT DAM (below) has reached its final height and the San Joaquin River has been turned through the river outlets in the dam. Temporary outlets have been plugged and the reservoir is rising.

ERECTION of steel for the double-deck cantilever Pit River Bridge is complete with the last pin driven (lower left) into place several weeks ago. Traffic will use the bridge in a few months.



Proper Use of Lights On Construction

Glare, shadows and uneven illumination during night work on construction projects should be eliminated in order to increase efficient and economic operation — Night work may be made as efficient as daytime work by proper illumination

By BEVERLY A. TRAVIS
Chief Engineer Electrical
The Austin Co.
Seattle, Wash.

STATISTICS show that construction work is one of the most hazardous of all occupations. Add to the usual hazards the difficulty of seeing and the importance of proper lighting for night work becomes immediately apparent. During the present emergency when long hours are required to maintain construction schedules it becomes increasingly important to do everything possible to create the greatest efficiency in workmen and hold accidents to a minimum.

Fatigue related to glare

Tests have proven that eye strain reacts directly on the nervous system and ultimately leads the workman to do things which, under normal conditions, he would never attempt. Glare—the bug-a-boo of all lighting men—paralyzes the seeing nerve. Everyone has experienced the seconds following the blinding glare of an oncoming automobile, when for all practical purposes he is absolutely blind. During that split second anything can happen and the sense of sight can be of no help in avoiding disaster. Many times these split seconds mean life or death on construction work. With derricks lifting and swinging heavy loads, conveyor lines transporting materials and hundreds of other operations, all senses are needed for survival. As one man aptly stated, "A tired workman is an accident looking for someplace to happen."

The feeling of fatigue from eye strain is not generally realized. Research has shown that fatigue from eye strain is more pronounced in many occupations than fatigue from physical exertion. You may say construction is not close work—the seeing task is easy; therefore, the fatigue from eye strain is practically non-existent. In this discussion of quantity of light, there is always the implied guarantee of good quality. By that is meant principally freedom from glare. A bright light source in the field of vision is a menace, not only to vision, but to life and limb, because it reduces the capacity of the visual apparatus to see properly. Shadows must also be reduced because shadows in the safety sense may conceal danger.

Let us go back to the problem of glare. Many construction jobs have stuck a flood-lite up on a fence or building which happened to be handy and assumed they had provided all the light necessary for night work. In order to light the area where the work is being done the workmen face the lights. Every time a workman looks up, the light hits him directly in the eye. This may not have the intensity of an oncoming automobile headlight but the effect on the eye is the same even if of lesser degree. If this momentary paralysis of the eye is carried intermittently through an 8-hr. shift, the workman leaves the job tired and probably with a headache. He may not understand why, or he may have some vague idea that the lights caused his headache, but the real cause of the trouble is not apparent to him.

Uneven illumination dangerous

Another fundamental of lighting which is known to all, but often overlooked, is the distortion caused by shadows at night. Everyone can remember how he, as a youngster, used to make pictures of animals and grotesque creatures by casting shadows on the wall. With improperly placed lights things become just as distorted on the construction job at night.

It does not take much imagination to feel that what was a power shovel during the day has become a prehistoric monster in the gloom of night. You reach for a railing that isn't there, dodge a falling object which was only a shadow and fall into a hole and try to pound objects which are always moving. These are only a few of the dangers which confront a workman on a poorly lighted construction job.

Uneven levels of illumination or contrasts are bad in any seeing task. It is much better to have less light and have it evenly distributed than to have high intensity spots with dark areas. The eye has to work overtime in order to constantly adjust itself to these conditions.

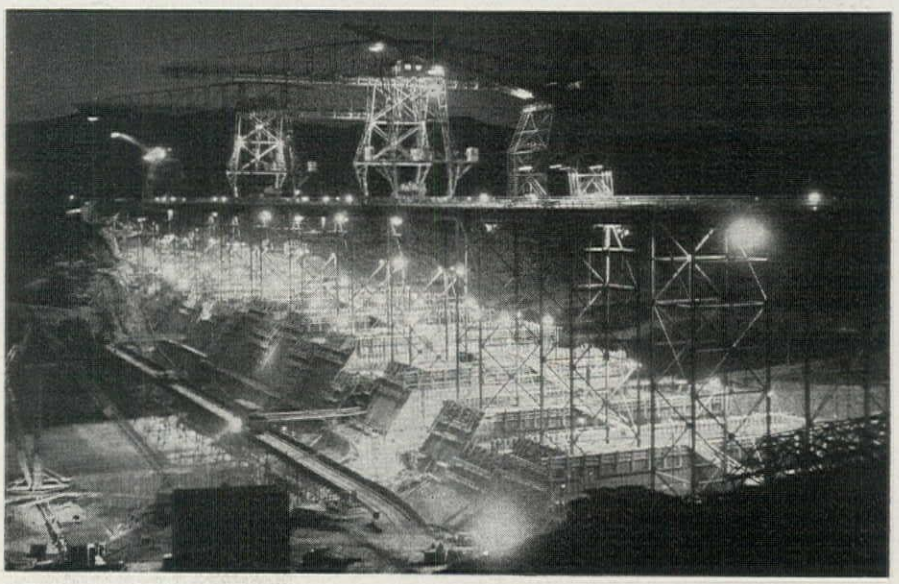
Saving by proper illumination

One of the most frequent reasons for poorly lighted construction areas is that, being only of a temporary nature and the general belief on the part of most construction men that they can get along with very little light, it is unnecessary to spend money on good equipment and installation. In other words, the cost is too great. Let us analyze this angle.

The Washington Department of Labor and Industries in its classification and rates effective Jan. 1, 1941, requires payment by the employer of 12c per workman-hour for Class 2 occupations for insurance and medical aid. This classification covers many of the types of outside construction. Compare this cost with operating a steel mill which, under Class 18, costs only 7c per workman-hour. With such spreads in cost of state insurance surely any means of reducing accidents can be evaluated in actual dollars and cents cost on the job.

Why does the construction industry have one of the highest rates? How does

TYPICAL night lighting system on large western construction projects was installed at Friant Dam, being built on the San Joaquin River by Griffith Co. and Bent Co. under the direction of the Bureau of Reclamation. Note the high light intensity.



for Safety Projects

your night crew compare in output with the day crew? You say these are all things which you can't control. I will differ with you. The night work does not have to be any more hazardous than day, and the elimination of accidents, day or night, will reduce your insurance. As for workman efficiency, we have data to prove that a night crew under proper lights can operate just as efficiently as the day crew.

I have attempted to show that there are three things to guard against in outside illumination:

1. Glare—low lights shining into workmen's eyes.
2. Shadows—light which distorts normal seeing.
3. Uneven illumination—freedom from sharp contrasts in brightness between contiguous areas.

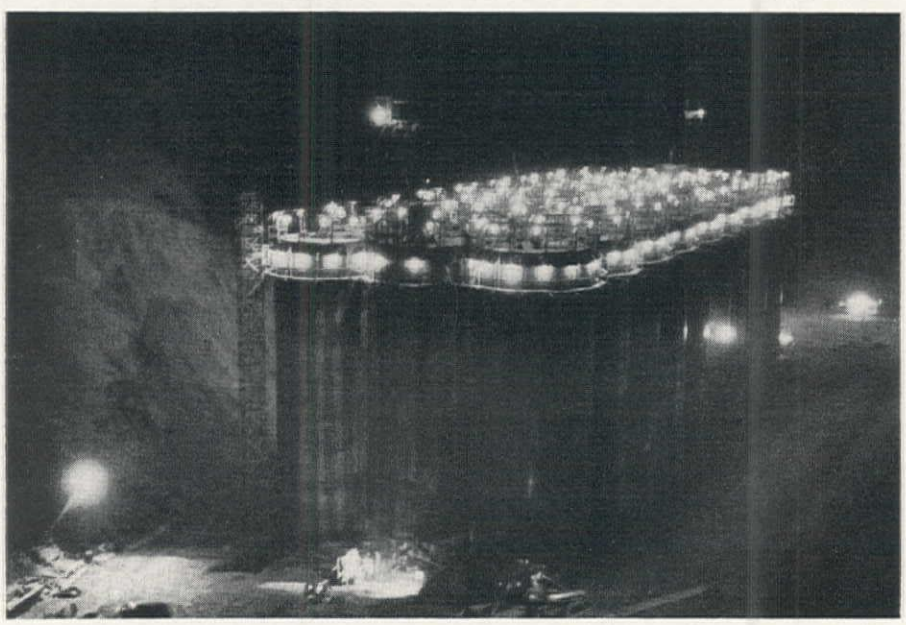
To indicate how these difficulties may be overcome and also give a more concrete basis for construction illumination I propose to cover an actual installation which was made in the vicinity of Seattle.

Height and spacing of lights

The problem of glare is most easily handled by installing the lights on high poles at least 60 ft. and higher if the throw is long. It is always necessary to keep the poles out of the way of construction and therefore usually a distinct advantage to locate them well out of the actual working area and high enough to shine over equipment or buildings which are located on the fringe.

AT SHASTA DAM on the Sacramento River in northern California Pacific Constructors have a total lighting load of about 760 kw. Light intensity at the west abutment averages 10 ft.-candles. Suspended across the dam site on a steel cable are 64 24-in., 1500-watt flood lights with searchlight distribution characteristics. A total of 212 of these units is employed, all with dust-tight covers made of a special heat treated safety glass to prevent injury in case of breakage.

AN EARLIER construction project on which work was carried on around the clock was the cement silos at the Permanente Corp. cement mill near Mountain View, Calif.



Using the proper equipment with proper spacing of lights will eliminate the trouble of shadows and uneven illumination. Usually the lights should not be more than 300 ft. apart unless a concentrating type (long throw) flood is used. For most applications the standard open type wide angle flood is the practical unit. The effective light from this unit drops off rapidly beyond 150 ft., therefore on longer throws the more concentrating type of unit should be used. These units can be mounted in groups on the pole and focused so that the coverage is uniform.

On the installation which I mentioned, the working area was 800 x 1400 ft. or 1,120,000 sq. ft. The construction was so arranged that a row of poles could be installed through the center of this area, dividing it into two identical sections

400 x 1400 ft. Four poles 85 ft. high were used in each row, with five 1500-W. units on each of the outside poles and four 1500-W. units facing each way on the center poles. This made a total of 108 Kw. The lights were focused so that the end unit in each bank was directed at approximately 45 deg. with the side lines and the center light directed toward the center of the area.

Light intensity

Assuming that each flood produced 13,300 lumens, which is one manufacturer's rating for 1500-W. lamp, the total light produced would be 72 x 13,300 or 958,000 lumens; or an average illumination of 95,800 ÷ 112,000 = 0.85 ft.-candles. Power consumption was 108 Kw., or 108,000 ÷ 1,120,000 = .097 W. per sq. ft.

In these days when talking of lighting in terms of 30 to 100 ft.-candles the values given above seem insufficient. However, it proved to be quite satisfactory for the type of work being performed. This fact proves the adaptability of the human eye. As a more tangible comparison, the light on a bright moonlight night is .025 ft.-candles. We can get about fairly well on a moonlight night and here we have 34 times the brightness.

A check on several other outside lighting jobs which the company has installed recently showed the following results:

288,000 sq. ft.—(45 Kw.)—thirty 1500-W. floods.
Average illumination 1.38 ft.-candles.
Power consumption 0.156 W. per sq. ft.

367,000 sq. ft.—(177 Kw.)—one hundred eighteen 1500-W. floods.
Average illumination 4.3 ft.-candles.
Power consumption .48 W. per sq. ft.

137,000 sq. ft.—(76.5 Kw.)—fifty-one 1500-W. floods.
Average illumination 4.95 ft.-candles.
Power consumption 0.56 W. per sq. ft.

These figures indicate that approximately 1/10 W. per sq. ft. is required to produce 1 ft.-candle of illumination on area to be lighted. Our experience leads us to believe that for average construction jobs with proper distribution of light, this figure can be used. The amount of light required may vary but as a general rule not less than one ft.-candle should be provided. In some work as much as 5 ft.-candles may be required.

Marshall Ford Dam Reaches Final Height

MARSHALL FORD dam on the Colorado River of Texas has been completed by the Bureau of Reclamation. The world's fifth largest masonry dam—with a volume of 1,864,000 cu. yd. of concrete—reached crest height on Nov. 22.

The structure, located about 18 mi. northwest of Austin, consists of both concrete and earth and rock-fill. The main section is concrete which is 2,423 ft. long and rises 270 ft. above foundation bedrock. Winging off to the east at the left end of the concrete portion is a great earth and rock-fill embankment section 105 ft. high, 560 ft. thick at the base and 35 ft. at the crest. The volume of the earth and rock-fill embankments of the dam is 1,715,000 cu. yd., making a combined total of both concrete and earth and rock-fill of 3,579,000 cu. yd.

Structural Steel Shape List Simplified

IN ORDER to secure maximum production of steel mills and to conserve the available supply of steel during the present emergency, A. D. Whiteside, chief of the iron and steel section of the Office of Production Management, has requested steel manufacturers to eliminate non-essential and unnecessary structural shapes which are now offered for use in various types of construction projects. Effective Feb. 1, 1942, producers of structural steel shapes have been requested to roll only those shapes included on the simplified list of sections which is given in its entirety on this page.

Nominal Dimensions	Weight per Foot				
WIDE FLANGE BEAMS					
36x16½	300	280	260	240	230
36x12	194	182	170	160	150
33x15¾	220	200	.....	.....	.....
33x11½	152	141	132	125	.....
30x15	210	190	172	.....	.....
30x10½	124	116	108	.....	.....
27x14	163	145	.....	.....	.....
27x10	106	98	91	.....	.....
24x14	150	130	.....	.....	.....
24x12	120	100	.....	.....	.....
24x9	87	80	74	.....	.....
21x13	132	112	.....	.....	.....
21x9	96	82	.....	.....	.....
21x8¼	73	68	63	59	.....
18x11¾	114	105	96	.....	.....
18x8¾	85	77	70	64	.....
18x7½	55	50	.....	.....	.....
16x11½	96	88	.....	.....	.....
16x8½	78	71	64	58	.....
16x7	50	45	40	36	.....
14x16	426	398	370	342	320
	314	287	264	246	228
	211	193	176	158	142
14x14½	136	119	103	95	87
14x12	84	78	.....	.....	.....
14x10	74	68	61	.....	.....
14x8	53	48	43	.....	.....
14x6¾	38	34	30	.....	.....
12x12	190	161	133	106	92
	79	72	65	.....	.....
12x10	58	53	.....	.....	.....
12x8	45	40	.....	.....	.....
12x6½	36	28	25	.....	.....
10x10	112	100	89	77	66
	54	49	.....	.....	.....
10x8	41	33	.....	.....	.....
10x5¾	26	21	.....	.....	.....
8x8	67	58	48	40	35
	31	.....	.....	.....	.....
8x6½	27	24	.....	.....	.....
8x5¼	21	17	.....	.....	.....
LIGHT BEAMS					
12x4	22	19	16½		
10x4	19	17	15		
8x4	15	13	.....		
6x4	16	12	.....		
JOISTS					
12x4	14				
10x4	11½				
8x4	10				
6x4	8½				
***JUNIOR BEAMS**					
12x3	11.8				
11x2⅞	10.3				
10x2¾	9.0				
9x2⅜	7.5				
8x2¼	6.5				
7x2⅛	5.5				
6x1⅞	4.4				
STANCHIONS					
6x6	27½	25	22½		
	20	18	15½		
5x5	18½	16	13½		
4x4	13	10	.....		
H-BEAMS					
8x8	34.3				
6x6	25				
6x6	20				
5x5	18.9				
4x4	13				
SUBWAY COLUMNS					
5¾x9½	40				
BEARING PILES					
14x14½	117	102	89	73	
12x12	74	53	....	....	
10x10	57	42	....	....	
8x8	36	.....	....	....	
STANDARD BEAMS					
24x7⅞	105.9	.....	.....		
24x7	100	90	79.9		
20x7	95	85	.....		
20x6¼	75	65.4	.....		
18x6	54.7	.....	.....		
15x5½	50	42.9	.....		
12x5¼	50	40.8	.....		
12x5	31.8	35	.....		
10x4⅝	35	25.4	.....		
8x4	23	18.4	.....		
7x3⅝	15.3	.....	.....		
6x3⅜	17.25	12.5	.....		
5x3	10	.....	.....		
4x2⅝	9.5	7.7	.....		
3x2⅜	7.5	5.7	.....		

*Rolled by Jones & Laughlin Steel Corp.

Nominal Dimensions	Weight per Foot			
STANDARD CHANNELS				
18x4	58	51.9	45.8	42.7
15x3⅜	55	50	40	33.9
12x3	30	25	20.7	.....
10x2⅝	30	25	20	15.3
9x2½	20	15	13.4	.....
8x2¼	18.75	13.75	11.5	.....
7x2	14.75	12.25	9.8	.....
6x2	15.5	10.5	8.2	.....
5x1¾	9	6.7	.....	.....
4x1⅝	7.25	6.25	5.4	.....
3x1½	6	5	4.1	.....
CAR BUILDING CHANNELS				
13x4	50	40	35	31.8
12x4	50	45	40	35
4x2½	13.8	....	....	.....
3x1⅞	7.1	....	....	.....
SHIP BUILDING CHANNELS				
12x3½	37	32.9	30.9	
10x4	41.1	33.6	28.5	
10x3½	28.3	24.9	.....	
10x3½	25.3	21.9	.....	
9x3½	25.4	23.9	.....	
8x3½	22.8	21.4	.....	
8x3	19.3	18.7	.....	
7x3½	22.7	19.1	.....	
6x3½	18	.....	.....	
6x3½	15.3	.....	.....	
6x3	16.3	15.1	.....	
6x2½	12	.....	.....	
7x4	18.8	.....	.....	
7x3	17.6	.....	.....	
***JUNIOR CHANNELS**				
12x1½	10.6			
10x1½	8.4			
10x1⅛	6.5			

EQUAL ANGLES

Nominal Dimensions	Gauge				
8x8	1⅛	1	⅞	¾	⅝	½
6x6	1	⅞	¾	⅝	½	⅜
5x5	⅞	¾	⅝	½	⅜	....
4x4	¾	⅝	½	⅜	5/16	¼
3½x3½	⅝	½	⅜	5/16	¼	....
3x3	½	⅜	5/16	¼	3/16	....
2½x2½	½	⅜	5/16	¼	3/16	....
2x2	⅜	5/16	¼	3/16	....	....

UNEQUAL ANGLES

8x6	1⅛	1	⅞	¾	⅝	½
8x4	1	⅞	¾	⅝	½	7/16
7x4	⅞	¾	⅝	½	7/16	⅜
6x4	⅞	¾	⅝	½	7/16	⅜
5x3½	¾	⅝	½	⅜	5/16	....
4x3½	⅝	½	⅜	5/16	¼	....
4x3	⅝	½	⅜	5/16	¼	....
3½x3	⅝	½	⅜	5/16	¼	....
3½x2½	½	⅜	5/16	¼	....	....
3x2½	½	⅜	5/16	¼	....	....
3x2	½	⅜	5/16	¼	3/16	....
2½x2	⅜	5/16	¼	3/16	....	....
2½x1½	5/16	¼	3/16	....	....	....

Nominal Dimensions	Weight per Foot				
SHIP BUILDING BULB ANGLES					
10x3½	32.3	29.9	27.2	24.8	22.4
9x3½	23.8	21.6	19.4	.....	.....
8x3½	24.3	20	16	.....	.....
7x3½	21.1	17.1	13.6	.....	.....
6x3½	17.4	13.9	10.7	.....	.....
5x2½	9.8	7.3	.....	.....	.....
3x2	3.8	.....	.....	.....	.....
CAR BUILDING BULB ANGLES					
5x4½	19.1				
5x3½	13				
4x3½	14.3				
4x3½	11.9				
ZEES					
6⅛x3⅝x½	21.1				
6x3½x⅜	15.7				
5x3¼x½	17.9				
5⅛x3⅜x7/16	16.4				
5 1/16x3 5/16x⅜	14.0				
5x3¼x7/16	11.6				
4 1/16x3⅛x½	15.9				
4⅛x3 5/16x⅜	12.5				
4 1/16x3⅛x5/16	10.3				
4x3 1/16x¼	8.2				
3x2 11/16x½	12.6				
3x2 11/16x⅜	9.8				
3x2 1/16x¼	6.7				
EQUAL TEES†					
4x4x½	13.5				
3x3x⅜	7.8				
3x3x5/16	6.7				
2½x2½x⅜	6.4				
2½x2½x5/16	5.5				
2½x2½x¼	4.6				
2¼x2¼x¼	4.1				
2x2x7/16	4.3				
2x2x¼	3.56				
UNEQUAL TEES†					
5x3⅛x½ (fl) x13/32 (st)	13.6				
5x3x⅜ (fl) x13/32 (st)	11.5				
4x4½x⅜	11.2				
4x3x⅜	9.2				
4x2½x⅜	8.5				
3x2½x5/16	6.1				
MISC. CAR BLDG. SECTIONS CENTER SILL SECTION					
12x3¼—7x 11/16	40.3				
12 11/16x6 29/32—4 7/16x 11/16	41.2				
12⅞x6 27/32—4x 11/16	36.2				
12 11/16x6 29/32—3 11/16x 11/32	31.3				
W SIDE PLATE SECTION					
7 7/16x¾	9.9				
3x5/16	5.1				
3⅜x¼	8.3				

†Any Standard, Wide Flange or Junior Beam 6 inches or over in depth can be split to form Tees.

Selecting Army Camp Sites

Procedure in choosing localities for large cantonments includes first tactical consideration, then available areas, terrain and adjacent facilities for serving the camp—Architect-engineer limits final area and fits units to the terrain

AT THE beginning of the present national emergency, many of the cantonment sites for training the American Expeditionary Forces of 1917 were found deficient in the requirements for modern conditions. Where practical, cantonment sites of the first world war were rehabilitated for the first contingent of troops called into service, while simultaneously the Army began planning sites for entirely new military establishments. This assignment—the provision of housing and utilities for a million and a half men—has constituted the most varied and complex construction program ever undertaken in the United States. Now that the Army is in the second phase of its program—the operation and maintenance of its newly built facilities—it is possible to review some of the factors governing the location of camps which since June, 1940, have sprung up in all parts of the country.

Location of general areas

Under the supervision of Col. E. M. George, Ninth Zone constructing quartermaster, plans and studies have been underway for some time on projected Army camps at Albany, Ore.; Medford, Ore.; West Yellowstone, Mont.; and Marysville, Calif. A high degree of specialized knowledge and judgment has gone into the selection of these sites for the housing of thirty some odd thousand men each, with not only all the utilities common to a fair sized city, but with also every facility for training these men in warfare.

The general area in which an Army camp is located is determined primarily upon the need for military forces in that region and upon the adaptability of the area to training needs. The choice of the general area for investigation is determined by a board of high-ranking officials in the War Department. As these sites are approved for planning purposes, they are released by the Quartermaster General to the Zone Constructing Quartermaster, of whom there are nine in the United States proper, and under whose jurisdiction all Army cantonment construction in a particular zone is conducted.

Such general sites may be as large as one hundred thousand acres, and it is necessary to make recommendations on a general site in the area for a cantonment, maneuver grounds, ranges and

ILLUSTRATING how a large cantonment is fitted to the general site is this aerial view of Camp Cooke, situated between mountain ranges and the sea. Before the camp construction was started the site looked like that in the photograph above.

RAILROAD FACILITIES are important to cantonments for they provide means of bringing supplies and materials. Fairly flat terrain, as at Camp Cooke, permits railroad lines to be built easily and quickly, thus facilitating later construction work.

training facilities. In general, 40,000 to 50,000 ac. for triangular division camps (with one dimension approximately 10 mi. in length) and 75,000 ac. of maneuverable terrain for armored division camps affording cover and concealment are considered sufficient. Some major camps, however, are much larger. Camp Cooke, near Lompoc, Calif., is an example, with some 90,000 ac.

Camp fitted to area

The Zone Constructing Quartermaster then takes steps to co-ordinate the limits of the site with the Commanding General of the Corps Area concerned. This is handled through a Board of Officers appointed by the Commanding General. Subsequently, the Board makes a survey of the sites included in the designated area, and returns a report with recommendations. Additional data is forwarded by the Zone Constructing Quartermaster, principally on engineering features of the area.

If Washington puts a stamp of approval on the site, a contract is let to an architect-engineer who is charged with the responsibility, under a constructing quartermaster, for developing an exact layout plan.

Quite generally, this area is still too large, and it is the architect-engineer's job to limit it to what is absolutely necessary for the entire camp. In the Albany-Corvallis region, for example, the original site embraced approximately 65,000 ac., which was cut down to a rectangular area of about 45,000 ac., about 5 mi. wide and 8 mi. long, with a segment extending off one side to include the Willamette River. Also in the case of Marysville, the original 70,000 ac. were reduced to about 40,000 ac.

As a rule, the architect-engineer's planning, a complicated process requiring completion within 60 or 90 days, is essentially the adaptation of a camp design to the terrain of the site. Actual selection of the site has already been made on the basis of the report submitted by the Board of Officers.

CANTONMENT SITES should have transportation facilities readily available in the immediate vicinity. At this part of the proposed Medford, Ore., site there are a railroad, state highway, and county highway adjacent to the camp area.

Requirements to be fulfilled

The mission of this Board is to consider a suitable area to provide housing and training facilities for not less than 30,000 troops. Part of this area should be comparatively level, yet well drained, for barracks, division review area and drill fields, cavalry ranges (if specified) infantry ranges, bayonet and grenade courts, instruction fields for motor vehicle drivers and medical sanitation. Other parts should be sufficiently rolling to provide varied topography for maneuvers and tactical exercises or, as in the requirements for the winter training camp at West Yellowstone, must have a variety of gentle and steep slopes to provide for skiing and mountain climbing instruction.

The area must be sufficiently large or have training areas adjacent thereto to provide for an artillery range, approximately 5 by 10 mi. in size, sites for mechanized unit field maneuvers, engineer demolition, obstacle and field fortifications. Thought must also be given to the ground cover of this area as excessively dry underbrush and resinous trees may necessitate fire precaution installations.

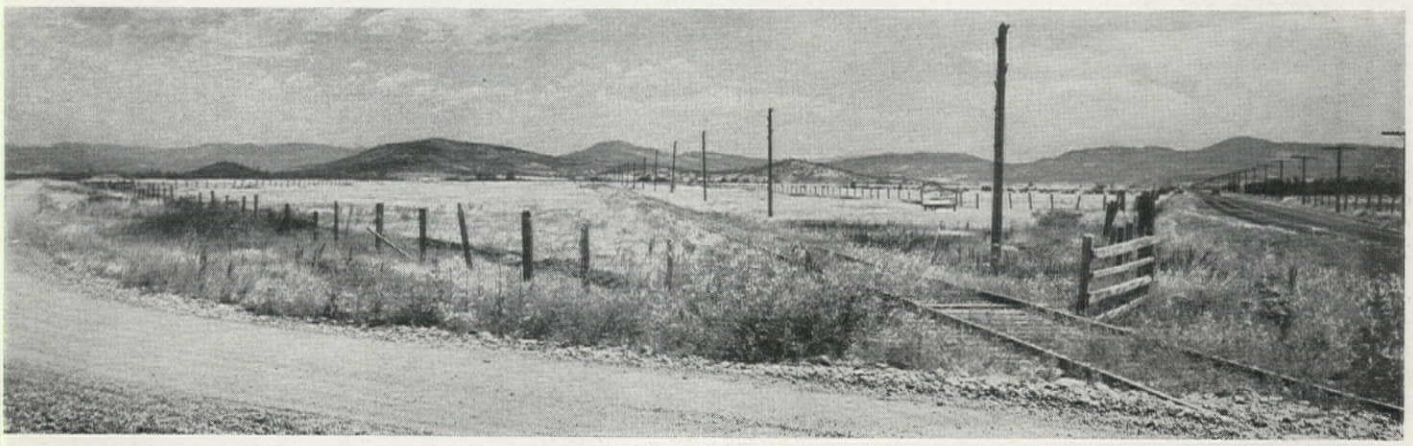
Important with regard to the training area is that it be readily accessible to troops moving from the barracks. The ideal situation is a cantonment site of from 1,600 to 2,000 ac. with about 2 mi. of suitable terrain on all four sides. In any case, 1 mi. of suitable terrain must be available on two sides of the cantonment area with one other side open to at least 2 mi. of training ground. The cantonment area must, of course, be located at one end or side of the whole site so as not to interfere with artillery and other firing.

Streams or lakes are usually required for pontoon and fixed and floating bridge training. Officers surveying the site must see that such natural streams, lakes, ravines or hills are not so situated that troops will have to make a long detour in going from the barracks to the position.

Another factor is a landing field. If one is not available within approximately 15 mi.—as is the case at the isolated West Yellowstone site—it must be determined that there is space for one in the projected area.

Construction problems considered

These are a few of the principal mili-



tary features to be borne in mind during the process of site selection. There are also problems of construction and maintenance of the camp, if built. The site should be sufficiently close to centers of population to expedite delivery of supplies and to provide suitable social and cultural opportunities for the troops. The availability of labor, utility installations such as fuel, power, water, sewage disposal, communication lines and building materials of all kinds must be considered.

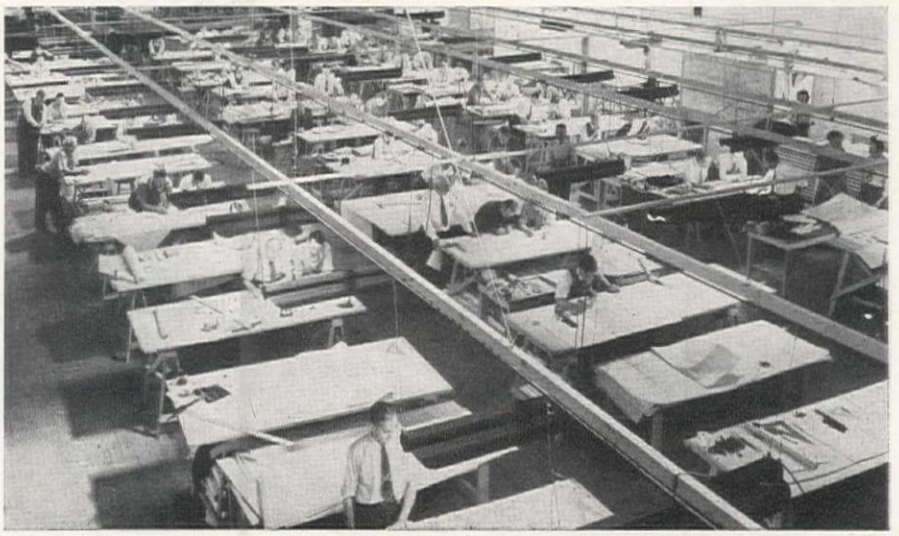
Information of a general kind must be gathered regarding ownership of the land and its purchase or lease price. If the land is largely State or Government owned, as at West Yellowstone, acquisition may be fairly simple. On the other hand, as at Medford, there may be nearly a thousand parcels of separately owned land, each requiring extensive title research and the fixing of a just and reasonable price. If oil, gas, coal or other mineral deposits are present, it will be necessary to determine the status of ownership of such rights and wells or mines, if any.

Arterial highways and railroads are obviously vital matters. These should be accessible without too great expense, and capable of accommodating heavy traffic. They should not, if it can possibly be avoided, intersect the cantonment area or separate it from the training area. Moreover, upon their location may depend the suitability of the site. For it will be necessary to locate the Camp Quartermaster, warehouses, laundry, bakery and cold storage plant nearest the existing railroad in order to minimize the cost of additional railroad trackage.

Important factors

Three other important questions must be posed by the site selectors: 1—Can an adequate water supply be developed without incurring undue expense? 2—Will the camp always be free of floods? 3—Will the camp always be free of mud during prolonged rainy periods, either during construction or after the troops move in, to such an extent that it can be solved by the application of engineering principles? If the answer to any of these three questions is in the negative, all idea of the site must be abandoned.

Natural conditions, such as soil, climate and rainfall must be taken into account. Although the architect-engineer will have considerable latitude in adapting standardized plans to the terrain he must adhere to certain definite principles. The direction of prevailing winds will largely determine the relation of the hospital area to the whole layout. Dust from parade grounds or other intensively used areas, noise from barracks and motor storage posts, smoke from power plants or laundries, or odors from kitchens and sewage treatment plants, must be avoided. At the same time, hospitals must be on high ground at least one mile from the firing ranges, which in turn should be within a few minutes' walk from the barracks. Thus, one natural obstacle, such as a large outcropping of rock or an extended marshy area, may make construction of the camp excessively costly or entirely impractical.



DURING the planning stage of a cantonment project, the architect-engineer often employs large numbers of engineers and draftsmen. Here is the temporary office of Myron W. Hunt, H. C. Chambers and Blackie & Wood, set up in the city auditorium of Medford, Ore., while planning was in progress for a camp in that area.

If these or other construction essentials are physical impossibilities in the site, it obviously must be rejected forthwith.

When members of the Board of Officers look off to the rolling hills, lakes and valleys of a proposed area, they endeavor to visualize before them an individual city of approximately two thousand buildings that may be called upon to accommodate as high as 50,000 persons for a period of at least five years. With this responsibility, it will readily be seen that site selection must be both an exact science and a thoroughly developed art.

Disbursement of Highway Income

ELEVEN Western States spent about $196,751,000 for highways and streets during 1940 according to figures just released by the Public Roads Administration. The division of expenditures is given below. In the same period 3½ billion gallons of gasoline were burned in the West.

	Collection of Highway User Revenues	State Highways	County and Local Roads and Streets	Non-Highway Uses	Gasoline Consumption (gallons)
Arizona	$ 369,000	$ 6,634,000	$ 1,861,000		111,516,000
California	4,137,000	47,693,000	23,163,000	$13,989,000	1,948,880,000
Colorado	828,000	10,305,000	3,561,000		246,918,000
Idaho	105,000	5,472,000	2,462,000		107,644,000
Montana	155,000	10,101,000	1,485,000		134,974,000
Nevada	69,000	4,158,000	27,000		42,487,000
New Mexico	473,000	12,072,000	267,000	616,000	108,834,000
Oregon	666,000	14,958,000	2,622,000	139,000	264,654,000
Utah	204,000	5,102,000	999,000	37,000	105,635,000
Washington	714,000	29,614,000	8,979,000	618,000	384,359,000
Wyoming	56,000	5,527,000	689,000		70,753,000
Total	$7,776,000	$151,636,000	$45,115,000	$15,399,000	3,526,654,000

S. F.-O. Bay Bridge Earns $25,000,000 in Five Years

AFTER NEARLY five years of operation, the San Francisco-Oakland Bay Bridge has carried more than 61,000,000 vehicles, according to the announcement of the California Toll Bridge Authority for the month ending Oct. 31, 1941. During the period since Nov. 12, 1936, when the $80,000,000 structure was first thrown open to motor vehicle traffic, toll collections have totaled $24,492,000. During the month of October, the bridge carried 1,750,000 vehicles, or an average of 56,463 per day. Bridge tolls have been decreased since the opening from 65 cents to 25 cents, and the average toll per vehicle is now 28 cents for the month of October, 1941, as compared to 40 cents for the average since the opening of the bridge. Interurban train passengers who have been carried over the bridge since Jan. 15, 1939, have contributed $1,256,859 to the bridge revenue. A total of 50,274,000 pasengers have been carried in the 22-mo. period.

Construction Design Chart

LXXII . . . Earth Ditch, Discharge—3-ft. Bottom

By JAMES R. GRIFFITH

Lieut. Comdr. CEC-V(S), USNR

Seattle, Wash.

A CHART was presented in the Dec., 1940, issue for the determination of flow in open channels having a side slope of 1½ to 1, and a bottom width of 2 ft. This one was mentioned as being the first of a series of such charts for various channel widths. The accompanying chart is the second one, being for identical conditions with a 3-ft. bottom width. The reader interest in hydraulic and irrigation charts, as evidenced by inquiries, has exceeded any other group.

A solution line has been drawn on the accompanying chart for the same assumed conditions used in the Dec., 1940, issue:

Depth of Water = 15 in.

Channel gradient = 1.5 ft. per 1,000 ft.

On the discharge scale, the following values will be noted:

Discharge = 9.1 cu. ft. per sec.

Discharge = 18 ac. ft. per day.

Table No. 26 of *Handbook of Water Control*[1], gives a discharge of 8.9 cu. ft. per sec. for the same assumed conditions. This is equivalent to a discharge of 1.983 × 8.9 = 17.7 acre ft. per day.

Table No. 17 of *Hydraulic and Excavation Tables*[2] gives for the assumed conditions the following values by interpolation:

Hydraulic = 0.81

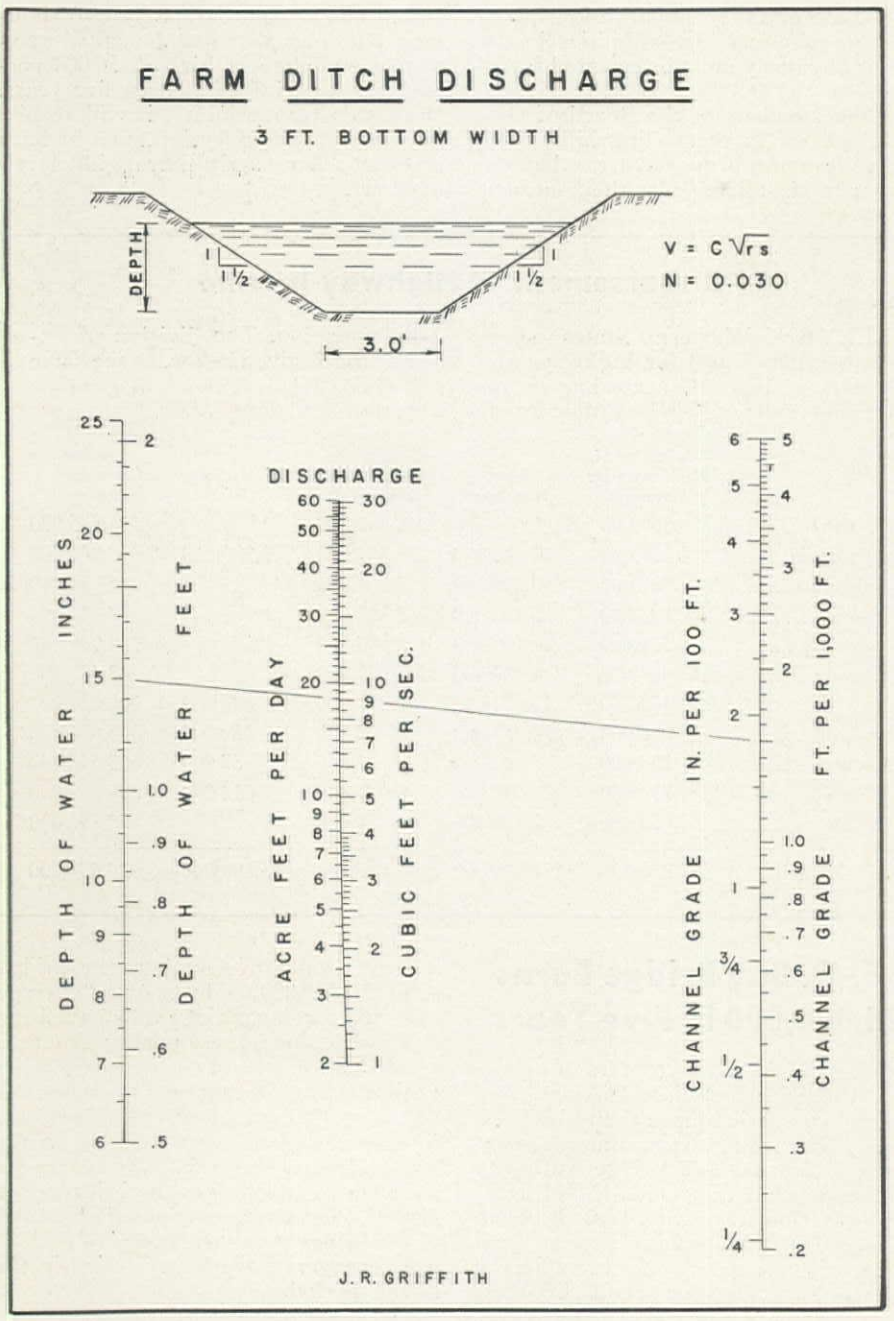
Area = 6.11

Table No. 10 of the same reference, for a gradient of 0.0015 and a value of $r = 0.81$, gives a velocity of $V = 1.49$ ft. per sec. The computed discharge, by this reference, would then be $Q = A\,V = 6.11 \times 1.49 = 9.1$ cu. ft. per sec., or $Q = 1.983 \times 9.1 = 18.05$ ac. ft. per day.

And so ends the sixth year of these charts. Thanking the many readers who have taken the time and trouble to comment on these contributions, in addition I want to wish all of you a Merry Christmas and a prosperous year to come.

[1]Armco Culvert Mfrs. Assoc.

[2]U. S. Reclamation Service.



The Last Chart

Requirements of the National Emergency will eliminate one of the oldest features of *Western Construction News*. Number 72 will be the last of a six-year series of Construction Design Charts. Lt.-Comdr. Griffith has not been able to find time free of his official duties in which to prepare additional charts for the continuation of this series.—*Editor*.

Honnen Awarded Pioneer Highway Tunnel Drift

THE FIRST STEP in construction of a highway tunnel on U. S. Highway 6, west of Denver, Colo., will be undertaken by the Ed H. Honnen Construction Co. following award of a contract by the Colorado Highway Department for a pioneer drift. The proposed tunnel, as it is contemplated by the highway department, would cross the Continental Divide at Loveland Pass between Georgetown and Dillon. It would be 32 ft. wide and 21 ft. high from crown to pavement, costing an estimated $1,450,000. In order to determine the exact character of the ground before proceeding with the full tunnel, highway department engineers decided upon construction of a pioneer drift 7 x 7 ft. at the crown of the arch. Honnen submitted a bid of $198,449, and was awarded the contract early in November. The pioneer drift is to be completed within 450 calendar days.

San Bernardino Air Depot

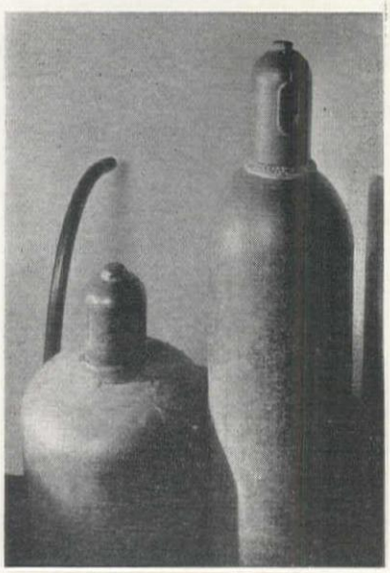
PLANS ARE being prepared by the U. S. Engineer Department for construction of a $15,000,000 Army and Air Corps supply depot at San Bernardino, Calif. Detail plans for the project have not yet been announced, but reports indicate that the War Department will lease the 547-ac. San Bernardino County Airport, and purchase an additional 1,000 ac. as ground space.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

Proper Handling of Welding Equipment

—From a handbook published by Victor Equipment Co.



1—Unscrew cylinder caps.....

2—Crack valve.....

3—Attach oxygen regulator.....

1—Place your oxygen and acetylene cylinders together (or on your cylinder truck) where you will use them. Unscrew both cylinder valve protection caps. (These caps should be put away carefully so that they may be replaced on the empty cylinders when they are ready for return shipment.) Examine both cylinder valve threads and wipe them off with a clean cloth to eliminate any accumulation of dirt which might otherwise enter the regulators.

2—Place the acetylene valve wrench (furnished by the acetylene manufacturer) on the valve stem and leave it in that position while welding or cutting. The oxygen cylinder valve is provided with a handwheel. Slightly open the oxygen cylinder valve (this is called cracking) to make sure that it will not stick and to blow out any dirt or dust. Do likewise with the acetylene cylinder valve.

3—Now attach your oxygen regulator to the oxygen cylinder valve by using the open-end, four-way wrench furnished you with the outfit. Do not use excessive pressure but tighten the regulator connection nut firmly. Make sure that the regulator tension screw is in the "out" position. Turn the tension screw anti-clockwise to release pressure upon the regulator diaphragm. Open the oxygen cylinder valve slowly—the high pressure regulator gauge dial should move slowly until it registers a pressure of about 200 lb. per sq. in. if the cylinder is full.

Now proceed in a like manner with your acetylene valve and regulator. You may now open the oxygen valve fully—keep it completely opened during operation. Should the cylinder valve indicate a stem leak when the valve is fully opened, close it again and notify your supplier. The acetylene cylinder valve should be opened no more than one turn of the valve wrench—do not turn valve stem further than that.

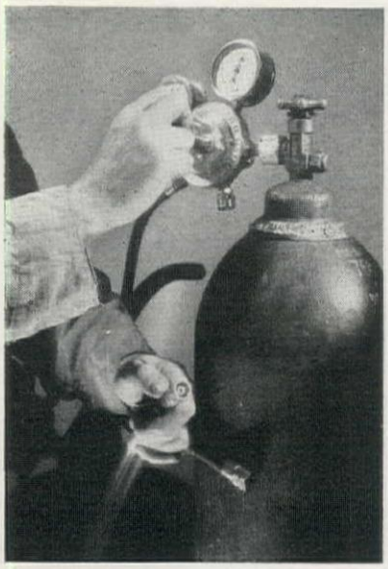
4—Now connect one end of the oxygen hose (the green one) to the outlet nipple of your oxygen regulator. Screw regulator tension screw (clockwise) into the regulator spring housing until the low pressure gauge registers 3 to 5 lb. pressure.

5—In this way blow out the hose to clean it and remove any accumulated dust, dirt or the protective talcum powder often used to preserve the inner hose lining during storage. Dust or dirt might otherwise enter the fine gas passages of your torch. Now release again the regulator tension screw until the regulator low pressure gauge registers zero pressure.

6—Connect the free end of the oxygen hose to the oxygen inlet nipple of the welding or cutting torch. The inlet connection has a righthand thread. Proceed in a like manner to connect the acetylene hose to the acetylene regulator and torch. The acetylene hose connections have a lefthand thread.

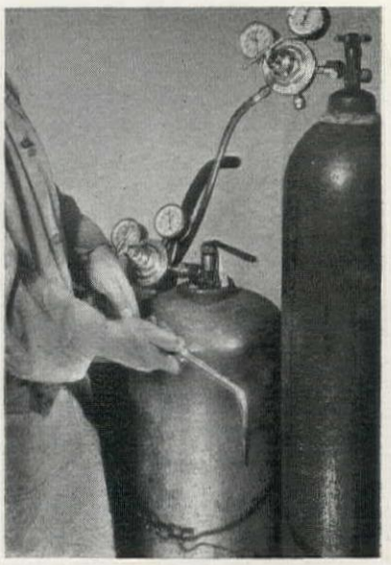
4—Connect oxygen hose.....

(Continued on next page)



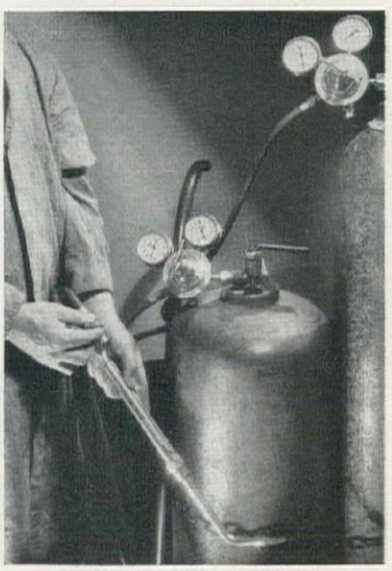
5—Blow out hose

6—Connect torch



7—Select torch tip

8—Adjust oxygen regulator



9—and acetylene regulator

7—Select the torch tip suitable for the welding or cutting job. Both the welding torch nozzle and the cutting tip are provided with a male cone seat. Insert this cone seat into the torch head and fasten it with the tip nut. Do not use excessive pressure.

8—Partially open the oxygen torch needle valve and adjust the oxygen regulator tension screw (screw it clockwise) into the regulator spring housing) until the low pressure gauge registers the proper oxygen pressure for the tip size you have selected. Then again close the torch oxygen needle valve.

9—Do likewise to adjust the acetylene gas pressure. The reason why the torch needle valves should be opened (one at a time) is to give you the regulator pressures as required when the torch valves are opened—with closed needle valves the regulator pressure is slightly higher, as you will note.

Finishing Work

When you are through with your welding or cutting operation, proceed as follows: Shut the torch acetylene valve—then the oxygen torch valve—both tightly. When the torch flame has been extinguished, close both cylinder valves.

Open the torch oxygen valve (leave the acetylene valve closed) and the accumulated oxygen will drain out of the oxygen regulator. Then release the oxygen regulator tension screw by screwing it partially out of the spring housing—anti-clockwise. When no more oxygen pressure is registered on the low pressure gauge, close the torch needle valve. Proceed likewise to drain the acetylene regulator.

✦

Safety Precautions

Do not undertake the repair of welding or cutting equipment with oily hands, gloves or tools.

Never convert a fuel gas regulator into one for oxygen use.

Never utilize any kind of grinding compounds in an attempt to seat nozzle or cutting tip cone ends.

Never employ over-sized wrenches or excessive pressure when repairing welding and cutting apparatus.

Never use cylinder gas without a suitable pressure reducing regulator.

Never stand directly in front of, or behind an oxygen regulator when you turn on the oxygen cylinder valve.

Don't forget to release regulator tension screw before opening cylinder valve.

Don't attach new or formerly stored hose lengths to torch needle valve without first blowing out these hose lengths to eliminate accumulated foreign matter which might otherwise enter and clog up the torch ports.

Don't open acetylene cylinder valve more than one full turn, but open oxygen cylinder valve fully.

Never test for leaks with a flame—always use soap and water.

If you cannot stop a cylinder valve leak by closing it, notify the manufacturer.

Don't neglect ordinary fire prevention precautions.

If an acetylene cylinder should catch fire it can usually be extinguished with a wet blanket.

Never fill a smaller gas cylinder from a larger one.

Don't use a grinder or watch a torch or welding machine arc without properly designed eye protection.

NEWS OF WESTERN CONSTRUCTION

DECEMBER, 1941

Plan $126,000,000 Utah Steel Plant Expansion Program

LARGEST of all construction projects yet announced for Utah is the latest Reconstruction Finance Corp. increase of $91,000,000 to the original $35,000,000 plan of expanding the Columbia Steel Company at Provo, Utah. The construction at the Utah unit will provide four additional pig iron furnaces and one open hearth furnace to produce steel ingots and a rolling mill to turn out steel plates.

The 840,000 tons of steel ingots and 500,000 tons of steel plates estimated annual production will be utilized chiefly on the Pacific Coast, and mostly in shipbuilding, which means that the Utah plant will replace the usual Atlantic seaboard sources.

The great need of water of such a plant is contemplated to place a higher value on the Provo River project, and directly assist in securing priority preferences to complete construction of that project.

The mayor of Provo, Utah, said that the public works loans now sought for the city would undoubtedly be expedited by this addition, and announced that the city's application to the federal defense public works for a grant and loan of $1,760,000 for power development had been given an A-1 rating.

Although one estimate of 18 to 24 months as the time for construction has been given, the actual building will not be in progress for several weeks, depending on rate checking and other plans.

The steel development received its first big boost when it was announced June 19 of this year that the OPM was studying a $57,200,000 expansion for the Provo plant of Columbia Steel; definite action was taken when the Defense Plant Corp. allotted $35,000,000 on Oct. 31, for the construction of two blast furnaces, and now the prospects of the $126,000,000 expansion seem certain after the announcement of the RFC on Nov. 26.

Tacoma Narrows Bridge May Cost $9,500,000

PLANS for the new Tacoma Narrows Bridge will probably provide for a 4-lane structure to cost about $9,500,000, according to reports from the Pacific Northwest. The Washington Toll Bridge Authority has applied to the U. S. Engineer Department for permission to reduce clearance over the Tacoma Narrows by 25 ft. Original clearance of the span was about 195 ft. at high water, but an additional 25 ft. will be required below the new span in order to make room for a truss girder. The new towers will be 63 ft. wide, and taller than the present towers. The original piers, anchorages and approaches are to be utilized for the new design. The total estimated cost of the new structure includes an allowance of $2,500,000 for the original piers.

Santa Fe Dam Construction Started With Ground-Breaking Ceremonies

GROUND-BREAKING ceremonies for Santa Fe Dam, near Los Angeles, Calif., were held on November 8. Four contractors — Morrison-Knudsen Co., Inc., Boise, Idaho, and Los Angeles; Winston Brothers, Minneapolis, Minn.; J. F. Shea Co. and Ford J. Twaits Co., Los Angeles—hold a joint contract of $8,837,190 for construction of the dam which will be 92 ft. high and 23,800 ft. long. The reservoir will have a maximum storage capacity of 47,200 ac. ft. The outlet works will consist of sixteen 6 x 9-ft. gated conduits, with a maximum discharge capacity of 37,400 cu. ft. per sec. With a crest length of 1,200 ft., the spillway will have a discharge capacity of 200,000 cu. ft. per sec. Construction of the dam will require 14,201,000 cu. yd. of excavation; 11,950,000 cu. yd. of embankment; 163,000 cu. yd. of concrete; and 11,500,000 lb. of reinforcing steel. The contractors will be allowed 830 calendar days for completion of the structure. (See *Western Construction News,* July, 1941, for unit bid summary of the project.) The dam will be the second largest rolled earthfill dam in the world, being surpassed only by Denison Dam, now under construction in Texas. The structure was designed, and is being constructed under the supervision of the Los Angeles District of the U. S. Engineer Department.

ON NOV. 8 official ground-breaking ceremonies were held on the site of Santa Fe Dam near Azusa, Calif., to mark the beginning of construction on the world's second largest rolled earthfill dam for the Los Angeles flood control program.

Contractors' Bond Costs Lowered for Army Camps

PREMIUM RATES for performance and payment bonds in connection with construction work under the jurisdiction of the Constructing Quartermaster of the U. S. Army have been established at $10.00 per thousand on the contract price, where the amount of the contract is less than $2,500,000. The reduced rate is subject to stipulations that time for completion of the contract shall not exceed 12 months, and that performance and payment bonds shall continue to be in substantially the same form as now required. The regular premium rate has been $15.00 per thousand. For construction of contracts of $2,500,000 or more, and subcontracts in less amounts under the larger contracts, the rates for performance and payment bonds will be specifically determined in each case. The basic rate of $10.00 per thousand will be subject to downward gradation, depending upon the size of the contract, and it is contemplated that rates as low as $7.50 per thousand will be in effect for contracts of $9,000,000 or more. These reduced rates have been announced by the Towner Rating Bureau, which represents a majority of surety bond underwriters.

Plan $5,000,000 Enlargement of Two Army Cantonments in Southern California

PLANS ARE in preparation for enlarging housing and facilities for approximately 9,300 additional officers and enlisted men at Camp Haan and Camp Callan, it has been announced by the Office of the Ninth Zone Constructing Quartermaster in San Francisco. Cost of these additions, if authorized, are expected to amount to a total of about $5,000,000.

Planning at Camp Callan is well advanced. The Constructing Quartermaster for San Diego will issue invitations to bid on a lump sum contract when the work is authorized. Buildings will be temporary, wood frame structures. Architectural and engineering work at Camp Haan will be performed by the Office of the Constructing Quartermaster. Facilities will be provided for about 6,000 men.

California to Collect $30,000,000 in Sales Tax

CALIFORNIA is planning to collect about $30,000,000 in sales taxes from contractors who have been engaged on cost-plus-a-fixed-fee contracts for the Federal Government. The move to collect the taxes was started following a decision of the U. S. Supreme Court several weeks ago, in which the court ruled that the State of Alabama was entitled to collect sales taxes from contractors working on a cost-plus-a-fixed-fee basis. The state will assess the contractors, who in turn will be reimbursed by the Federal Government. Collection of the sales tax has been a problem of the State Board of Equalization, the contractors, and the Federal Government for more than a year. About six months ago, the Board agreed to withhold attempt to collect the tax until the decision had been reached by the Supreme Court. Since June, 1940, expenditures of the Federal Government, under the defense program, have been estimated to total $3,655,092,000 in California.

Los Angeles Aluminum Plant to Be Built Soon

CONSTRUCTION of a $5,538,000 aluminum extrusion plant will be undertaken by the Bohn Aluminum and Brass Corp. at Los Angeles, Calif. Funds for construction and operation of the plant have been allotted to the manufacturer by the Defense Plant Corporation. An estimated $1,753,000 will be required for the purchase of land and construction of buildings at the Los Angeles plant.

Washington Orders Highway Salary Survey

GRIFFENHAGEN & ASSOCIATES, a New York financial and survey firm, has been engaged by the State of Washington to make a survey of salaries and positions in the Washington State Highway Department. The survey will include a study of salaries and job classifications. If it is considered to be successful, and is approved by the Governor, it will be carried out in other state departments.

Army Awards $1,696,800 Washington Jetty Job

GUY F. ATKINSON CO., San Francisco, Calif., and Kern & Kibbe, Portland, Ore., have received a joint award of $1,696,800 from the Seattle district of the U. S. Engineer Department for construction of a breakwater at Neah Bay at the mouth of the Strait of Juan De Fuca on the northwest point of the Olympic Peninsula. The contract was awarded for the 8,200-ft. breakwater on the second call for bids after army engineers had rejected the $3,635,250 low bid of the Columbia Construction Co. and revised the project plans to an estimated cost of $1,141,000.

Licenses Renewable After Military Service

CONTRACTORS who are licensed in California and inducted into the armed forces of the United States are entitled to license renewals without examination, and without payment of fees for delinquency, in accordance with a new section of the California Business and Professions Code passed by the 1941 legislature. Section 114 provides that a person holding a valid renewable license at the time of his entry into the armed forces of the United States may, within 60 days after his discharge, renew his license, without examination, on payment only of the renewal fee for the year in which he makes the application. The Contractors' State License Board will require an affidavit as to the date of entry into the armed forces in order to ascertain that the applicant held a valid renewable license at the time.

Preliminary Work Begun by Denver On Blue River

INTEREST of the City Council of Denver, Colo., in the Blue River project was evidenced by the announced intention of transferring immediately $100,000 from the general fund to a separate fund to start work on the Blue River Diversion. The potentialities of the project in water developed, acres irrigated, and power developed, are high. If maximum utilization is made of all water possible for diversion the estimated cost has been placed as high as $100,000,000. A more limited plan has been suggested which would cost around $40,000,000.

The consensus of engineers who have studied the undertaking is that it is apt to greatly exceed in scope the Colorado-Big Thompson project now under construction by the Bureau of Reclamation. Part of the water developed would be used to augment the domestic water supply of Denver. The lands to be irrigated would lie much closer to Denver than those benefited by the Big Thompson project. The city's move is actuated by a desire to establish priority on the water and to encourage some government agency such as the Bureau of Reclamation to undertake complete development at an early date.

This project would seem to be ideal for inclusion in undertakings now being studied to take up the slack following the transition from war to peace-time activities.

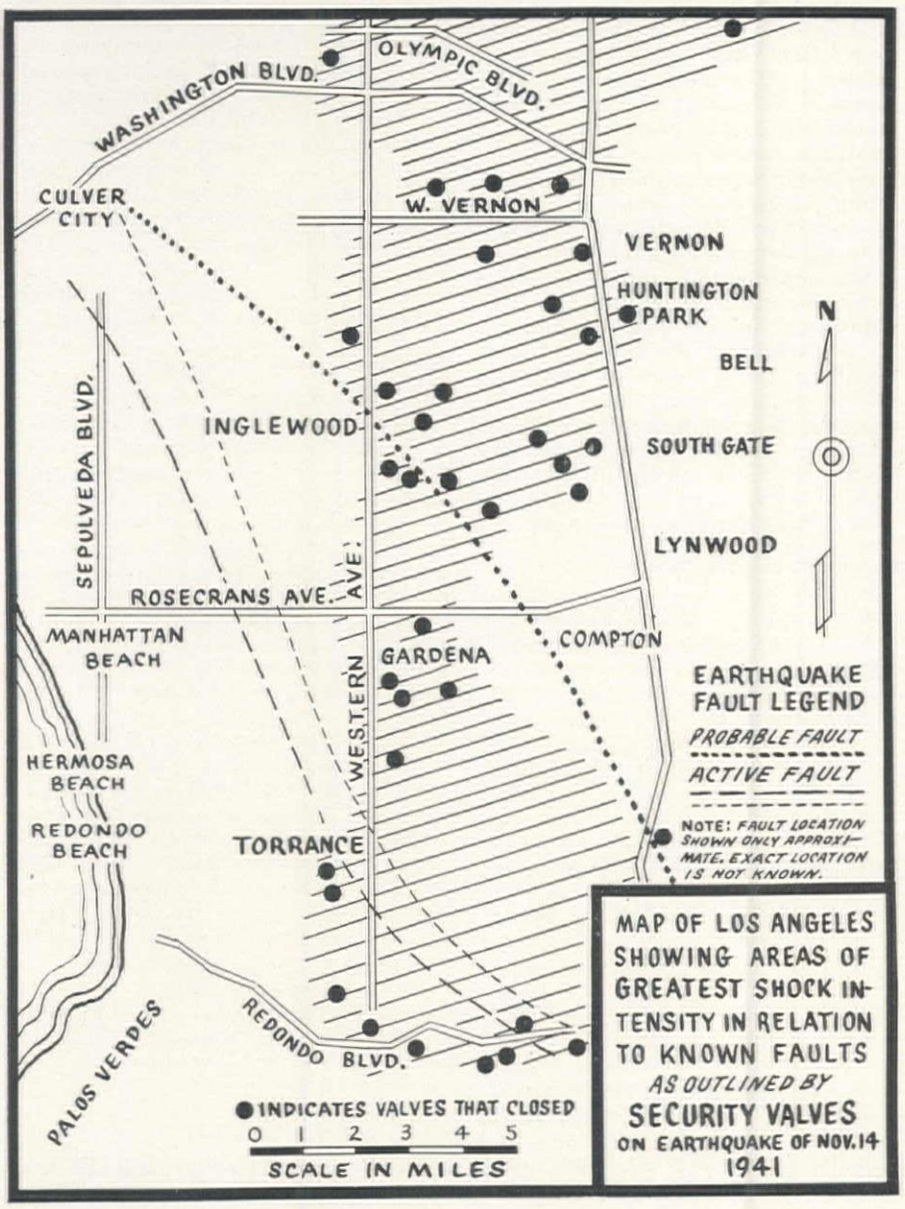
This project has been studied with a number of different solutions possible, ranging from a project which would call for ultimate large development to one very small in comparison and benefiting a very limited area. Likewise, these plans from the largest to the smallest, would involve construction ranging from $100,000,000 to $40,000,000. One of the plans includes: 1—A 400,000-ac.-ft. reservoir would be constructed on the Blue River near Dillon, on the western slope. A series of canals, small tunnels and siphons would carry this water some 12 mi. to the west portal of a 22-mi.-tunnel. This tunnel would be very similar in size to the Continental Divide tunnel. Its eastern portal would be in Clear Creek Canyon above Idaho Springs. From this point a series of canals, siphons and tunnels would convey the water by the way of Bergen Park and through the foothills west of Denver, along the west side

and in a southerly direction to the South Platte Canyon. 2—Just below Deckers, Colo., in the Platte Canyon, three large concrete storage reservoirs would be constructed. From this point, water would be distributed through a large canal running north and east through Douglas, Arapahoe and Adams•Counties in a northeasterly direction and terminating some 20 mi. east of Brighton.

Earthquake Valves in Los Angeles Indicate Area Affected by Shock

A NEW METHOD of determining the limits of areas affected by earthquakes, and the approximate intensity, was developed following a heavy earthquake which occurred in the Los Angeles, Calif., area on Nov. 14. Following the earthquake, and an earlier and somewhat lighter one which occurred on Oct. 21, the U. S. Coast and Geodetic Survey has compiled location maps of the affected area, which indicate where earthquake-operated gas shut-off valves were motivated by the shock. Automatic valves, consisting essentially of a round steel ball mounted on a cylindrical column, are designed to shut off gas lines when affected by a shock with an intensity of about 6. Valves of this type have been installed in nearly all schools in southern California. Following the relatively severe earthquake in the Los Angeles area on Nov. 14, a record was made of the valves that had been closed, forming a picture of the fault along which the shock moved, as well as an indication of the intensity. The U. S. Coast and Geodetic Survey has assigned an intensity of 7 to the shock which caused damage estimated between $500,000 and $1,000,000 in Gardena and Torrance.

AREA AFFECTED BY EARTHQUAKE INDICATED BY CLOSED VALVES



Permanente Corp. to Double Magnesium Plant Capacity

PERMANENTE CORP., Los Altos, Calif., has announced plans for expansion which will more than double the original capacity of 12,000 tons of magnesium annually. Construction is expected to begin immediately on an expansion of physical facilities, financed by a loan of $11,000,000 from the Reconstruction Finance Corporation.

Maintenance Priority Aid Given Irrigation Districts

SPECIAL PRIORITY assistance for scores of industries has been made available following amendments to Preference Rating Order P-22, covering repair, maintenance and operating supplies, it was announced by the Priorities Division of OPM at San Francisco, Calif. Terms of the order now include privately-owned irrigation systems, toll bridges and toll canals. Priority assistance is also granted to those using tools or equipment to repair or maintain the property of other producers. Complete details of the amendments are on file in the field offices of the Priorities Division at San Francisco, Los Angeles, Portland and Seattle.

Army Lays Plans to Film Camp Construction Work

PLANS are under way to make moving pictures of major Army construction projects in the Ninth Zone. A record of the $17,000,000 Camp Cooke project at Santa Maria, Calif., is expected to be of great interest not only to military personnel but to the public as well.

While moving pictures will be made first at Camp Cooke, a fully equipped station wagon will be sent to all parts of the Zone to record important and interesting construction activities. Cantonment housing is only one item under the jurisdiction of the Zone Constructing Quartermaster's Office. Ports of embarkation, ordnance plants, hospitals, dams, giant warehouses, firing ranges, motor repair shops and sports arenas are also a part of this wide-flung building activity.

The moving picture project is to be handled by the Public Relations Section of the Ninth Zone Constructing Quartermaster's Office.

San Diego Water Supply Improvements Planned

WITH THE APPROVAL of a $2,071,000 grant to San Diego for the construction of nine water supply projects, plans for the work are being rushed to completion under the direction of Fred Pyle, city hydraulic engineer. The largest project, estimated to cost $1,200,000, consists of laying a supplemental pipe line from El Monte pumping station to Murray reservoir, near La Mesa.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

Washington, D. C.—Unless the unpredictable happens, the law will be signed, before this is published, transferring all Army construction activities from Quartermaster Corps to Corps of Engineers. The House made only one change in the sweeping shift, it added a provision that officers and civilians permanently employed in the Construction Division of the Quartermaster Corps be transferred to the Corps of Engineers. The Senate accepted the change, and the law, as amended, was sent to the White House for the Presidential signature.

More Army construction

In November the President sent another message to Congress asking an additional appropriation of $7,000,000,000 for the Army. It is understood the total includes an item of from $1,600,000,000 to $2,000,000,000 for construction. There seems no secret about the plan to secure an increase of the Army next spring bringing the total up to 4,000,000 or 5,000,000. There is to be a further war budget appropriation of $38,000,000,000 early next year.

Many new bases obviously are already planned for shipping and planes; meaning more shipyards, depots, arsenals, airfields, industrial plants, and military works. Thirty ordnance plants are completed and 50 are scheduled for swift construction. They tell us here that considerably more than three-fourths of the construction program is yet to come.

Interdepartmental procurement

It is important to follow the legislation introduced by Senator Thomas of Utah. His bill, S. 2032, apparently a joint effort with Senator Reynolds which makes it an administration measure, will authorize one agency of the Federal Government to buy supplies, materials, equipment, services and work of any kind from any other Federal agency. This enables one agency to hire or contract the materials and services of another agency, if the work or the materials can be obtained more conveniently or more cheaply than it can be done by private non-Government agencies or persons.

The bill has been favorably reported out of the Senate Committee on Military Affairs. As a system of interdepartmental procurement by contract it opens many probabilities that warrant thought. Some members of Congress wonder what contractors think about it.

Construction Industry Conference

Construction Conference organized here by Stuart Fitzpatrick of the U. S. Chamber of Commerce early in November had little participation from the Pacific West but brought out several arresting ideas. Harvey Wiley Corbett, engineer and architect of New York, hammered home the idea that bombing and aircraft have permanently eliminated heavy structures in building, including skyscrapers and apartment houses. He declared buildings of the immediate future will weight one-third of the structure of the present.

Brick, stone and concrete will not be used. He anticipates walls will be 3 or 4 in. thick. He predicts manufactured synthetic materials will be used to make buildings which can be quickly put together of mass-produced, prefabricated elements. He thinks these buildings, produced like motor cars, will be taken apart as rapidly as they are put up.

M. N. Watson, president, Associated General Contractors, pointed out that Public Law 89, enacted by the 77th Congress, protects the contractor from damages if he is unable to fulfill contracts by reason of operation of priority orders which come to him bearing a higher order than the one he is unable to fulfill. "Co-operation," said Mr. Watson, "will be required of owners, architects and engineers in designing new projects with the minimum use of critical materials and the maximum use of substitutes, both on defense and non-defense construction.

"Co-operation will be required of contractors in adapting themselves to new materials and methods and developing new efficiencies. Co-operation will be required of material and supply manufacturers in developing substitutes, of labor in handling the substitutes, and of equipment manufacturers. And co-operation will be required of the Government so that the policies for use of scarce materials are administered intelligently so that an entire industry is not strangled for want, for example, of a few nails."

Replacement of equipment

The maintenance and repair priority order of OPM has been construed by John L. Haynes, chief of the Construction Division, to cover repairs and replacements and rehabilitation of all equipment used by contractors and others in the construction industry. The high A rating bestowed by Preference Order P-22 therefore may be used by contractors and others in the construction industry to secure maintenance and operating supplies to keep equipment in good condition.

OPM issued a statement declaring the construction industry will have a very active year in 1942. There may be a drop of 65 per cent in strictly non-defense construction, but it is pointed out the currently scheduled program for Government-financed industrial facilities exceeds $2,225,000,000; in January it will exceed $2,750,000,000; by next July, $4,000,000,000; and by January, 1943, approximately $5,000,000,000. Direct military construction next July is expected to total $6,500,000,000, and is expected to increase to $8,000,000,000 by 1943. Total defense construction by January is expected to reach $9,000,000,000; by July, 1942, $12,000,000,000; and in 1943, $15,000,000,000.

A permanent WPA

Rep. Jerry Voorhis, of California, has introduced the companion bill to S. 1833 introduced in the Senate last August by Sen. Thomas of Utah. The bills which are identical would make the WPA a permanent agency of the Federal Government, under the Federal Works Agency. Its chief purpose is to provide work for those otherwise out of employment, or unemployable, by constructing and financing Federal and non-Federal public works projects, and by aiding in similar work in States or partially supported by Federal funds.

Mr. Voorhis is frank in admitting he does not wholly support the bill. Apparently he introduced it at the request of some administration follower. It is not expected, however, this bill, or the Thomas bill, will be enacted. Similar objectives are aimed at in legislation under discussion by Sen. Bert Wheeler of Montana. The general idea here is that administration forces are leaning towards the Wheeler plan in order to dilute Wheeler's enthusiasm for non-intervention. The effect of the Wheeler proposals would virtually accomplish the result of the Thomas-Voorhis bill.

Defense Plant Corp. has authorized Columbia Steel Co. to establish a new steel plant at Pittsburg, Calif., capable of turning out 500,000 tons a year of plate and 30,000 tons steel castings. DPC also has provided $22,000,000 for an aluminum plant to produce 60,000,000 pounds annually at Fairview, Ore.

Defense highway bill signed

FDR signed the Defense Highway Act. But he protested the authorization of $50,000,000 for the strategic network of highways and bridges, implying they are entirely superfluous for defense. He asks that the authorization be deleted in the future, and hints that he might veto any appropriation making the authorization effective. It will be remembered half this sum would be allocated in accordance with regular Federal aid practices while the rest would be spent by FWA without regard to allocations or state lines.

The law increases Federal aid from 50% to 75%, provides $150,000,000 for access roads, $10,000,000 for surveys and plans, and $10,000,000 for airplane flight strips. Lt.-Col. Stedman S. Hawks, Air Corps, is to be the expert to work with the Public Roads Administration in building the flight strips. State Highway Departments are expected to handle the jobs.

Another highway project has been financed by RFC to the tune of $30,000,000, from Nogales, Mexico, to Guadalajara. The Mexican Government is to receive $10,000,000 a year.

Rivers and Harbors bill

The Rivers and Harbors Bill HR 5993 was reported out of Committee late in

November. The bill represents a total of projects amounting to $987,000,000. While the projects undoubtedly will be authorized, appropriations will not be made for most of them until the end of the war. In the Pacific West beneficiaries will undoubtedly get more immediate action. Most of the Western projects have some bearing on defense.

The St. Lawrence Seaway project, however, is included, and may be validated. It is expected as soon as the bill finally clears the House the Columbia Power Authority bill will come before the Rivers and Harbors Committee early in December. This right of way for early consideration was finally arranged by Administration forces by reason of the introduction of the President's bill, HR 6076.

In a special message, the President sent to Congress a supplemental estimate for an appropriation of $1,830,000 to initiate improvement of the Burbank-Western system of flood control in the Los Angeles River Valley. This is part of the Los Angeles and San Gabriel Rivers and Ballona Creek flood control plan. The Burbank-Western system is urged at this time by the Air Corps as of prime importance to national defense to protect the Lockheed and Vega plants in Burbank. Roosevelt gave notice that $2,290,000 more would immediately be needed in fiscal year 1943, next June.

In process also is an appropriation of $500,000 for bridges in Alaska on the Palmer Richardson Road. Another special message asks for $30,000,000 to construct, operate and maintain Bonneville power transmission lines, needed quickly to supply power as soon as possible.

Approved Defense Public Works Projects

Location	Type of Work	Estimated Cost
Arizona		**$.. 168,695.**
Fry	Recreation Center	82,195 F
Tucson	Recreation Center	50,000 F
Tucson	Health Center	36,500 NF
California		**$6,086,719**
Alisal Sanitary Dist.	Sewerage	356,134 NF
Artesia	School Addition	49,000 NF
Bakersfield	Recreation Center	3,600 F
Burbank	Recreation Center	75,000 F
Chula Vista	Recreation Center	45,000 F
Chula Vista	School	107,114 F
Downey	School Addition	73,127 F
Escondido	School	37,674 F
Fresno	Recreation Center	15,600 F
Inglewood	Recreation Center	75,000 F
King City	Recreation Center	45,000 F
La Jolla	Recreation Center	45,000 F
Lancaster	Recreation Center	45,000 F
Lemoore	Recreation Center	45,000 F
Lompoc	Sewerage	110,407 F
Monterey	Recreation Center	75,000 F
National City	School Addition	86,900 NF
National City	Recreation Center	45,000 F
North Sacramento	Recreation Center	10,000 F
Paso Robles	Water Supply Improvements	42,300 F
Paso Robles	Recreation Center	91,000 F
Paso Robles	Sewerage	49,000 F
Richmond	Recreation Center	35,000 F
Riverside	Recreation Center	16,000 F
Salinas	Hospital Facilities	527,606 NF
Salinas	Sewerage	391,000 NF
San Diego	Water Supply Improvements	2,071,000 NF
San Diego	Recreation Center	114,500 NF
San Luis Obispo	Water Supply Improvements	338,100 F
San Luis Obispo	Health Facilities	122,477 F
San Luis Obispo	Recreation Center	68,000 F
San Miguel	Recreation Center	95,750 F
San Miguel	School	23,327 F
San Miguel	Sewerage System	143,000 F
San Miguel	Water Supply Improvements	27,716 F
San Rafael	Recreation Center	45,000 F
Santa Monica	Recreation Center	20,000 F
Sausalito	Recreation Center	20,480 F
Stockton	Recreation Center	20,000 NF
Taft	Recreation Center	45,000 F
Vallejo	Recreation Center	120,407 F
Vallejo	Sewerage Facilities	270,500 NF
Victorville	Recreation Center	45,000 F
Colorado		**370,300**
Arapahoe County	School Addition	17,500 NF
Denver	Recreation Center	3,800 NF
Denver	School	189,000 NF
Denver	Recreation Center	15,000 NF
East Mesa Sanitary Dist.	Sewerage System	48,700 F
Minnequa Heights Sanitary Dist.	Sewerage System	96,300 F
Idaho		**45,000**
Boise	Health Clinic	45,000 F
Nevada		**152,757**
Hawthorne	Recreation Center	45,000 F
Hawthorne	School Addition	17,180 NF
Hawthorne	Sewers	45,577 NF
Las Vegas	Recreation Center	45,000 F
Oregon		**173,392**
Astoria	Recreation Center	45,000 F
Hammond	Recreation Center	4,200 F
Hermiston	Recreation Center	36,050 F
Hermiston	School Addition	8,360 NF
Hermiston	School Addition	3,000 NF
Pendleton	Recreation Center	28,000 F
Seaside	Recreation Center	3,250 NF
Stanfield	School Addition	19,090 F
Warrenton	School Addition	26,442 NF
Utah		**173,000**
Ogden	School Addition	173,000 NF
Washington		**2,010,559**
Bremerton	Recreation Center	150,000 F
Bremerton	Incinerator	92,400 NF
Bremerton	Hospital	661,760 F
Coupeville	School	150,000 NF
Everett	Recreation Center	36,300 F
Ft. Townsend	Recreation Center	45,000 F
Kirkland	Sanitary Sewers	240,000 NF
Kitsap County	Combined Sewers	154,255 F
Olympia	Recreation Center	75,000 F
Pleasant Valley	School Addition	22,000 NF
Poulsbo	School	175,000 NF
Silverdale	School Addition	68,959 NF
Tacoma	Recreation Center	139,885 F
Wyoming		**138,000**
Cheyenne	Recreation Center	8,000 F
Cheyenne	Recreation Center	130,000 F
Alaska		**572,238**
Anchorage	Health Center	35,000 F
Anchorage	Recreation Center	125,000 F
Anchorage	Water Supply	68,510 F
Anchorage	Water Supply	196,490 F
Fairbanks	Recreation Center	20,000 NF
Ketchikan	Health Center	40,000 NF
Ketchikan	Recreation Center	22,500 NF
Seward	Recreation Center	5,000 F
Sitka	Sewerage	40,410 NF
Sitka	Sewerage	19,328 NF
Hawaii		**325,000**
Oahu Island	Recreation Center	325,000 F

Total—93 Projects $10,215,660

Federal Construction 61 Projects.....$4,899,814
Non-Federal Construction 32 Projects $5,315,846

Jobs—Coming and Going . . .

Bridges

Construction of a $550,000 viaduct between Sacramento, Calif., and North Sacramento is proceeding after a delay of several weeks due to a lack of reinforcing steel.

Estimates for the construction of three bridges in Long Beach, Calif., have been set at a total of $1,300,000.

H. G. Weeks, transportation engineer, has recommended against entrance into the transportation business by the California Toll Bridge Authority, operating agent of the San Francisco-Oakland Bay Bridge.

The temporary bridge built by the U. S. Navy in Los Angeles Harbor was completed and opened to traffic late in November.

Dams

A shut-down on Shasta and Keswick dams in northern California was threatened when the engineers and operators' union staged a one-day walk out at the Columbia Construction Co. aggregate plant in protest against operating conditions.

For the second time all bids submitted for the construction of Granby Dam on the Colorado-Big Thompson project were rejected by the Bureau of Reclamation.

San Diego will probably make a second effort to secure bids under $60,000 for strengthening San Dieguito dam.

Caddoa, Colo., situated within the reservoir site of John Martin Dam, will be moved by Jan. 1 to a new location at the south abutment of the dam.

Fern Ridge Dam, first unit to be completed in the $69,000,000 Willamette Basin Project, was formally dedicated on Nov. 1.

Atkinson & Kier poured the first bucket of concrete in the $12,000,000 Keswick dam on Nov. 14.

A 65-ft. fill on the Arroyo Seco Freeway extension through Elysian Park in Los Angeles will be constructed as an earthfill dam, and serve as a reservoir for the city water supply system as well as a highway.

Highways

New Mexico issued $1,000,000 of highway debentures for financing state highway construction projects.

Colorado has spent $75,358,628 on highway construction and maintenance during the past five years.

Supervisors of Cochise County, Ariz., have asked that a new short-cut from Bisbee to Fort Huachuca be placed in the state highway system.

Work on the Lodi-Rio Vista, Calif., highway is more than 60 per cent complete, with Clyde Wood engaged on a $330,000 grading contract and the Tavares Construction Co. on a $370,000 swing bridge.

Union Paving Co. has been awarded a $324,549 contract for widening the last section of El Camino Real between Redwood City and Palo Alto, Calif.

U. S. Highway 70, between Roswell and Clovis, New Mex., was closed to traffic by high water when several uncapped artesian wells started flowing following heavy rains.

Northwestern Engineering Co. has shut down for the winter its 9½-mi. grading and bituminous surfacing job in Washakie National Forest, Wyo.

Paving liens against property owners in Albuquerque, N. Mex., were cancelled when the district court ruled that the liens were subject to the statute of limitations.

Irrigation

Morrison-Knudsen Co., Inc., and M. H. Hasler, who recently completed the second 20-mi. section of the Coachella branch of the All-American Canal, were low bidders at $2,539,500 for construction of the third section of 22 mi.

Henry L. Horn has been awarded a $217,784 contract for 8½ mi. of the Yakima Ridge Canal in Washington.

Tunnels

Lining of the 15,000-ft. Alpine-Draper Tunnel on the Provo River Project in Utah has been completed by Thompson-Markham.

Allied Engineering and Shipbuilding Corp. and the Tavares Construction Co., Los Angeles, have been awarded a $3,000,000 contract by the U. S. Maritime Commission for the construction of five 350-ft. concrete barges at a yard in National City, Calif.

The Platt Rogers Construction Co. has been awarded a $283,180 contract by the Bureau of Reclamation for driving a combination diversion and outlet tunnel at Granby Dam for the Colorado-Big Thompson Project.

A gunite lining in the Tulelake Tunnel on the Klamath Project (Oregon-California) has been completed by J. A. Terteling & Sons.

Pacific Bridge Co. has been awarded an $8,550,000 contract by the U. S. Maritime Commission for construction of 9 small cargo vessels at the company's yard in Alameda, Calif.

Sewerage

The city council of Napa, Calif., will apply to the Federal Works Agency for assistance in financing a proposed $375,000 sewage disposal plant.

Plans and specifications have been approved, and a $195,000 grant accepted, for construction of sewer facilities in the Alisal district of Salinas, Calif.

The Los Angeles County Flood Control District has been granted a priority rating which will permit immediate construction on the first unit of the $1,200,000 Sawtelle-Westwood storm drain.

Waterway Improvement

Recent floods in New Mexico caused damage in Roswell estimated at $750,000.

Dredging of the Los Angeles River outlet has been delayed several months due to the inability of the Standard Dredging Corp. to secure delivery of the special steel required for dredging pipe.

Parker-Schram has just completed the $600,000 flood control project on Deer Island in the Lower Columbia River.

Columbia Construction Co. has completed 6,500 ft. of the north jetty at Grays Harbor, Wash., and expect to complete the remaining 1,200 ft. by next March.

Mercer-Fraser Co. began construction of a naval base at Morro Bay, Calif., following formal dedication of the project on Nov. 16.

Channel improvement on the Snake River between Lewiston, Ida., and the river mouth will be undertaken soon by the U. S. Engineer Department.

Water Supply

The Las Vegas Land and Water Co. will make improvements estimated to cost $15,000 to the water supply facilities in Las Vegas, Nev.

Hyde Forbes, consulting engineer of San Francisco, has been retained by the War Department to prepare plans for a $250,000 supplemental water supply system at Ford Ord, Calif.

After two months deliberation, the Fresno city commission awarded a contract for 21,500 ft. of cast iron pipe, similar to that which has always been used in the water system, and thereby eliminated suggestions that other types of material be used.

Contract Awarded for Largest Wind Tunnel

PITTSBURGH - DES MOINES Steel Co. has been awarded a $5,202,320 contract by the national advisory committee for aeronautics for the construction of the world's largest wind tunnel at the Ames Aeronautical Laboratory adjoining Moffett Field, near Sunnyvale, Calif. Preliminary work on the tunnel was started during November, but it is expected that actual construction on the site will not begin until spring. The steel will be prefabricated in the East and shipped to Sunnyvale for erection. The tunnel will cover 10 ac. of ground and will be 900 ft. long by 400 ft. wide, and a maximum height of 200 ft. A construction period of 900 days will be allowed for completion of the contract.

Investigate Feasibility of Alternate S. F. Bay Bridge

A JOINT INVESTIGATING board made up of members from the Army and Navy are contemplating a report on the necessity for construction of a bridge to cross San Francisco Bay between Hunters Point on the San Francisco peninsula and Bay Farm Island near Alameda. The investigation was undertaken as a result of a congressional resolution passed last spring. Construction of a bridge to serve as an alternate route in case of damage to the San Francisco-Oakland Bay Bridge has been advocated by various civic organizations.

West Yellowstone Camp Planning Is Reduced

ORDERS have been received from the War Department to discontinue plans for a triangular division camp at West Yellowstone, Mont., and to start plans for a garrison of only one reinforced regiment. In compliance with this order, planning at the site will now be on the basis of a garrison for only approximately 5,000 men, instead of the approximately 35,000 previously contemplated.

Shanley Van Teylingen & Henningson, architect-engineers, who have been conducting pre-planning surveys in the area on the basis of a triangular division and attached troops, have been instructed to curtail their force.

Dam on Colorado Needed to Power Magnesium Plant

DEWEY DAM may be constructed by the Bureau of Reclamation on the Colorado River if the Utah Magnesium Corp. decides to undertake construction of a magnesium refining plant near Thompson, Utah. The company has been testing deposits of magnesium chloride in a 6,000-ac. area about 30 mi. from the site of the proposed dam between Grand Junction, Colo., and Moab, Utah. Present plans of the Bureau of Reclamation contemplate a concrete structure 300 ft. high, impounding about 6,000,000 ac. ft. of water, and capable of generating 160,000 kw. of hydroelectric power. The total estimated cost of the dam and power plant is about $30,000,000.

Magoffin Sets Record Driving Divide Tunnel

S. S. MAGOFFIN CO., contractor at the east portal of the Continental Divide tunnel for the Colorado-Big Thompson Project, established a new record for western tunnel driving when progress of 74 ft. was reported in a 24-hr. period ending at 8 p.m. on October 10. At that time, the 13-mi. tunnel had been driven 16,700 ft. in from the east portal. Construction of the tunnel is under the supervision of the Bureau of Reclamation.

Second Hand Bridges Solve Steel Shortages

TWO STATE HIGHWAY departments—California and Idaho—have at least partially solved the difficulty of securing steel for bridges by utilizing second hand structures at new locations. The California Division of Highways dismantled a 200-ft. steel bridge on U. S. 101 near Sargent's with the intention of remodeling the structure to a 160-ft. span and re-erecting it on the Sunol-Dublin road, where it will replace a wooden bridge across the Arroyo de la Laguna.

A wooden bridge across the Potlatch River above Kendrick, Ida., was replaced by a 90-ft. steel pony truss which had formerly carried state highway No. 10 across Pine creek, near Kellogg. The structure had been replaced in 1938, and when it was found impossible to secure steel for the Potlatch bridge, the old structure was dismantled, hauled 160 mi. and re-erected on new concrete piers.

OBITUARIES . . .

Edwin W. Kramer, 64, widely known San Francisco engineer and a member of the State Defense Council, died Oct. 31 after a short illness. He recently collaborated on the planning and design of the Central Valley project, now under construction by the Bureau of Reclamation. During his career he made numerous contributions to California hydroelectric development. In 1936 Kramer became regional director of the Federal Power Commission in San Francisco. He had served for almost 30 years before this with the U. S. Forest Service, starting as construction engineer in Montana, later to become director of all engineering for the Forest Service in California.

* * *

James J. Gwyn, 83, retired chief engineer of the Denver and Rio Grande Western railroad, died Oct. 25. Born in Louisville, Ky., he went to Colorado at the age of twenty as a member of the Army Engineering Corps. In 1879 he joined the engineering forces of the Denver and Rio Grande Railroad Co. and for the next three years did location and construction work in southern Colorado and New Mexico. From there he went to Laredo to work on the Tampico branch of the Mexican Central. Before he returned to Mexico several years later to work on the location and construction of the Cuernavaca and Pacific Railway, he was in charge of the reconstruction and standard gauging in the Royal Gorge in Colorado. Following his return, Gwyn worked on numerous railroad jobs in the West, including among others the Beckwith Pass-Feather River route in California. He became chief engineer of the Rio Grande system in 1908, after serving for a period as assistant chief engineer. Before retiring in 1923, after a long illness, he supervised among other major projects the detour double track and later the yard at Soldier Summit. During the rehabilitation program from 1923 to 1928, Gwyn served as a consultant to the President on major works of the reconstruction period. In 1933, at the age of 75, he was placed in charge of the Dotsero Cutoff, the heaviest piece of railroad work ever built in Colorado.

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W. T. Jacobsen, secretary-treasurer of the Jacobsen-Jensen Co. of Portland, Ore., died of a heart attack September 6. He was one of the organizers and charter members of the Portland Chapter of the Associated General Contractors of America, and had served as president and director.

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George W. Conners, 70, surveyor and road contractor of Santa Rosa, Calif., died recently from a stroke of paralysis.

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Robert F. Brown, 45, engineer with the California Water Service Co., San Jose, was killed Oct. 29 in an automobile accident near Santa Cruz. For several years prior to his death, Brown was manager of the Stockton water system.

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Charles M. Thomas, 76, former city engineer of Burlingame, Calif., died recently after a long illness.

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Carl Nyberg, Spokane contractor, died recently from injuries suffered in an automobile accident near Libby, Mont.

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William A. Roberts, Spokane, Wash., died recently at Hamilton, Mont., where he was superintending a road construction project for Clifton & Applegate and Henry Georg of Spokane. Roberts was born at Sparta, Wis., and had been connected with the Clifton & Applegate organization for the past 15 years. He had been engaged in construction work in the Pacific Northwest for more than 33 years.

Shasta Dam Will Be 602 ft. High

SHASTA DAM'S official maximum height from the bedrock foundation to the roadway on top will be 602 ft., according to an announcement by the Bureau of Reclamation, following completion of the lowest excavation in the Sacramento River. Sound bedrock was reached about 100 ft. below the former river bed, at El. 475.5 at the deepest point, which was found to be in Block 41-A (see *WCN*, May, 1938) in the spillway section near the upstream heel of the dam. The top of the dam is to be at El. 1,077.5 and the difference will make Shasta the second highest dam in the world by a wide margin over Grand Coulee which is third at 550 ft. Tallest of all is Boulder Dam at 726 ft.

The first concrete was poured Nov. 14, on the lowest bedrock in the spillway section, and the total yardage placed to date in the dam is 2,210,000, a little over one-third its ultimate mass. The contract for construction of Shasta Dam and Power Plant, held by Pacific Constructors, Inc., is 62 per cent complete.

Pine Flat Dam Planned As 402-ft. Concrete Structure

PRELIMINARY PLANS for the proposed Pine Flat dam on the Kings River, east of Fresno, Calif., indicate that the structure under consideration is a gravity concrete dam about 420 ft. high, with a crest length of 1,725 ft. The estimated cost has been reported by the Bureau of Reclamation as $19,000,000.

Highway Contractors of Colorado Join A.G.C.

THE COLORADO Association of Highway Contractors, with headquarters at Denver, has been granted a charter as a chapter of the Associated General Contractors of America. The membership of the newly affiliated chapter includes 50 of the leading contractors engaged in highway and heavy construction work in Colorado and surrounding territory. Charles B. Berry is president of the Colorado Association for 1941, and James B. Kenney has been manager and director for a number of years.

NEW BOOKS...

STEEL PRODUCTS MANUAL—CARBON STEEL PLATES—Section 6—Published by American Iron and Steel Institute, 350 Fifth Avenue, New York, New York. 68 pages, 6x9. Price 25 cents.

A revision of the April, 1938, issue of the same manual section, this publication defines and classifies carbon steel plates in accordance with the latest practices. The manual includes a brief description of ordinary manufacturing processes, special manufacturing processes, standard methods for sampling, permissible variations for dimensions and workmanship, and a glossary of terms. The last half of the manual consists of standard specifications as set up by various groups. Included are standard specifications for steel for bridges, buildings, mild steel plates, structural steel for locomotives and cars, carbon steel plates for stationary boilers and other pressure vessels, all from the American Society for Testing Materials; and specifications for steel, boiler and fire-box for locomotives from the Association of American Railways.

* * *

STEEL PRODUCTS MANUAL—WROUGHT STEEL WHEELS—Section 20—Published by the American Iron and Steel Institute, 350 Fifth Ave., New York, New York. 66 pages, 6x9. Price 25 cents.

Revised from the earlier issue of March, 1938, this section of the manual presents standard designs and standard specifications for wrought steel wheels, as established by the mechanical division of the Association of American Railroads. It describes briefly methods of manufacture, and includes recommendations for permissible wheel loads for various classes of wheels.

* * *

BOULDER CANYON PROJECT—PART IV—DESIGN AND CONSTRUCTION — Bulletin 1—General Features—Published by the Department of the Interior, Harold L. Ickes, Secretary. Orders may be addressed to the Bureau of Reclamation at either Denver, Colo., or Washington, D. C. 300 pages 6¼ x9 ¼. Price $1.50 for paper bound copy, or $2.00 for coth bound copy. For distribution in foreign countries, the prices are slightly higher.

Eleventh of the contemplated final reports on the Boulder Canyon Project, Bulletin 1 of Part IV covers the general design and construction features of the Boulder Canyon Project. The report covers preliminary investigations, development of the designs for Boulder Dam, construction of facilities prior to beginning of work on the dam, features of the construction plant at the dam site, design and construction of the dam, penstocks, outlets and spillways, the power plant, architectural features of the project, and Lake Mead. The bulletin also includes some material covering parts of the project removed from Boulder Dam, including a description of Imperial Dam, the desilting works, and the All-American Canal system. Drawings and photographs illustrate design features, construction activities, and the completed structures. A bibliography includes references to some of the more important published articles and reports on the Boulder Canyon Project.

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BOULDER CANYON PROJECT—Part IV—BOULDER DAM—Design and Construction—Published by the Department of the Interior, Harold L. Ickes, Secretary. Orders may be addressed to the Bureau of Reclamation at either Denver, Colo., or Washington, D. C. 253 pages, 6¼ x 9¼. Price $1.50 for paper bound copy, or $2.00 for cloth bound copy. For distribution in foreign countries, the prices are slightly higher.

Twelfth in the series of complete reports on the Boulder Canyon Project, Bulletin 2 of Part IV is devoted entirely to Boulder Dam. The introduction discusses a scope of the bulletin, selection of the site, preliminary design, construction schedule, and costs. It also includes a bibliography of references to some of the more important published articles and reports. Chapter II is devoted to the design of the dam, including such details as access facilities, drainage system, seals, electrical and mechanical features, and measuring equipment. The remainder of the bulletin is devoted to a discussion of the construction procedure, including the excavation of foundation and abutments, grouting of foundation and abutments, concreting, cooling of the concrete, and contraction joint grouting. Many of the design and construction features are illustrated by detailed drawings and by photographs.

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TRADE STANDARDS — Published by Compressed Air Institute, 90 West St., New York, New York. 110 pages, 8½ x 11. Price $1.50, plus postage.

The fifth edition of Trade Standards, prepared by the Compressed Air Institute, was issued late in 1938, and is intended as an authoritative summary of nomenclature and terminology relating to air compressors. In addition to definitions, nomenclature, standards and data, the book describes in detail reciprocating compressors and vacuum pumps, rotary displacement compressors, blowers and vacuum pumps, centrifugal compressors and blowers, compressor accessories, portable compressors, rock drills and accessories, and pneumatic tools and accessories. Section 7 of Part I includes a comprehensive discussion of the cost of compressing air, including costs of various types of fuel, air friction losses, and other factors affecting compressor operation.

* * *

WELDING PROCEDURES—Published by Air Reduction, New York, New York. 54 pages, 8½ x 11. Price 60 cents.

Recommending welding processes and filler metals for welding with all types of metals and metal alloys, this book is intended to give the welding operator the latest information and new techniques of welding. Grouped under the more commonly used metals are (1) recommendations for the best process to be used under various circumstances for the particular metal; (2) recommendations of filler metals for each process; and (3) a large number of hints and descriptions of specialized techniques not commonly known. The book also contains a number of blank sheets which may be used for keeping comparable welding records on various jobs.

PERSONALLY SPEAKING

Glenn L. Enke, for ten years bridge designer with the California Division of Highways, has resigned to join the staff of **Donald R. Warren,** consulting structural and civil engineer of Los Angeles. As engineer of design for the state, Enke recently prepared the plans for the $3,500,000 vertical lift bridge across the Cerritos Channel from Long Beach to Terminal Island. Before this he was with the American Bridge Co. at Gary, Ind., and with Giffels and Vallet of Detroit, Mich. A graduate of the University of California, he is a registered structural engineer.

* * *

Capt. Robert C. Kyser, executive officer the past year on staff of the constructing quartermaster for Ogden and vicinity, has been transferred to Washington, D. C., as assistant to the chief of water transportation of the war department. Before coming to Ogden, Capt. Kyser, a graduate of the United States military academy at West Point, was stationed in the Panama Canal zone as constructing quartermaster in charge of a $4,000,000 army construction program.

* * *

Thomas W. Parry, formerly district conservationist with the Bureau of Reclamation, has been promoted to the position of field supervisor in the division of operation and maintenance. **Jack W. Rodner,** formerly with the soil conservation service of the Department of Agriculture at Yakima, Wash., has been named soil and moisture district conservationist in charge of Region IV, covering the Southwest. He is stationed at the headquarters of the division in Denver.

* * *

Second Lieut. Robert L. Trout, son of Glen H. Trout, bridge engineer for Union Pacific with headquarters at Omaha, Neb., and formerly employed by the Union Pacific and various Utah electrical firms, is in charge of the construction of about 50 mi. of railroad at the Ogden General Depot and the Ogden Ordnance Depot, costing approximately $2,000,000.

* * *

Frank D. Cannon, safety engineer for the Waterfront Employers of Portland, Ore., for 13 years, has been promoted to a similar position with the Waterfront Employers of Southern California, with offices at San Pedro. He will be succeeded by **Max Twermos,** assistant to **Byron O. Pickard,** chief safety engineer in San Francisco. Cannon succeeds **E. J. Baird** at San Pedro. The latter has been promoted to a new position in the same port.

* * *

Capt. Rulon J. Ballard, formerly in charge of power plant design for the Utah Power and Light Co., is executive officer at the Utah Ordnance Plant at Salt Lake City, on the staff of the constructing quartermaster for Ogden and vicinity. He is a graduate of the school of engineering of the University of Utah.

CAPT. RULON J. BALLARD is executive officer at the Utah Ordnance Plant at Salt Lake City, Utah, on the staff of the constructing quartermaster for Ogden and vicinity.

* * *

Morrough P. O'Brien, chairman of the Department of Mechanical Engineering at University of California and chairman of the Federal Erosion Board, and **A. L. Sondregger,** consulting engineer of Los Angeles, Long Beach and Newport Harbors, have been retained by the city of Seal Beach as consultants for the $198,700 Anaheim Bay protection and improvement program.

* * *

Morris Hayes and **Richard D. Spearman,** until recently assistant engineer and inspector, respectively, for the Metropolitan Water District of Southern California, have resigned to join the firm of Leeds, Hill, Barnard, and Jewett, consulting engineers of Los Angeles, Calif. They are engaged in national defense work at San Luis Obispo, Calif.

* * *

John L. Savage, chief designing engineer for the Bureau of Reclamation, has been awarded one of the highest honors of the American Society of Civil Engineers by the addition of his name to the roll of honorary members of the Society. Except for a period of eight years when he was associated with A. J. Wiley in consulting work, Savage has spent his entire engineering career in the Bureau of Reclamation organization. Since 1924 he has been chief designing engineer in charge of office work on some of the greatest engineering projects ever conceived.

* * *

Mark Falk, consulting structural engineer of Los Angeles and president of the Structural Engineers' Association of Southern California, has been appointed as a member of the State Board of Registration for Civil Engineers. He replaces **Julian Hinds,** general manager and chief engineer of the Metropolitan Water District of Southern California. Falk will serve until Jan. 15, 1943.

* * *

Capt. John L. Holbrook, formerly assistant constructing quartermaster at a $2,500,000 forty-warehouse construction project at Ogden Ordnance Depot, has transferred to the operating staff of Lt. Col. William Mays at Utah General Depot in Ogden. A former employee of the Utah State Road Commission, Capt. Holbrook will act as utilities officer on the staff.

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Lt. Col. Lacey V. Murrow, formerly Washintgon state highway director, has been appointed acting deputy chief of staff of the Second Air Force, with headquarters at Spokane, Wash. He has been assigned the supervision of construction, supplies and evacuation in the eleven western states which comprise the territory of the Second Air Force.

* * *

Harry N. Jenks, consulting sanitary engineer of Palo Alto, Calif., has been retained by the city council to make a survey of the city's sewage disposal situation. The survey will require about three months. Jenks will also aid the city council in planning to finance needed work in the city's $450,000 system.

* * *

George W. Howson, engineer with the Bureau of Reclamation, has been assigned to work on further engineering studies of the proposed Kings River project 30 mi. east of Fresno, Calif. He will work under the administrative supervision of R. S. Calland, district engineer of Sacramento.

* * *

J. M. Montgomery & Co., newly organized consulting engineering firm, has been retained by the Defense Plant Corp. to prepare the plans and specifications for power and water supplies for the Basic Magnesium, Inc., plant near Las Vegas, Nev. The job is estimated to cost $7,000,000.

* * *

J. W. Hamilton, for the past 24 years a Washington state highway department official, resigned his post recently and

will be succeeded by **George A. Mason.** Hamilton was district highway engineer at Olympia from 1935 to the time of his resignation. From 1919 to 1928 he was district engineer at Olympia, and then for seven years was state maintenance engineer. Mason was assistant district engineer since 1929. Prior to 1920 he was with the department in other capacities.

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Brig. Gen. Philip B. Fleming, Federal Wage-hour Administrator, has been nominated for the position of Federal Works Administrator. Fleming would succeed John M. Carmody, who has been nominated for membership on the Maritime Commission.

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C. R. Haden, formerly project engineer at Federal Terrace near Vallejo, Calif., is now stationed at Denver, Colo., where he is in charge of Defense Public Works projects in Colorado, New Mexico, Utah, Idaho, and Wyoming. **V. L. Logan** succeeds him as project engineer at Federal Terrace.

* * *

Raymond T. Sande has resigned from the Idaho State Highway Department to accept a position with Shanley Van Tevlingen & Henningson Co., which is engaged in surveys and preparation of plans for the Army cantonment project at Henry's Lake, near West Yellowstone, Mont.

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D. K. Woodin, formerly with the Metropolitan Water District of Southern California, has taken a temporary appointment as testing engineer at San Vicente Dam, being built by the city of San Diego, Calif.

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Eugene H. Merrill, chief engineer of the Utah public service commission for the last six years, has resigned to become senior industrial analyst in the division of power of the OPM at Washington, D. C.

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Karl J. Drus, for the last year and a half technical adviser on the construction of Fern Ridge and Cottage Grove Dams at the area office in Eugene, Ore., is now designing engineer in the district engineer's office of the U. S. Engineers.

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Tom R. Pearce, county surveyor of Josephine County, Ore., has been appointed county engineer.

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Alfred D. Coons, resident engineer at the College of Agriculture at Davis, Calif., has been appointed city engineer of Davis.

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Woodworth and Cornell, contractors of Tacoma, Wash., have announced a change in the name of their firm. Hereafter the firm, located at 1200 East D St., will be known as Woodworth & Co., Inc.

SUPERVISING THE JOBS

C. C. DeArmond is superintendent of divisions upper 5, 6, and 7 at Camp Cooke on the Santa Maria-Lompoc Project, Army cantonment being built on Burton Mesa, south of Santa Maria, and 5 miles north of Lompoc, Calif. **Earl Schoonover** is general foreman. MacDonald & Kahn, Inc., San Francisco, and J. F. Shea Co., Inc., were awarded the contract on a low bid of $17,382,821.

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Oscar Erickson, superintendent for Ford J. Twaits, Los Angeles, Calif., is in charge of construction of landing strips, runways and taxiways and additional building at Mather Field, east of Sacramento, in Sacramento County, Calif. **A. W. Schoolmaster** is office manager and estimator, and **W. W. Price, Jr.,** is field engineer for the supplemental contract awards of $875,031 and $1,102,286.

* * *

H. B. Berky is in charge of concrete structures on the Yakima Ridge Canal, Roza Division, Yakima project for Barnard-Curtiss Co., Minneapolis, Minn., who was awarded the contract on a low bid of $149,422. Until recently Berky was employed on the construction of Willow Creek Dam at Augusta, Mont., completed October 11, where the government is now storing water for next year.

* * *

Sherman W. Gibbs is engineer and general superintendent for the construction of two jetties and a bulkhead for the U. S. War Department at the entrance to Bodega Bay, Sonoma County, Calif. **Bernard Piombo** is in charge of quarry operations, and **Jim S. Hawkins** is to be in charge of jetty operations. The contract was awarded to Piombo Brothers & Co., San Francisco, Calif., on a low bid of $307,700.

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Kenneth Scheyer is supervising construction of runways and landing mat and additional facilities at Fresno Air Base in Fresno, Calif., for N. M. Ball Sons, Berkeley, Calif. **Leonard Ball** is office manager, **Art King** is concrete foreman, and **Erwin Bloomfield** is subgrade foreman on the $320,105 supplemental award contract.

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Gilbert E. Marshall is superintendent, **R. H. Hoffner,** foreman, **Howard Walters,** surfacing superintendent, and **Roger Hanson** is office manager for 12 mi. of surfacing, oiling and construction of drainage structures on Sec. A and B of the Harlowton-Moore Road in Judith Basin and Fergus Counties, Montana. The contract was awarded to S. H. Arkwright, Inc., Great Falls, Mont., on a low bid of $98,644. The same men are in charge of 8.5 mi. of grading, surfacing and constructing drainage structures on Sec. A of the Baker-Ekalaka Road in Fallon County, on a $80,678 contract.

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W. J. Porter has been appointed superintendent for highway construction on Stevens and Ferry County roads, Columbia River Reservoir, on the Columbia Basin project. Roy L. Bair Co., Spokane, Wash., was awarded the contract on a low bid of $112,510. **Robert Crick** and **C. A. Gustin** are foremen, and **George Gehrke** is bridge foreman. One schedule has been sub-let to L. A. Woodard, of Missoula, Mont.

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Burrage Weiss is supervising construction of sewer, water and gas systems at the Air Corps West Coast Replacement Center, Santa Ana, Calif., on a $236,041 contract let to Vinson & Pringle, Phoenix, Ariz. **N. S. Shumway** is foreman, **Ralph Van Buskirk,** assistant superintendent, and **R. G. Vratney,** bookkeeper.

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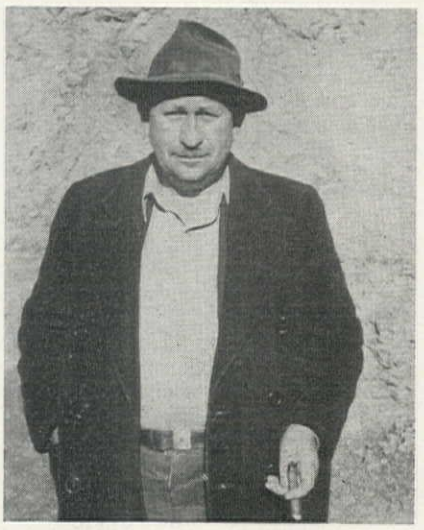
Spencer B. Lane is project manager for Barrett & Hilp, San Francisco, on the construction of an ordnance machine shop building at Mare Island, Calif. **James A. Lindsay** is general superintendent of Mare Island jobs, while **Frank Atkinson** is job superintendent on

OSCAR THOMPSON, superintendent for Engineers, Ltd., is in charge of construction of Alpine Dam near Fairfax, Calif., which is described in this issue on page 356.



Thos. J. Barbre Photo.

JOHN R. AUSTIN (right), formerly superintendent at the Carlton Drainage Tunnel, Cripple Creek, Colo., is now in charge of driving the west portal of the Continental Divide Tunnel at Grand Lake, Colo. Assisting him are, left to right: Charles Swartz, shifter, and M. J. Greer and Larry Finn, Bureau of Reclamation engineers.

this project. The $1,250,000 contract was awarded on a cost-plus-a-fixed-fee basis.

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C. R. Poppy, construction superintendent for Earl W. Heple, San Jose, is in charge of construction of a reinforced concrete viaduct between American River bridge and North Sacramento, and 0.4 mi. of grading and paving. The contract was let at $528,136.

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Ralph Wigle is directing construction of 4.3 mi. of grading, drain structures, and placing bitum. treated surf. on Section A of Rt. 4, in El Dorado Canyon, Boulder Dam National Recreation Area, in Clark County, Nev. A. Teichert & Son, Inc., Sacramento, Calif., secured the contract on a low bid of $139,254. **Bud Brown** is grade foreman of the job.

* * *

Jess W. Hoopes, employed for the past year as superintendent of a rock fill dam on the Nantahala project in North Carolina for the Utah Construction Co., has transferred to Garfield, Utah, as superintendent for the same company, on work in connection with the Utah Copper Co.

* * *

R. Milner, assistant superintendent of the American Dredging Co., is in charge of an estimated 3 months project of dredging at the Morro Bay Naval base in San Luis Obispo County, Calif. **J. L. Ten Brook,** job superintendent, and **Capt. Ralph Moberry,** dredge master, will assist him on the project which in its entirety will total $550,000.

* * *

Ben Bolton is project manager and **Robert Stoddard,** superintendent, on the 10-mi. pipeline project from Lake Mathews to Camp Haan and March Field in Riverside County, Calif. The contract was awarded to Morrison-Knudsen Co., Inc., of Boise, Ida., on a low bid of $523,944.

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C. B. Lauch has been appointed job superintendent for R. D. Merrill Construction Co., Helena, Mont., to direct construction of the 56-unit Washington Courts housing project in Twin Falls, Idaho. The contract was awarded at $181,943.

* * *

Art Amundsen, superintendent with L. H. Hoffman Construction Co., Portland, Ore., is in charge of an approximately $250,000 construction job for the skeleton of main building, office building and packing unit of a carbide and ferro-alloy plant in St. Johns, Multnomah County, Ore.

* * *

George Van Dyle is directing construction of a U.S.O. building at Burbank, Calif., for Myers Bros., Los Angeles. **Walter Whittaker,** purchasing agent, and **Oscar Wyatt,** job superintendent, are assisting him on the $97,313 job.

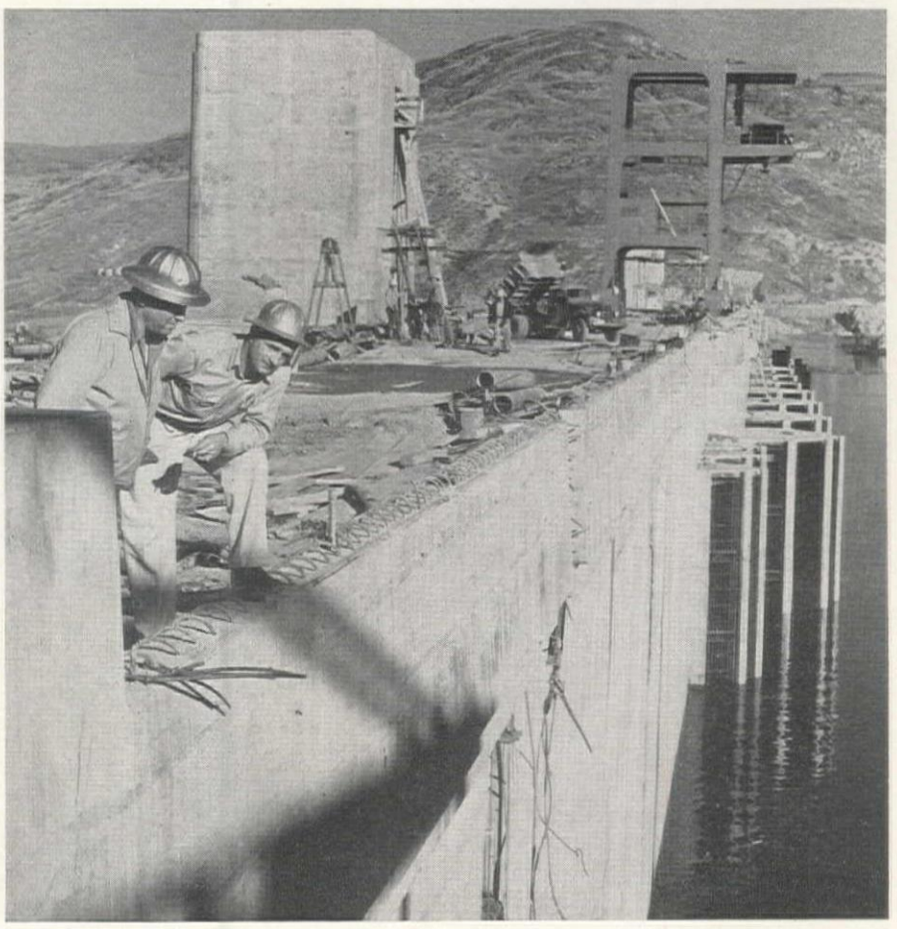
* * *

J. W. Davis is assistant to the general superintendent for the Pacific Naval Base Contractors, Inc., Alameda, Calif., who are building a naval air base at Honolulu, Hawaii. It is estimated that the air base will require approximately 3 years to be constructed.

* * *

Joseph Hall is directing construction of a defense housing project at Lerdo, near Bakersfield, in Kern County, Calif., for Guy E. Hall, Bakersfield. He is assisted by **L. H. Huffman,** estimator, and by **K. E. Hall, J. W. Beatty,** and **F. E.**

ART FINDLEY (right), concrete shift-boss, and Ernie Brown, C.B.I. electrician's shift-boss, are two construction workers who have been at Grand Coulee since the world's largest dam was begun seven years ago by Mason-Walsh-Atkinson-Kier. The 550-ft. structure has nearly been completed by Consolidated Builders, Inc.



TO CONSERVE time, T. M. Page (right), Glendale, Calif., contractor, flies from one job to another. He has jobs underway in Gallup, New Mex., Del Mar, Paso Robles, and Victorville, Calif. C. M. Stains, superintendent of Victorville airport job is on the left.

Knight, superintendents on the $268,491 job.

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F. V. Henderson, superintendent with R. D. Merrill Construction Co., Helena, Mont., is in charge of construction of buildings for the Air Corps Ferrying Command at Long Beach, Calif. **W. A. Carson** is office manager for the $438,-181 job.

* * *

Paul B. Tichener, general superintendent with Ford J. Twaits, Los Angeles, is supervising the construction of a U.S.O. Recreation building in San Miguel, Calif. **Jack Malven** is job superintendent of the work, which was awarded on a low bid of $85,153.

* * *

Henry Tietjen, formerly assistant superintendent for L. H. Hoffman, Portland, Ore., on a previous contract for work on the Bonneville Dam in Oregon, is now carpenter superintendent on the swing shift for Puget Construction Co. for a 4-unit addition to the power house at the Dam.

* * *

N. H. Anderson, superintendent for W. T. Drury, Bakersfield, Calif., is being assisted in the construction of an electric distribution system at the Victorville Military Airport by D. C. Sparling, general foreman. Low bid for the job was $98,257.

* * *

Ed Roach, superintendent with the Northwestern Engineering Co., Rapid City, South Dakota, is in charge of highway construction on the Granger Junction-Green River Road, in Sweetwater County, Wyo. Low bid for the job was $162,279.

* * *

L. J. Sullivan is supervising construction of intake and discharge structures and wharves at the Wilmington Steam Plant, Wilmington, Calif., for C. M. Elliott, and Stroud-Seabrook & Tavares Construction Co., Los Angeles, who were awarded the contract on a low bid of $528,092.

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Robert G. Nicklas, formerly junior engineer with the U. S. Engineers, has transferred from Mather Field to the Sacramento Air Depot, where he is employed by the Ford J. Twaits Co. as field engineer.

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J. G. Morgan is resident engineer on the $9,000,000 Santa Fe Dam project on the San Gabriel River southwest of Azusa, Calif., where ceremonies marking the actual start of work took place on Nov. 8. Morgan has just finished supervising the construction of Sepulveda Dam and retarding basin in Central San Fernando Valley.

* * *

O. M. Hooper, superintendent with Ford J. Twaits Co., Los Angeles, Calif., is supervising construction of sewer, water and gas systems at the Victorville Military Airport, San Bernardino County, Calif. The contract was awarded on a low bid of $273,470.

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Don D. Prothro, formerly foreman for L. E. Dixon Co., is now with the Seattle-Tacoma Shipbuilding Co. at Tacoma yards in Washington.

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I. F. Lindsay, who was superintendent for A. Teichert & Son, Inc., Sacramento, Calif., on the construction of a state highway building at Bakersfield, is now employed by George Pollock Co., of Sacramento.

* * *

Verner C. Johnson is directing construction of an A. C. gasoline fueling system at the Muroc Bombing Range near Muroc Lake, in Kern County, Calif. Flotation Systems, Inc., Los Angeles, secured the contract at $81,652.

* * *

Duffy G. Reed is supervising highway construction on Tipperary Corner Road in Jerome County, Idaho, for Dan J. Cavanagh, Twin Falls. **Clarence Webb** and **L. E. Smith** are assisting him on the $112,763 job.

ASSEMBLING the world's largest hydro-electric generators at Grand Coulee Dam are, left to right, Sam P. Fisher, assembly foreman for Westinghouse Electric and Manufacturing Co.; F. J. Malarkey, turbine erection engineer for Newport News Shipbuilding and Drydock Co.; H. Walter Berkley, erection superintendent for Westinghouse; F. A. Smith, erection engineer for the Woodward Governor Co.; and J. A. Kadletz, transformer erection engineer for the General Electric Co.

Measure the VALUE of "Hercules" (Red Strand) Wire Rope by what it will do

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Results are what count—now more than ever. In order to speed up production, and still maintain a reasonable margin of profit, it is of utmost importance to use materials and equipment of proven dependability.

For over 55 years "HERCULES" (Red Strand) Wire Rope has been demonstrating its stamina and trustworthiness. Its record of *consistent* performance—day after day, and month after month—has made and held a host of loyal friends. Such performance is never a matter of chance, but the result of sound fundamental principles, extensive research, experienced organization, and efficient manufacturing facilities.

HAVE YOU TRIED
Preformed
"HERCULES"
RED STRAND
WIRE ROPE
—?—
IT'S TOPS AS
A
MONEY SAVER
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Why not measure the ultimate value of "HERCULES" (Red Strand) Wire Rope by the accurate yardstick of performance? Give it a chance to prove just what it can do. You will quickly discover that its long life makes for more continuous production and lower operating cost.

We especially recommend the Preformed type of "HERCULES" (Red Strand) Wire Rope for use on backfillers, bulldozers, carryall scrapers, clamshells, conveyors, cranes, draglines, dredges, hoists, mining machines, shovels, skimmers and trench hoes. We will gladly furnish full particulars.

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KENNETH SCHEYER (right), superintendent, and Leonard Ball, office manager, are in charge of runway and landing mat construction at Fresno Air Base, Calif., for N. M. Ball Sons.

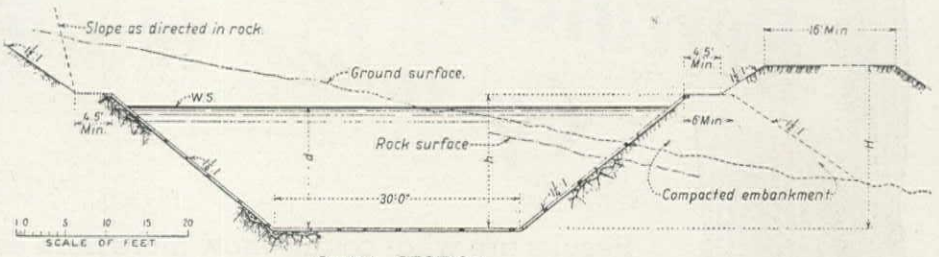
H. E. Cox, Jr., general superintendent for J. E. Haddock, Ltd., Pasadena, Calif., is in charge of construction of the highway, and of runways, taxiways, and parking area at Sherwood Field Airport, Paso Robles, Calif. He is being assisted by **Cal Cook,** assistant superintendent, and **Deal Newell,** office manager, on the $93,103 job.

UNIT BID SUMMARY

Irrigation...

California—Fresno County—Bur. of Recl.—Excavation

Fredericksen & Westbrook, and Paul J. Tyler, Sacramento, Calif., $989,280, low to the Bureau of Reclamation, Sacramento, for earthwork, concrete lining, and structures for 5.6 mi. of the Friant-Kern canal, Friant division, Central Valley project, located near Friant. The bottom width of the canal is 30 ft., depth of excavation varies from 15 ft. 10¾ in. to 16 ft. 6½ in., side slope is 1¼ :1, minimum berm width is 16 ft., lining thickness is 3½ in., capacity is 3502 cu. ft. per sec. The work is to be completed within 600 calendar days. The Government will furnish the following materials: cement for use in concrete, mortar, and grout; pumicite, or other admixture if required, for use in concrete; reinforcement bars; paper tubing for paper sleeves for covering the ends of the longitudinal reinforcement bars at contraction joints in concrete canal lining; structural steel for the highway bridge; galvanized-steel pipe for drains for the deck of the highway bridge; elastic filler material, rubber water stops, rubber channels, copper nails, and coating materials for



CANAL SECTION

HYDRAULIC PROPERTIES

CANAL SECTION	A	V	Q	r	n	s
Lined Section No.1	707.78	4.95	3502	9.21	.014	.00012
Lined Section No.2	750.93	4.66	3502	9.51	.014	.0001

DIMENSIONS

CANAL SECTION	b	h	d	H
Lined Section No.1	30'0"	15.90'	14.65	19.5'
Lined Section No.2	30'0"	16.50'	15.29'	20.0'

use in joints; sewer pipe for drains from bridge abutments, and lumber for permanent erection in bridges and railings. The contractor will be required to furnish all sand and broken rock or gravel for concrete, sand for mortar and grout, all backfill materials, including gravel backfill at the ends of bridges and gravel for gravel pockets at the inlets to drain pipes through the abutments at the highway bridge, all rock and rock spalls, gravel, or crushed rock for dry-rock paving; all form materials, including oil for oiling forms; all wire, wire ties, or other appliances used for holding forms and for securing reinforcement bars; metal or other temporary supports, if used, for reinforcement bars and other metalwork; all spikes and nails less than twentypenny in size to be used in structures; all water used for mixing, cleaning, curing concrete and mortar and for puddling backfill; all other materials not a part of the completed construction work required for the completion of the contract; as well as sand and gravel for concrete, and sand for mortar, which may be obtained from a natural deposit downstream from Friant Dam, or from any other source approved by the contracting officer. If deposits to be used by the contractor are located at points approved by the engineer on the property of the Government or on withdrawn public land in the vicinity of the work, no charge will be made to the contractor for materials taken from such deposits and used in the work. Bids were received from the following:

(1) Fredericksen & Westbrook, and Paul J. Tyler.....$ 989,280
(2) The Utah Construction Co., Griffith Co., and H. Stanley Bent..... 1,037,470
(3) Clyde W. Wood..... 1,113,385
(4) W. E. Callahan Construction Co..... 1,122,744
(5) Rhoades Bros. and Floyd Shafner....$1,149,860
(6) Bressi and Bevanda Constructors, and Macco Construction Co..... 1,226,490
(7) George Pollock Co..... 1,419,686
(8) Guy F. Atkinson Co..... 1,443,055

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
267,000 cu. yd. excav., com., for canal.....	.45	.50	.49	.60	.53	.53	.75	.68
985,000 cu. yd. excav., rock, for canal.....	.45	.50	.49	.60	.53	.53	.75	.68
55,000 sta. cu. yd. overhaul.....	.01	.02	.01	.05	.05	.02	.01	.02
104,000 cu. yd. compact. embank.....	.12	.30	.25	.60	.33	.40	.15	.25
2,000 cu. yd. excav., com., for drain. channels and dikes.....	1.50	.55	1.65	4.00	.85	1.50	2.00	2.50
7,000 cu. yd. excav., rock, for drain. channels and dikes.....	1.50	.55	1.65	4.00	.85	1.50	2.00	2.50
100 cu. yd. excav., com., structs.....	2.25	4.00	2.00	4.00	2.40	4.00	3.00	2.50
5,500 cu. yd. excav., rock, structs.....	2.25	4.00	2.00	4.00	2.40	4.00	3.00	2.50
229,000 sq. yd. prep. rock found. for concrete lining.....	.25	.45	.65	.15	.47	.60	.40	.50
36,000 sq. yd. trimming earth found. for concrete lining.....	.25	.45	.65	.15	.47	.60	.40	.20
3,200 sq. yd. backfill.....	1.25	.50	.25	.65	.20	.25	.20	1.00
1,600 sq. yd. puddling or tamping backf.	1.25	1.00	.75	1.00	.60	2.00	.40	2.50
1,050 sq. yd. conc. in structures.....	30.00	27.00	32.00	32.00	22.00	40.00	30.00	35.00
25,800 sq. yd. conc. in canal lining.....	9.00	6.50	7.80	5.32	9.50	9.00	10.00	12.50
1,150,000 lb. plac. reinf. bars.....	.03	.0225	.0225	.0225	.02	.03	.02	.025
100 sq. yd. dry-rock paving.....	20.00	6.00	5.00	20.00	6.00	5.00	5.00	6.00
90 lin. ft. lay. 4-in. diam. sewer pipe	5.00	3.00	1.00	3.00	1.00	2.00	.90	.50
165,000 lb. erect. struct. steel in bridge.....	.05	.025	.05	.0125	.04	.03	.025	.03
70 MFBM erect. timber in struct.....	80.00	35.00	50.00	50.00	50.00	$100	75.00	80.00

Washington—Yakima County—Bur. of Recl.—Yakima Ridge Canal

Henry L. Horn, Caldwell, Idaho, $217,785, low to the Bureau of Reclamation, Yakima, for earthwork, concrete lining, and structures on the Yakima Ridge Canal. The canal has the following dimensions: length of canal 8.87 mi.; bottom width 10 ft. in lined sections and 33-36 ft. in earth sections; depth of excavation approx. 8 ft.; side slope 1¼ :1; Berm width 14 ft. min.; thickness of lining 4 in.; and rate of flow 800-900 cu. ft. per sec. The contractor shall begin work within 30 days after date of receipt of notice to proceed and shall complete all of the work within 400 days from the date of receipt of such notice. The government will furnish cement, sand, and broken rock or gravel for use in conc.; admixtures, if required, for use in conc. cement and sand for mortar; reinforcement bars; metal dowels for construction joints in siphon barrels; bituminous material for coating or paper tubing for paper sleeves for covering the ends of dowel bars at construction joints in siphon barrels; paper tubing for paper sleeves for covering the ends of the longitudinal reinforcement bars at grooves in conc. lining; metal water stops for construction joints in siphon barrels;

(Continued on next page)

It's the "DIGGINEST" 3/4 YD. DRAGLINE You Ever Saw!

That's the verdict of many dragline experts after putting the Lorain-40A through its paces. They have sent this machine into treacherous swamps—highballed it rough-shod cross country to prove its travelability. They have dug everything from the softest muck to the toughest clay with the boom at all angles, and got better than average production. Yes, they have even checked drag cable costs and found that the "40A" was saving them money.

A few of the features that make for such outstanding performance are listed briefly on this page. Complete information on these and other factors that have won this 3/4-yd. machine the reputation of being the "digginest" dragline in its class is contained in the new Lorain-40A catalog. Write for your copy today.

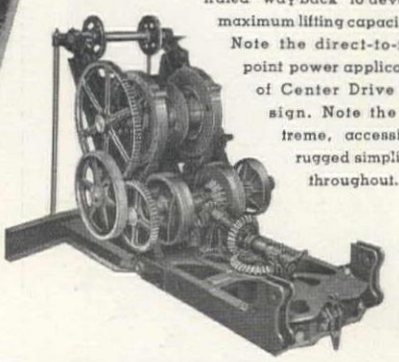
UNIVERSAL CRANE DIVISION - THE THEW SHOVEL CO.
LORAIN, OHIO

THEW CENTER DRIVE
REG. U.S. PAT. OFF.

3/4YD LORAIN 40A

BALANCED TURNTABLE

Balance—Power—Simplicity—all in one turntable. Note how machinery weight is concentrated "way back" to develop maximum lifting capacities. Note the direct-to-the-point power application of Center Drive design. Note the extreme, accessible, rugged simplicity throughout.

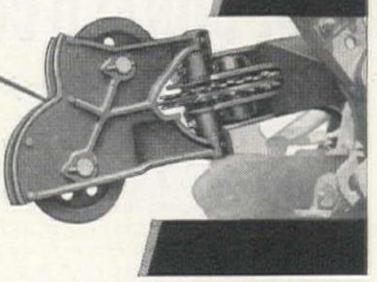


2-SPEED CRAWLER

Center Drive design for simplicity and ruggedness of construction. 2 speeds in either direction with all steering controlled from operator's position. Extra wide swamp pads give "soft ground flotation" without sacrifice of crawler mobility.

"CABLE MISER" FAIRLEAD

This patented dragline fairlead reduces cable wear two ways—(1) the two front sheaves are free to swivel, and thus maintain a constant direct lead from bucket to sheaves; (2) the rear horizontal sheaves have geared flanges so that when one revolves the other also turns, thereby eliminating destructive cable scrubbing.



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Irrigation . . .

blow-off valves, pipe, and connections for siphons; sewer pipe for drains; tar paper for use over permanent drains and for use between culvert boxes and canal lining; metal pipe for weep pipes; precast conc. pipe for turnouts; turnout gates; lumber for permanent installation in structures, but not lumber for forms or other temporary construction. The contractor will be required to funish all gavel for gravel blankets on the inside slope of canal embankments; gravel or broken rock for backfill around drain pipes; all form materials, including oil for oiling forms; all spikes or nails less than twentypenny size to be used in structures; all wire, wire ties, or other appliances used for holding forms and for securing reinforcement bars; metal or other temporary supports, if used, for reinforcement and other metalwork; all water used for mixing, cleaning, and curing conc. and grout, for puddling backfill, and for moistening embankment materials to be compacted; all backfill materials, including gravel for gravel backfill at the ends of bridges and for gravel pockets at weep holes; all rock and rock spalls, gravel, or crushed rock for dry-rock paving; and all other materials not a part of the competed construction work, required for the completion of the contract. Bids were received from the following:

(1) Henry L. Horn.....$217,785
(2) Clare Schweitzer..... 234,902
(3) Natt McDougall Co..... 240,737
(4) J. A. Terteling & Sons and Barnard-Curtis Co.....$287,915
(5) David A. Richardson..... 307,415

	(1)	(2)	(3)	(4)	(5)
513,000 cu. yd. excavation, common, for canal	.12	.14	.15	.15	.27
31,000 cu. yd. excavation, rock, for canal	.25	.30	.50	.15	.65
85,000 cu. yd. excavation for corebanks	.15	.125	.12	.20	.25
26,000 cu. yd. compacting embankments	.15	.27	.32	.42	.25
142,000 sta. cu. yd. overhaul	.015	.02	.02	.03	.015
4,000 cu. yd. excav., common, for drainage channels and dikes	.15	.55	.48	.35	1.00
100 cu. yd. excav., rock, for drainage channels and dikes	.50	.55	2.00	1.00	1.00
20,000 cu. yd. earth lining of canal	.20	.20	.25	.40	.20
2,000 cu. yd. gravel blanket on inside of canal embankment	2.00	1.75	1.60	2.00	2.00
10,300 cu. yd. excavation, common, for structures	1.00	.90	.50	1.20	1.50
550 cu. yd. excavation, rock, for structures	1.50	.90	2.00	2.00	2.00
100 sq. yd. preparing rock foundations for concrete lining	.50	.75	2.00	1.00	1.00
12,900 sq. yd. trimming earth foundations for concrete lining	.12	.75	.62	.65	.50
16,900 cu. yd. backfill	.15	.14	.20	.20	.15
5,400 cu. yd. puddling or tamping backfill	.40	.50	.50	.85	.40
3,430 cu. yd. concrete in structures	19.00	19.00	19.50	25.50	16.00
1,470 cu. yd. concrete in canal lining	14.00	11.00	10.50	12.50	8.00
480,000 lb. placing reinforcement bars	.025	.025	.016	.035	.015
860 sq. yd. dry-rock paving	2.50	2.25	2.15	2.00	1.50
52 MFBM erecting timber in bridges	20.00	25.00	25.00	30.00	18.00
2,900 lin. ft. constr. 6-in. diameter underdr. with uncem. joints	.40	.50	.52	.70	.50
125 lin. ft. laying 6-in. diameter sewer pipe with cem. joints	.15	.15	.25	1.25	.30
590 lin. ft. laying 12-in. diameter concrete pipe	.30	.35	.45	1.25	.50
290 lin. ft. laying 18-in. diameter concrete pipe	.60	.45	.70	1.50	.80
170 lin. ft. laying 21-in. diameter concrete pipe	.90	.60	.85	2.00	1.00
140 lin. ft. laying 24-in. diameter concrete pipe	1.10	.65	1.10	2.50	1.20
42 lin. ft. laying 30-in. diameter concrete pipe	1.60	.75	1.45	3.00	1.85
90 lin. ft. laying 36-in. diameter concrete pipe	2.00	.80	1.75	3.00	2.00
500 lb. installing blow-off valves and connections	.15	.04	.15	.05	.08
6,600 lb. installing gates	.08	.04	.05	.05	.04

Montana—Teton County—Bur. of Recl.—Excavation

Williams Construction Co., Helena, $44,880, low to the Bureau of Reclamation, Fairfield, for earthwork and structures for open drains on the Greenfields division of the Sun River project, located near Fairfield and Ashuelot. Bottom width of both type A and type B drains vary from 4 to 6 ft., cut is variable, side slope is 1½ :1, berm width is 6 ft. The work shall be completed within 350 calendar days. The Government will furnish the following materials: cement for use in concrete; admixtures, if required, for use in concrete; reinforcement bars; corrugated-metal pipe and coupling bands; lumber for timber cradles for corrugated-metal pipe, where required, but not lumber for concrete forms; additional fencing material required in rebuilding fences; and all other materials not specifically mentioned that will become a part of the completed construction work. The contractor will be required to furnish all form materials, including oil for oiling forms; all wire and wire ties used for holding forms and for securing reinforcement bars; all sand and gravel used in concrete; tar and burlap for joints in corrugated-metal pipe; backfill materials; all water used for concrete and for pudding backfill; and all other materials not a part of the completed construction work required for the completion of the contract. Bids were received from the following:

(A) Williams Construction Co.....$44,880
(B) Ray Schweitzer..... 48,318
(C) Elmer Genger..... 54,535
(D) J. L. McLaughlin..... 54,590
(E) Barnard Curtiss Co..... 58,833
(F) Union Construction Co..... 58,835
(G) Vernon Brothers Co.....$67,375
(H) Hugh McConnell..... 72,943
(I) E. O. Howe..... 76,110
(J) J. W. Merz, Inc..... 84,375
(K) Peter Kiewit Son's Co..... 97,475

(1) 525,000 cu. yd. excavation for drains
(2) 18,000 cu. yd. excavation for structures
(3) 25,000 cu. yd. backfill about structures
(4) 1,850 cu. yd. puddle backfill about struct.
(5) 130 cu. yd. concrete in structures
(6) 8,000 lb. placing reinforcing bars
(7) 1,200 lin. ft. laying 15-in. corr. pipe
(8) 3,600 lin. ft. laying 24-in. corr. pipe
(9) 2 per mi. moving exc. machine

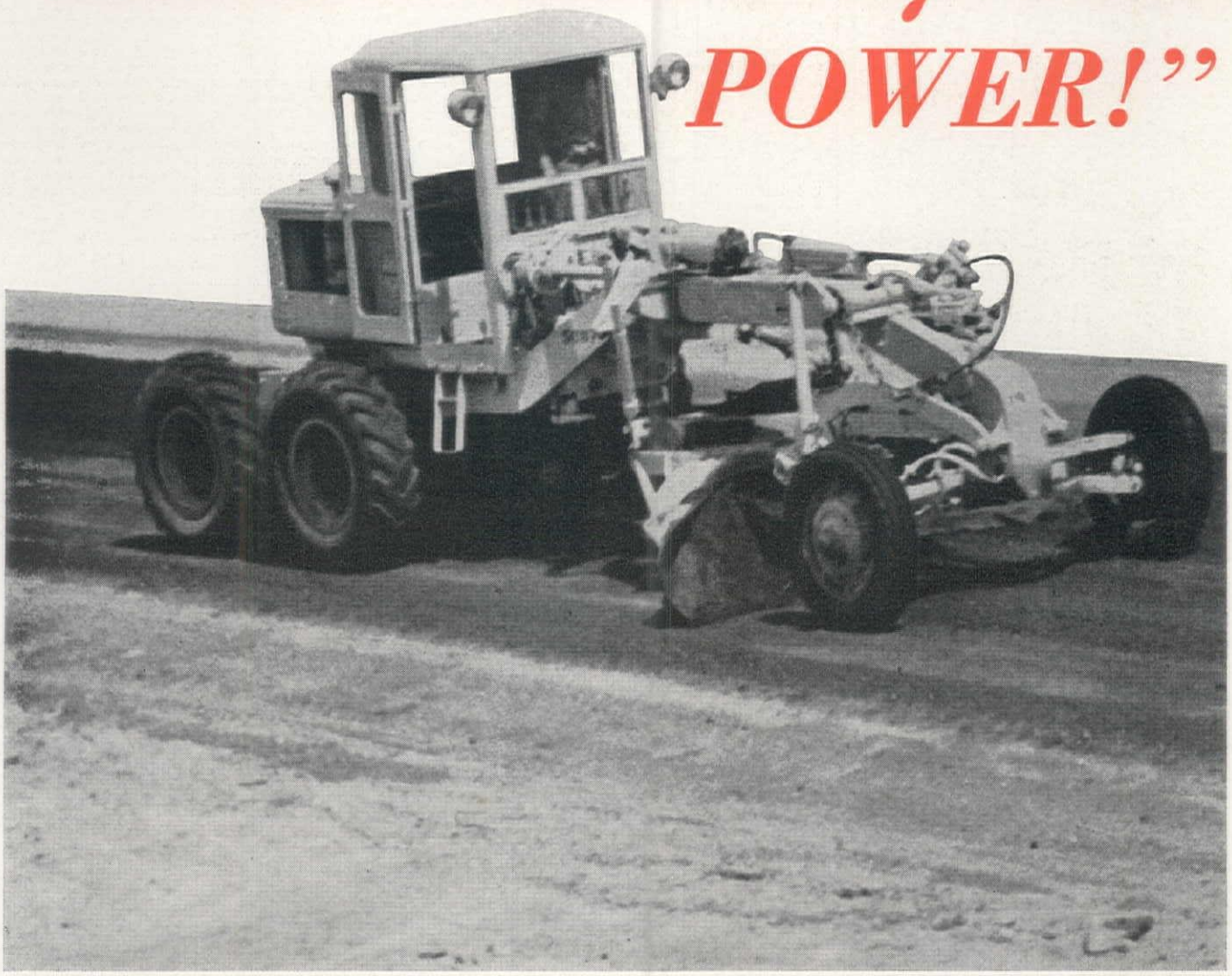
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	.07	.08	.075	.08	.0875	.08	.095	.1025	.10	.125	.12
(2)	.10	.001	.30	.20	.0875	.25	.30	.50	.60	.25	.75
(3)	.10	.10	.20	.15	.175	.20	.20	.15	.25	.20	.50
(4)	.20	.20	.20	.60	.50	1.00	.20	.30	.50	1.00	1.50
(5)	15.00	18.00	18.00	18.00	25.00	23.50	22.00	25.50	22.50	35.00	25.00
(6)	.02	.02	.025	.03	.03	.06	.03	.03	.05	.05	.03
(7)	.20	.15	.30	.20	.30	.40	.60	.35	.40	.50	.30
(7)	.02	.15	.30	.20	.30	.40	.60	.35	.40	.50	.30
(9)	15.00	15.00	25.00	25.00	5.00	15.00	15.00	25.00	15.00	25.00	25.00

Utah—Summit County—Bur. of Recl.—Excavation and Line

Norman I. Fadel, North Hollywood, Calif., $84,706, low to the Bureau of Reclamation, Provo, for earthwork, concrete lining, and structures on 3.1 mi. of the Weber-Provo diversion canal, Deer Creek division, Provo River project. The work is located near Kamas. Dimensions of lined section No. 4 are as follows: bottom width, 12 ft.; depth of excavation, about 20 ft.; side slope, 1¼ :1; berm width, 5 ft.; lining thickness, 4 in.; capacity, 1000 cu. ft. per sec. Dimensions of earth section No. 5 are as follows: bottom width, 26 ft.; depth of excavation, about 6 ft.; side slope, 2:1; berm width, 12 ft.; no lining; capacity, 1,000 cu. ft. per sec. Dimensions of earth section No. 6 are as follows: bottom width, 40 ft.; depth of excavation, about 2 ft.; side slope, 1½ :1; berm width, 12 ft.; no lining; capacity, non-uniform. The contractor shall complete the work within 400 days. The Government will furnish cement, sand, and broken rock or gravel for use in concrete; admixtures, if required, for use in concrete; cement and sand for use in grout and mortar; reinforcement bars; concrete pipe for the siphon; rubber water stops, elastic filler material, rubber channels, rubber cement, copper nails, paper sleeves, and coating material for joints; all lumber for permanent installation

(Continued on next page)

"And does that 'baby' have POWER!"



One of two Galion motor graders working on Rt. No. 15, eighteen miles north of Boise, Idaho

That was the remark of the operator of a big GALION which is *his* "baby."

He had just turned around and had come up a steep grade, in sandy material, back onto the road—ready for the return trip.

This extra power the operators of GALIONS talk about is *there*—GALION designers knew what the operators ON THE JOB wanted in a power blade, and gave it to them!

Ask any operator of a GALION, and see if he doesn't tell you the same thing that this Idaho operator told us, then—

ask your nearest dealer for a practical demonstration!

WESTERN DISTRIBUTORS

Brown-Bevis Equipment Co., Los Angeles, California, and Phoenix, Arizona; F. Ronstadt Hardware Co., Tucson, Arizona; H. W. Moore Equipment Co., Denver, Colorado; Hall-Perry Machinery Co., Butte, Montana; Morrow & Co., Albuquerque, New Mexico; Arnold Machinery Co., Salt Lake City, Utah; Nelson Equipment Co., Portland, Oregon, and Twin Falls, Idaho; Western Traction Co., San Francisco, California; Ormande C. Bell, Reno, Nevada; Service Equipment Co., Seattle, Washington.

THE GALION IRON WORKS AND MFG. COMPANY

Main office and works—Galion, Ohio

GALION ROAD MACHINERY

points to better roads

Irrigation . . .

in structures, but not lumber for concrete forms or for other temporary construction; metal sheets, carrier rods, and other metal flume accessories; pipe, fittings, and rivets for pipe handrail; metalwork for stop-plank guides; metal pipe for weep holes; metalwork for protection of edges of chute blocks; anchor bolts; bolts, washers, lag screws, driftbolts, curb bolts, anchor straps, and spikes and nails twentypenny or larger in size to be used in completed structures; wood preservative, paint, and coating materials; and all other materials not specifically mentioned that will become a part of the completed construction work. The contractor will be required to furnish all backfill materials including gravel for gravel backfill at the ends of bridges and gravel for gravel pockets at weep holes; all rock and rock spalls, gravel, or crushed rock for dryrock paving and riprap; all form materials, including oil for oiling forms; all wire, wire ties, or other appliances used for holding forms and for securing reinforcement bars; metal or other temporary supports, if used, for reinforcement bars, pipe, and other metalwork; all water used for mixing, cleaning, and curing concrete, mortar, and grout, for puddling backfill, and for moistening embankment materials to be compacted; all spikes or nails less than twentypenny in size to be used in structures; and all other materials not a part of the completed construction work required for the completion of the contract. Bids were received from the following:

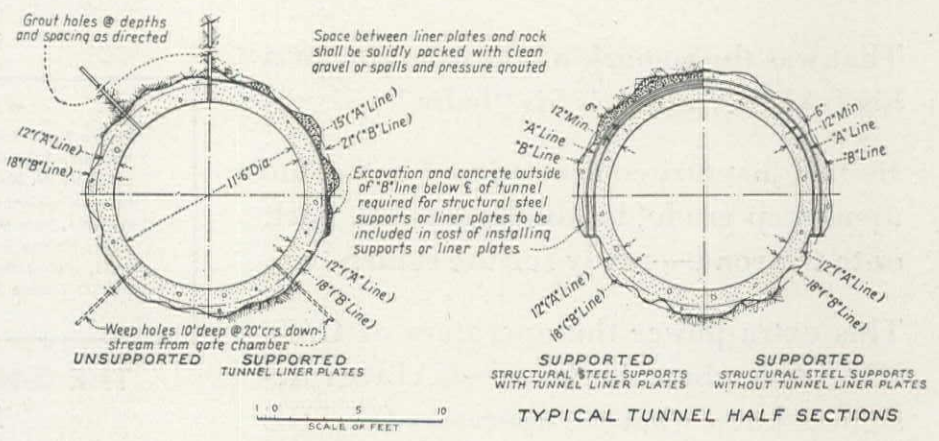
(1) Norman I. Fadel.....$84,706 (2) Carl B. Warren.....$124,013

		(1)	(2)
63,200	cu. yd. excavation, common, for canal	.32	.60
100	cu. yd. excavation, rock, for canal	1.50	1.00
260	cu. yd. compacting embankments	.40	1.00
8,250	cu. yd. excavation, common, for structures	.50	1.00
2,000	cu. yd. excavation, rock, for structures	1.50	2.50
490	sq. yd. preparing rock foundations for concrete lining	.35	.10
17,300	sq. yd. trimming earth foundations for concrete lining	.21	.41
2,800	cu. yd. backfill	.20	.20
1,300	cu. yd. puddling or tamping backfill	1.40	1.25
580	cu. yd. concrete in structures	28.75	40.00
1,850	cu. yd. concrete in canal lining	13.65	14.00
188,000	lb. placing reinforcement bars	.026	.05
100	sq. yd. dry-rock paving	2.50	5.00
650	cu. yd. riprap	2.50	2.50
86	lin. ft. removing corrugated metal pipe in existing structures	1.50	.75
20	MFBM removing timber in existing structures	23.00	25.00
200	lin. ft. removing metal parts in existing metal flumes	.30	.44
110	lin. ft. laying 21-in. diameter concrete pipe	1.75	1.32
35	MFBM erecting timber in structures	33.00	34.00
102	lin. ft. erecting No. 60 metal flume	.50	1.50
98	lin. ft. erecting No. 84 metal flume	.50	1.75
875	lb. installing miscellaneous metalwork	.15	.25

Tunnel . . .

Colorado—Grand County—Bur. of Recl.—Diversion & Outlet Tunnel

Platt Rogers, Inc., P. O. Box 153, Pueblo, Colorado, $283,180, low to the Bureau of Reclamation, Denver, for construction of diversion and outlet tunnel at Granby Dam. Combined bids for Granby Dam and tunnel (see *WCN*, Sept., 1941) were rejected and separate bids received. Bids for the dam were rejected the second time. The tunnel has a length of 1077 ft., is 11 ft. 6 in. in diameter, and has a minimum lining thickness of 12 in. This work is located on the Colorado River about five miles northeast of Granby. It is required that there be constructed and completed the diversion and outlet tunnel, including the open-cut excavation for the approaches to the inlet and outlet ends of the tunnel, the open-cut excavation above elevation 5154.0 for the trashrack structure at the top of the elevator shaft above the gate chamber, and the construction of the diversion and outlet tunnel, the inlet shaft to elevation 8154.0, and the elevator shaft to the rock line at approximately elevation 8240.0 for the outlet works. The contractor shall begin work within 30 days after date of receipt of notice to proceed, and shall complete all of the work within 225 days from the date of receipt of such notice. The government will furnish cement for use in conc., mortar, and grout; admixtures,



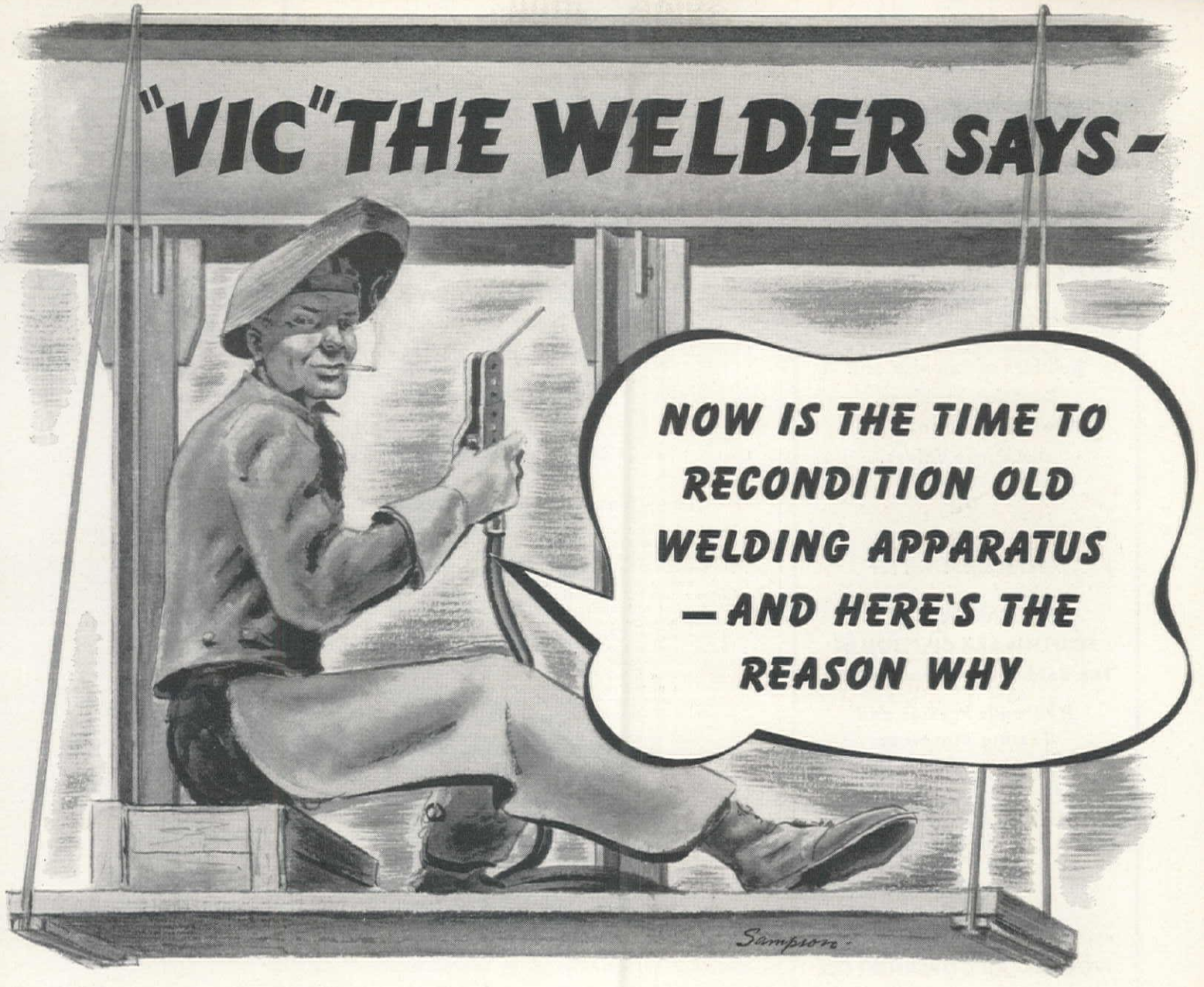
TYPICAL TUNNEL HALF SECTIONS

if required, for use in conc.; reinforcement bars; conc. or clay sewer pipe for drains; all pipe and fittings for grout connections for pressure grouting and all pipe, fittings, and grouting units for permanent installation in contraction joints; metal sealing strips and welding rods for welding joints in metal sealing strips; metal ladder rungs; metal inserts for guide-rail brackets in elevator shaft; anchor bolts; pipe for placing conc. in diversion bypass conduit; and all other materials not specifically mentioned in this paragraph. The contractor will be required to furnish all sand and broken rock or gravel for conc.; all sand for mortar and grout; all aggregates for porous conc.; all structural-steel supports, steel lagging, and steel tunnel-liner plates, if required, for permanent tunnel supports; all gravel or rock spall for filling space back of steel lagging and tunnel-plates in the tunnel; all lumber for temporary tunnel timbering, if required; all form materials, including oil for oiling forms; all wire, wire ties, or other appliances used for holding forms and for securing reinforcement bars; metal or other temporary supports, if used, for reinforcement bars, pipe, and other metalwork; all water used for mixing, cleaning, and curing conc. and for grouting operations; oakum or other suitable materials for calking grout pipes; and also all other materials not a part of the completed construction work required for the completion of the contract. Bids were received from the following:

(1) Platt Rogers, Inc.....$283,180
(2) Ed. H. Honnen Construction Co..... 317,870
(3) The Pioneer Const. & Eng. Corp.....$342,975
(4) S. S. Magoffin Company, Inc..... 373,575

(Continued on next page)

"VIC" THE WELDER SAYS -



Welding apparatus, both gas and electric, is in great demand by all defense industries. This equipment is going to be hard to get.

You will be smart to have your older torches, regulators or arc welding machines reconditioned. This way you can make sure that you have good apparatus as and when you need it. You will save both time and money—and you will help relieve a congestion in the welding and cutting apparatus industry. Yes-sir-ee—give this idea some careful thought.

—and VICTOR maintains fully equipped repair stations to make certain your apparatus will be reconditioned PROPERLY.

VICTOR

VICTOR EQUIPMENT COMPANY

844 Folsom Street
SAN FRANCISCO

3821 Santa Fe Avenue
LOS ANGELES

Tunnel...

		(1)	(2)	(3)	(4)
1,500	cu. yd. excavation, stripping sand and gravel deposit	1.00	.30	.30	.25
15,000	cu. yd. excavation, common, in open cut	1.00	1.55	2.35	2.00
7,000	cu. yd. excavation, rock, in open cut	2.00	1.55	2.35	2.00
7,800	cu. yd. excavation, all classes, in tunnel and shafts	15.00	18.00	19.00	24.00
20,000	lb. furn. and plac. perm. structural-steel tunnel supports	.10	.12	.15	.14
40,000	lb. furn. and plac. steel tunnel-liner plates and steel lagging	.12	.11	.15	.14
22,000	cu. yd. cobble-and-rock fill on downstream slope of dam emb	.50	.50	.30	.55
200	lin. ft. constr. 4-in. diam. sewer-pipe drain with uncem. joints, embedded in porous concrete	2.00	2.60	3.00	5.00
17	cu. yd. porous conc. in horizontal bands around elevator shaft	40.00	20.00	50.00	50.00
600	lin. ft. drilling weep holes	.75	1.50	1.00	1.00
1,000	lin. ft. drilling 1¾-in. diam. grout holes not more than 10 ft. deep	.75	1.50	3.00	2.00
1,500	lb. placing grout pipe and fittings	.50	.10	.25	.25
3,000	cu. ft. pressure grouting	1.00	1.50	1.25	2.00
2,400	cu. yd. concrete in tunnel lining	30.00	32.00	30.00	30.00
700	cu. yd. concrete in shaft, gate-chamber, and tunnel-plug lining	35.00	35.00	45.00	30.00
300	cu. yd. concrete in tunnel inlet and outlet structures	35.00	35.00	25.00	30.00
200,000	lb. placing reinforcement bars	.02	.025	.03	.04
200	lin. ft. placing metal sealing strips	.50	1.30	2.00	1.50
1,500	lb. installing miscellaneous metalwork	.50	.10	.30	.25

Utah—Wasatch County—Bureau of Recl.—Duchesne Tunnel

The Utah Construction Company, Ogden, Utah, $1,156,105, only bid to the Bureau of Reclamation, Salt Lake City, for the construction of the Duchesne Tunnel. The tunnel is about 70 mi. east of Salt Lake City and has the following dimensions: Length, 3 mi.; diameter, 9 ft. 6 in.; and rate of flow 374 cu. ft. per sec. The tunnel will be unlined at present but will be lined sometime in the future. The contractor shall begin work within 30 days after date of receipt of notice to proceed and shall complete all work within 900 days from the date of receipt of such notice. See *Western Construction News*, October, 1940, for typical tunnel sections. The Government will furnish cement for use in grout; all pipe and fittings for permanent installation in connection with pressure-grouting operations; all permanent structural-steel ribs, complete with bolts and gaskets, if required; all tie-rod stock and nuts; and all timber for permanent timber sets, spiling, lagging, sills, foot blocks, spreaders, collar braces, wall plates, and wedges. The contractor will be required to furnish all sand for grout; all spikes, driftpins, and dowels for installing permanent timber supports; all timber or other materials used for filling spaces outside of the "B" line in the tunnel; all gravel and spalls used for filling spaces back of plate-steel tunnel lining; all water used for mixing grout; oakum or other suitable materials for calking grout pipes; and all other materials not a part of the completed construction work required for the completion of the contract.

1,000	cu. yd. excavation, common, in open cut	3.00
1,600	cu. yd. excavation, rock, in open cut	3.00
62,700	cu. yd. excavation, all classes, in tunnel	16.40
770,000	lb. installing permanent steel-rib tunnel supports	.04
1,130	MFBM erecting permanent timbering in tunnel	70.00
90,000	lb. installing steel tunnel-liner plates	.05
125	cu. yd. washed gravel or spalls outside of plate-steel tunnel-liner plates	10.00
1,000	lin. ft. drilling grout holes not more than 10 feet deep	1.25
500	lb. placing grout pipe and connections	.25
2,000	cu. ft. pressure grouting	1.50

Colorado—Clear Creek County—State—Pioneer Drift

Contract awarded to Ed H. Honnen, Colorado Springs, $198,499, by the Colorado State Highway Department, Denver, for a pioneer drift 7 x 7 ft. in section and 1.38 mi. long at the crown of a proposed highway tunnel near Loveland Pass on U. S. Highway 6 between Silver Plume and Dillon. The tunnel is to be completed within 450 days. Bids were received from the following:

(1) Ed H. Honnen.....$198,499
(2) Pioneer Construction & Engineering Corp. 200,300
(3) Hamilton & Gleason.....$201,118
(4) Platt Rogers, Inc. 211,740

		(1)	(2)	(3)	(4)
Lump Sum	clear and grub	$200	$1000	$1000	$1000
7,000	cu. yd. unclassified excavation	.60	1.50	1.15	2.00
11,000	cu. yd. pioneer tunnel excavation	16.25	15.80	16.00	16.30
10	cu. yd. unclassified str. excavation	3.00	3.50	3.00	2.00
4	hr. mechanical tamping	5.00	5.00	5.00	3.00
162,000	sta. yd. overhaul	.02	.04	.03	.02
4,700	yd. mi. overhaul	.20	.25	.20	.20
86.0	MFBM untr. timber tun. lining	$125	80.00	$115	$150
82	lin. ft. 24-in. C. M. P. pave. invert	4.50	5.00	4.00	4.00

Highway and Street...

California—San Mateo County—State—Grade and Pave

Union Paving Co., San Francisco, $324,547, low to the California Division of Highways, Sacramento, for about 3.2 mi. pave and grade with A. C. between Charter St. in Redwood City and San Francisquito Creek Bridge. Bids were received from the following:

(1) Union Paving Co.....$324.547
(2) Piazza & Huntley..... 363,686
(3) A. J. Raisch and Earl W. Hepie.....$364,489

		(1)	(2)	(3)
710	cu. yd. removing concrete	4.00	3.00	3.50
Lump Sum	clearing and grubbing	$15000	$9000	$17080
39,500	cu. yd. roadway excavation	.25	.45	.60
5,900	cu. yd. struc. excavation	1.25	2.00	1.50
70,000	tons imported borrow	.75	.94	.75
4,000,000	sta. yd. overhaul	.002	.004	.003
86,835	sq. yd. prep. subgrade	.10	.10	.115
Lump Sum	dev. W. S. and furn. water equipment	$500	$500	$1000
952	M. gals. applying water	.80	1.15	1.50
169	stas. finishing roadway	10.00	10.00	15.00
116	tons liq. asph. SC-1 (pr. ct. and pen. trt.)	12.00	13.50	20.00
26	tons asph. emul. (pt. bdr.)	28.00	30.00	32.00
20	tons screenings (seal coat)	5.00	3.50	4.00

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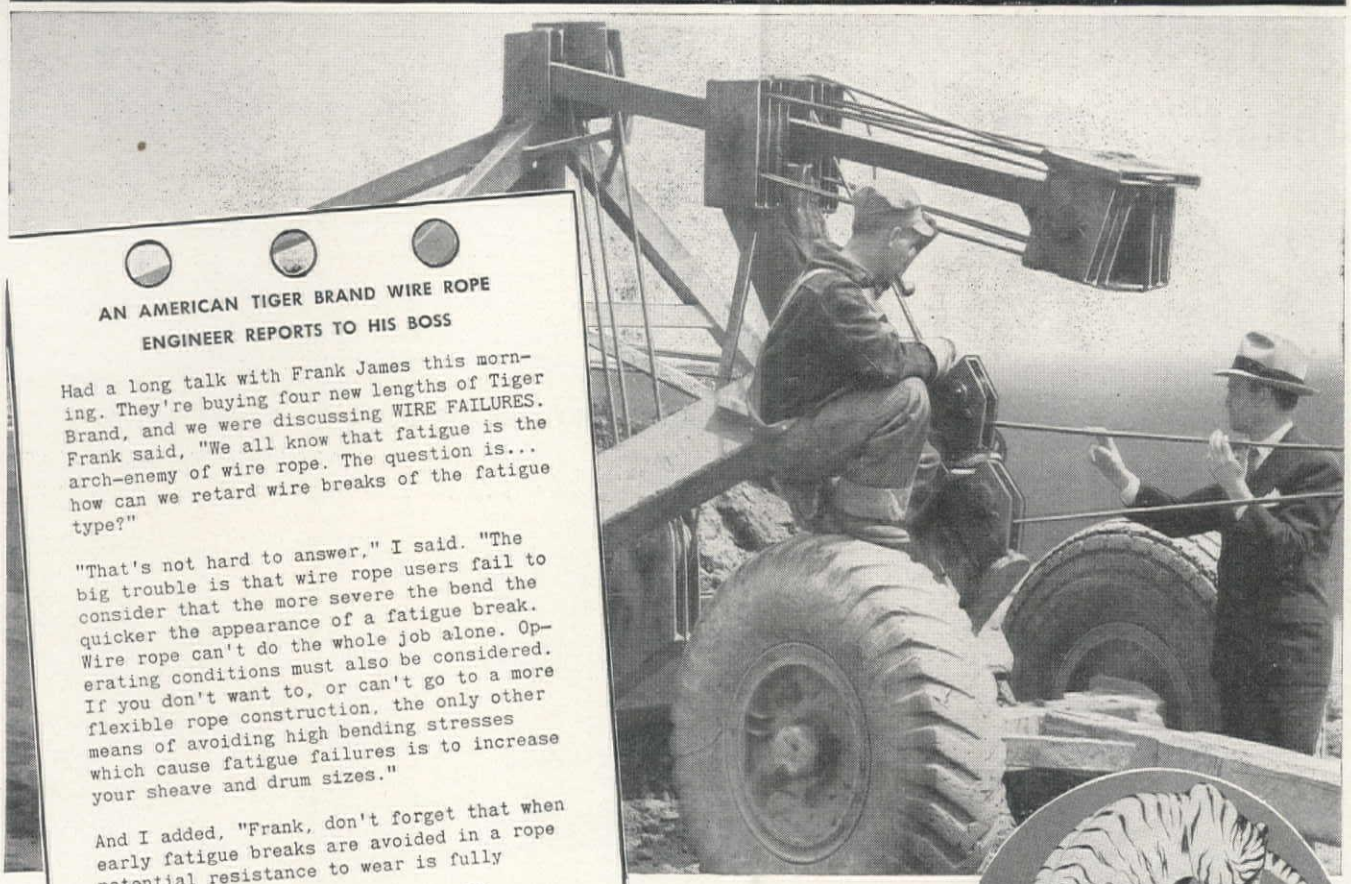
"FATIGUE is the Arch-Enemy of Wire Rope!"



AN AMERICAN TIGER BRAND WIRE ROPE ENGINEER REPORTS TO HIS BOSS

Had a long talk with Frank James this morning. They're buying four new lengths of Tiger Brand, and we were discussing WIRE FAILURES. Frank said, "We all know that fatigue is the arch-enemy of wire rope. The question is... how can we retard wire breaks of the fatigue type?"

"That's not hard to answer," I said. "The big trouble is that wire rope users fail to consider that the more severe the bend the quicker the appearance of a fatigue break. Wire rope can't do the whole job alone. Operating conditions must also be considered. If you don't want to, or can't go to a more flexible rope construction, the only other means of avoiding high bending stresses which cause fatigue failures is to increase your sheave and drum sizes."

And I added, "Frank, don't forget that when early fatigue breaks are avoided in a rope potential resistance to wear is fully realized."

George

Excellay Preformed

NUMEROUS conditions affect wire rope life, but none limits normal efficiency more than severe bending. Wire ropes are manufactured in various constructions for the purpose of securing varying degrees of flexibility. However, increased flexibility is secured at the sacrifice of resistance to abrasion, because greater flexibility is produced by increasing the number of wires in a wire rope which means that the size of the individual wires is correspondingly reduced. In order to secure satisfactory rope life it is necessary to specify a rope construction composed of wires of a large enough diameter so that they will not wear through in a comparatively short time. However, if the sheaves over which the rope operates are not of adequate size, bending stresses will be imposed which will cause wire breaks of a fatigue type and consequent removal of the rope at an early stage, even though the wear is slight. The smaller the size of sheave, the earlier these fatigue breaks will occur and the less the potential resistance to failure from abrasion will be realized.

Give these matters the attention they deserve and replacement of wire rope will be much less frequent. You'll get longer cable life.

Rely on the advice of the American Tiger Brand Wire Rope Engineer. These men can make recommendations which will correct the difficulties you are encountering. They will work with you, without obligation, to help you secure a full dollar's value out of every dollar you invest in wire rope.

USS

COLUMBIA STEEL COMPANY
San Francisco
AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
United States Steel Export Company, New York

UNITED STATES STEEL

Highway and Street . . .

260	tons liq. asph. MC-4 or 5 (P.M.S.)	13.00	13.50	15.85
5,200	tons min. aggr. (P. M. S.)	2.60	2.80	2.80
42,950	tons asph. conc.	3.65	3.90	4.03
740	ea. median strip bars	1.50	2.00	2.00
325	cu. yd. class B P. C. C. (parking strips)	13.00	12.00	14.00
137	cu. yd. class A P. C. C. (structures)	25.00	28.00	30.00
432	cu. yd. class B P. C. C. (curbs, gutters, sidewalks)	15.00	24.00	18.00
31	each monuments	3.00	3.00	3.00
0.7	mi. new property fence	$900	$850	$1000
11	each drive gates	30.00	20.00	25.00
820	lin. ft. 15-in. R. C. P.	2.00	1.80	1.45
300	lin. ft. 18-in. R. C. P.	2.50	2.40	1.90
920	lin. ft. 21-in. R. C. P.	3.50	2.80	2.35
2,080	lin. ft. 30-in. R. C. P.	6.50	4.75	4.00
112	lin. ft. 42-in. R. C. P.	12.00	9.00	6.50
60	lin. ft. 12-in. C. M. P. (16 gauge)	1.70	1.60	1.25
560	lin. ft. 18x2½-in. part circle C. M. culverts (8 gauge)	2.00	1.60	1.40
517	lin. ft. salv. pipe culverts	.60	1.00	1.00
18,540	lbs. bar reinforcing steel	.08	.10	.15
1,300	lb. structural steel	.25	.15	.25
47	each adj. manholes to grade	15.00	20.00	10.00
9	each frames and gratings	50.00	50.00	90.00
10	lin. ft. pipe hand railing	10.00	5.00	10.00
36	each ruby reflectors	2.00	2.00	3.00

Montana—Mineral County—P.R.A.—Steel and Concrete

Roy L. Bair, Spokane, Wash., $173,579, low to Public Roads Administration, Portland, Ore., for 0.383 mi. surf., 0.383 mi. grad., and 0.1489 mi. bridge. The width of roadway is 34 ft.; width of roadbed is 40 ft.; and the width of bridge is 26 ft. The work is on the Yellowstone Trail within the Cabinet National Forest. Bids were received from the following:

(A)	Roy L. Bair	$173,579	(F)	W. P. Roscoe Co.	$198,147
(B)	Henry Hagman	180,825	(G)	C. J. Montag & Sons Co.	202,695
(C)	Portland Bridge Co.	183,883	(H)	Peter Kiewit Sons Co.	219,398
(D)	McLaughlin Const. Co.	189,972	(I)	Thos. Staunton	227,748
(E)	Frank J. Haas	194,854	(J)	Nolan Bros., Inc.	284,760

(1)	All req.	maintenance of existing road	(18)	902	cu. yd. class B concrete
(2)	All req.	extra and misc. force account work	(19)	1,020	cu. yd. class D concrete
(3)	1.5	acres clearing	(20)	187	cu. yd. class S concrete
(4)	1	acre grubbing	(21)	279,000	lb. reinforcing steel
(5)	600	cu. yd. unclassified excavation	(22)	2,500	lb. structural steel
(6)	50	cu. yd. unclass. exc. for pipe struct.	(23)	833,700	lb. structural steel (erected)
(7)	2,800	cu. yd. unclass. exc. for bridge struct.	(24)	1,500	lin. ft. steel handrail
(8)	30,000	cu. yd. unclass. exc. for borrow	(25)	85	lin. ft. 18-in. std. reinf. conc. culv. pipe
(9)	28,000	sta. yd. special overhaul	(26)	54	lin. ft. 18-in. corr. galv. sheet metal pipe
(10)	1	acre roadside cleanup	(27)	140	lin. ft. 8-in. bit. coat. corr. sheet metal pipe type 2
(11)	2,700	cu. yd. gravel base course	(28)	4,900	lin. ft. untreated timber piling
(12)	120	units watering (1000 gal. units)	(29)	6,100	lin. ft. treated timber piling
(13)	All req.	providing and maint. water plant or plants	(30)	25	cu. yd. hand laid rock embankment
(14)	0.383	mi. B-1 roadmix surfacing laid	(31)	80	ea. concrete guide posts
(15)	45	tons SC-3 grade asph. for cl. B rdmx.	(32)	4	ea. spillway inlet, bit. coat. C.S.M. type 2
(16)	4	tons RC-1 grade asph. for cl. B seal			
(17)	843	cu. yd. class A concrete			

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
(2)	$1500	$1500	$1500	$1500	$1500	$1500	$1500	$1500	$1500	$1500
(3)	$100	$100	50.00	$100	$100	75.00	50.00	$180	$150	$100
(4)	$100	50.00	50.00	$100	25.00	75.00	50.00	$125	$150	$175
(5)	.40	1.00	.25	.50	.20	.50	.40	.50	.40	1.10
(6)	1.50	1.00	1.00	1.00	1.50	1.25	2.00	2.00	1.50	1.50
(7)	5.70	7.00	3.00	6.00	7.00	7.50	8.00	8.00	9.00	15.00
(8)	.30	.27	.25	.25	.20	.32	.35	.50	.29	.43
(9)	.02	.02	.01	.01	.01	.02	.03	.02	.04	.01
(10)	$100	$100	50.00	$200	$100	$100	$200	$125	$200	$150
(11)	1.50	1.40	1.10	.85	1.00	1.50	2.25	1.50	1.40	1.10
(12)	2.00	2.00	2.00	2.50	1.50	2.00	2.50	1.00	2.00	3.00
(13)	$100	$200	$100	$100	$200	$150	50.00	$400	$200	$100
(14)	$2500	$2500	$2000	$3000	$600	$2200	$4000	$2000	$3000	$2200
(15)	35.00	40.00	30.00	40.00	50.00	35.10	45.00	30.00	40.00	22.00
(16)	60.00	65.00	40.00	60.00	50.00	50.20	70.00	40.00	50.00	25.00
(17)	24.50	24.00	40.00	26.00	28.00	28.15	26.50	30.00	33.00	36.00
(18)	24.50	23.00	15.00	25.00	24.00	28.15	26.50	30.00	30.00	36.00
(19)	24.50	23.00	40.00	30.00	31.00	28.15	26.50	35.00	35.00	36.00
(20)	24.50	23.00	15.00	20.00	24.00	28.15	26.50	30.00	30.00	36.00
(21)	.065	.074	.08	.07	.08	.09	.07	.07	.09	.09
(22)	.20	.20	.20	.20	.10	.20	.30	.50	.12	.30
(23)	.025	.04	.03	.039	.0375	.04	.04	.04	.04	.07
(24)	6.40	6.00	9.50	7.00	5.00	4.00	7.00	5.00	8.00	8.00
(25)	2.50	3.00	4.00	5.00	2.00	3.00	3.00	3.00	4.00	3.20
(26)	2.00	3.50	4.00	4.00	2.50	3.00	3.00	2.75	3.00	2.40
(27)	1.60	2.00	1.50	3.00	1.50	2.50	2.00	2.00	3.00	2.00
(28)	1.00	.60	.40	.80	.90	.40	1.00	1.00	1.00	1.10
(29)	1.80	1.00	.60	1.50	2.00	.90	1.25	1.50	1.50	1.90
(30)	5.00	4.00	4.00	5.00	5.00	8.00	6.00	10.00	6.00	15.00
(31)	4.00	4.00	5.00	5.00	10.00	10.00	5.00	10.00	5.00	6.00
(32)	40.00	40.00	30.00	$100	50.00	50.00	25.00	$200	50.00	50.00

California—Los Angeles County—State—Grade and Pave

J. E. Haddock, Ltd., Pasadena, Calif., $259,824, low to the State Department of Public Works, Division of Highways, Sacramento, for 3.0 mi. grade and pave with A. C. on P. C. C. base. The work is between Long Beach Traffic Circle and Carson St. Bids were received from the following:

(1)	J. E. Haddock, Ltd.	$259,824	(4)	Griffith Co.	$276,999
(2)	Oswald Bros.	265,062	(5)	Ansco Contracting Co., Inc.	285,163
(3)	Sully Miller Contracting Co.	274,081			

		(1)	(2)	(3)	(4)	(5)
2,200	cu. yd. removing concrete	2.70	2.50	3.50	3.00	2.00
161	stas. clearing and grubbing	5.00	2.60	10.00	2.00	5.00
86,000	cu. yd. roadway excavation	.38	.39	.38	.412	.30

(Continued on next page)

Highway and Street . . .

1,800	cu. yd. structure excavation	.75	1.00	1.50	1.00	2.00
70,000	tons imported subgrade material	.45	.39	.45	.58	.62
Lump Sum	dev. W. S. and furn. wat'g equip.	$750	$2100	$4000	$1400	$3000
1,800	M. gal. applying water	.90	.65	2.00	1.35	2.70
47,500	sq. yd. preparing subgrade	.09	.09	.10	.10	.09
161	stas. finishing roadway	5.00	3.50	5.00	10.00	7.00
44,000	sq. yd. asphaltic paint binder	.02	.02	.05	.028	.06
45	tons asphaltic emulsion (cur. sl.)	25.00	30.00	30.00	27.00	24.00
18,500	tons asphalt concrete	3.90	3.84	3.30	3.68	3.00
8,000	cu. yd. P. C. C. (pavement base)	6.60	7.80	8.00	6.85	9.40
700	each pavement dowels	.30	.25	.20	.26	.70
90	cu. yd. class A P. C. C. (structures)	23.00	23.00	30.00	27.00	20.00
2,800	cu. yd. class A P. C. C. (curbs, gutters, sidewalks)	13.50	13.00	14.00	14.30	15.00
930	lin. ft. 30-in. R. C. P. (stand. str.)	4.45	5.00	4.50	5.00	4.70
1,060	lin. ft. 36-in. R. C. P. (stand. str.)	6.00	6.50	6.50	6.60	6.50
8,700	lb. bar reinforcing steel	.065	.06	.08	.065	.10
6,500	lb. miscellaneous iron and steel	.20	.22	.25	.20	.22
5	each adjusting manholes to grade	20.00	12.50	20.00	9.00	25.00
15,000	each mesembryanthemum croceum cuttings	.04	.035	.04	.034	.10

California—Santa Cruz County—State—Grade and Surface

Parish Bros., Sacramento, $334,810, low to Division of Highways, Sacramento, for 7.8 mi. grade and crusher run base surf. between Watsonville and Rob Roy Junction. Bids were received from the following:

(1) Parish Bros. $334,810
(2) A. Teichert & Son, Inc. 337,296
(3) N. M. Ball Sons 353,599
(4) J. A. Casson $410,443
(5) J. E. Haddock, Ltd. 464,039

		(1)	(2)	(3)	(4)	(5)
13	acres clearing and grubbing	$125	$280	$300	$150	$775
477,000	cu. yd. roadway excavation, w/o class	.156	.14	.175	.25	.25
6,100	cu. yd. structure excavation	1.00	1.00	1.30	1.50	2.25
4,000	cu. yd. ditch and channel excav.	.50	.75	.55	.75	1.25
2,608,00	sta. yd. overhaul	.0045	.004	.005	.01	.006
85	cu. yd. removing concrete	2.50	3.00	3.00	10.00	3.20
Lump Sum	dev. W. S. and furn. water equipment	$500	$250	$1000	$1000	$5000
3,600	M. gal. applying water	1.20	1.25	1.25	2.00	1.00
410	sta. finishing roadway	7.00	6.00	4.00	8.00	10.00
95,500	tons crusher run base	1.65	1.65	1.56	1.70	1.75
180	tons liquid asphalt SC-1 (prime coat)	13.00	16.00	13.50	15.00	30.00
95	tons liquid asphalt SC-2 (prime coat)	13.50	19.00	15.00	16.00	30.00
715	tons liquid asphalt SC-3 or 4 (bit. surf. trt.)	13.00	16.50	15.00	16.00	17.50
87,000	sq. yd. prep., mixing and shaping surf. (bit. surf. trt.)	.08	.07	.07	.09	.40
300	cu. yd. class A P. C. C. (structs.)	24.00	31.00	28.00	28.00	35.00
30	cu. yd. class B P. C. C. (curbs, gutters, sidewalks)	20.00	25.00	20.00	26.00	24.00
55,000	lb. bar reinforcing steel	.06	.10	.08	.08	.10
44	each monuments	3.00	3.00	3.00	3.00	3.50
308	each culvert markers and guide posts	2.50	3.00	3.00	3.00	2.75
2.0	mi. new property fences	$800	$800	$1000	$800	$800
6	each drive gates	20.00	25.00	25.00	50.00	30.00
1,200	lin. ft. 8-in. C. M. P. (16 gauge)	1.00	1.00	1.20	1.20	1.00
23	each spillway assemblies	20.00	16.00	20.00	20.00	20.00
165	each pipe anchors	10.00	7.00	8.00	1.50	5.00
20	each slip joints	12.00	12.00	12.00	15.00	10.00
10,000	lin. ft. 6-in. P. M. P. underdrains	.70	.60	.80	.70	.60
4,500	cu. yd. rock filling material	3.00	3.50	4.50	2.00	4.00
140	lin. ft. removing and salvaging pipe culverts	1.00	1.00	1.00	.50	.90
7,500	lin. ft. 7-in. galvanized metal pipe	.60	.60	.75	.70	.60
4,400	lin. ft. 8-in. galvanized metal pipe	.70	.75	.80	.90	.65
63	each reducers	6.50	8.00	5.00	10.00	10.00
1	each brick catch basin	$110	$150	$100	$200	90.00
3	each manholes adjusted to grade	50.00	20.00	30.00	50.00	20.00
5	each cast steel frames and covers	55.00	65.00	75.00	25.00	60.00
32	each redwood covers for drop inlets	5.00	7.00	6.00	10.00	9.00
1,900	lin. ft. 18-in. R. C. P. (std. str.)	2.00	2.40	2.30	2.25	3.50
100	lin. ft. 24-in. R. C. P. (std. str.)	3.55	3.70	4.00	3.50	4.25
74	lin. ft. 42-in. R. C. P. (std. str.)	10.00	8.50	9.00	8.50	9.00
190	lin. ft. 42-in. R. C. P. (ext. str.)	11.00	10.00	10.00	10.00	10.00

Colorado—Logan County—State—Steel and Concrete

Lawrence Construction Co., Denver, $28,507, low to the State Highway Department, Denver, for 2 structures and gravel approaches. The structures are located between Brush and Sterling on State Highway No. 2 and are 0.409 mi. in length. Bids were received from the following:

(1) Lawrence Construction Co. $28,507
(2) Colorado Bridge & Construction Co. 29,422
(3) Frank M. Kenney 30,282
(4) Steinwald & Watts $30,492
(5) Henry Shore 30,573
(6) H. H. & N. M. Monaghan 30,825

		(1)	(2)	(3)	(4)	(5)	(6)
Lump Sum	remove bridge, Sta. 825+	$450	$500	$250	$450	$500	$600
Lump Sum	remove 2 structures	50.00	15.00	20.00	50.00	$100	$100
Lump Sum	remove structure, Sta. 834+	$150	$100	50.00	$250	$200	$150
Lump Sum	remove, prepare bridge 834+	$350	$150	$500	$300	$500	$300
200	sq. yd. remove concrete pavement	1.00	.50	.50	.45	.50	1.25
Lump Sum	remove detour bridge 826+	$200	$100	$150	$300	$250	$250
4,300	lin. ft. remove, rebuild fence	.10	.05	.08	.07	.10	.10
140	each line posts, metal	1.00	1.00	1.25	1.00	1.00	1.25
5,000	cu. yd. unclassified excavation	.40	.33	.50	.55	.40	.35
300	cu. yd. unclassified ditch excavation	.50	.60	.50	.75	.50	.50
135	cu. yd. dry common excav. str.	1.25	1.20	1.20	1.25	1.00	1.00
125	cu. yd. wet common excav. str.	5.00	4.00	2.00	4.00	2.00	4.00
52	hours mechanical tamping	3.00	4.00	5.00	3.00	3.00	3.50
65	hours rolling fills	4.00	7.00	3.00	2.75	2.50	3.50
2	each furnish roller unit	$100	$250	$100	$100	$100	80.00
79	M. gal. wetting fills	1.75	4.00	3.00	1.75	1.50	2.00
48,000	sta. yd. overhaul	.02	.02	.01	.02	.01	.02
800	yd. mi. overhaul	.20	.20	.06	.20	.15	.15
10	cu. yd. sand cushion	1.00	2.00	2.00	2.00	1.50	2.00
1,020	ton gravel surfacing	1.00	1.00	1.50	.75	1.00	1.30
380	ton gravel stockpile	1.00	.70	1.30	.72	.90	1.30
1,000	ton mi. gravel overhaul	.10	.07	.08	.07	.06	.10

(Continued on next page)

Highway and Street...

11.5	MFBM untreated bridge timber	$100	$100	$120	$105	$100	$110
271	cu. yd. class A concrete	25.00	26.50	26.00	26.75	25.00	26.00
3	cu. yd. class B concrete	25.00	26.50	26.00	26.75	25.00	26.00
7	cu. yd. class A handrail	50.00	60.00	50.00	50.00	50.00	50.00
29,200	lb. reinforcing steel	.08	.08	.075	.079	.08	.085
59,900	lb. structural steel	.08	.08	.09	.08	.07	.09
56	lin. ft. 18-in. C. M. P. culvert	1.75	2.00	2.00	2.00	2.00	2.00
35	lin. ft. 36-in. C. M. P. culvert	5.00	6.00	4.50	5.20	5.00	5.00
480	lin. ft. treated timber piling	1.50	1.50	1.30	1.90	1.30	1.75
440	lin. ft. untreated timber piling	1.30	1.40	1.20	1.60	1.20	1.50
420	lin. ft. precast concrete piling	6.00	7.50	8.50	8.50	15.00	7.50
80	cu. yd. riprap	4.00	6.00	3.50	3.00	2.00	5.00
2	each barb wire gates	10.00	10.00	10.00	8.00	5.00	10.00
2	each project marker	25.00	25.00	25.00	25.00	25.00	25.00
11	each R. O. W. marker	5.00	5.00	5.00	5.00	5.00	4.00
4	each drain pipe 4"x5'0"	7.00	8.00	6.00	6.50	5.00	8.00
77	each timber guard post	2.25	3.00	3.00	2.50	3.00	2.50

California—Shasta County—State—Pave

A. Teichert & Son, Inc., Sacramento, $320,330, low to Division of Highways, Sacramento, for about 14 mi. of surface with plantmixed surface on crusher run base and over existing surface on highway between Bass Hill and Crespos, and about 0.3 mi. of pavement with P. C. C. Bids were received from the following:

(1) A. Teichert & Son, Inc. $320,330
(2) Fredericksen & Westbrook 346,005
(3) Macco Construction Co. 381,780

		(1)	(2)	(3)
200	cu. yd. structure excavation	2.00	1.60	2.50
8,000	cu. yd. imported borrow	.60	.50	1.00
600	cu. yd. top soil	1.50	1.50	4.00
Lump Sum	dev. W. S. and furn. water equip.	$1500	$2500	$2000
2,000	M. gal. applying water	1.50	1.20	3.00
8,800	sq. yd. prepare subgrade	.17	.12	.10
776	sta. finishing roadway	6.00	7.20	5.00
75,700	ton crusher run base	1.50	1.90	1.70
260	ton liquid asphalt SC-2 (prime coat)	20.00	15.00	17.00
2,050	ton paving asphalt (P. M. S.)	20.00	15.50	16.00
39,800	ton mineral aggregate (P. M. S.)	2.00	2.00	2.60
5,500	ton mineral aggregate (plantmix non-skid surface)	2.15	2.70	4.00
9	ton asphaltic paint binder	33.00	50.00	30.00
80	ton asphaltic emulsion (sl. ct.)	27.00	25.00	21.00
780	ton screenings (sl. ct.)	3.00	5.00	5.00
1,775	cu. yd. class B P. C. C. (pavement)	14.60	13.00	15.00
500	each pavement dowels	.48	.35	.25
3,200	lb. bar reinf. steel	.13	.10	.10
30	each raised bars	3.00	3.50	5.00
180	cu. yd. class A P. C. C. (curbs and gutters)	27.00	24.00	18.00
18,000	lin. ft. metal guard railing	.75	1.00	1.50
300	each culvert markers	3.00	3.00	4.00
340	each guide posts	3.00	3.00	4.00
80	lin. ft. 18-in. C. M. P. (16 gauge)	2.40	2.50	3.50
1,300	lin. ft. 1-in. galv. iron pipe	.35	.60	.40
6	each ruby reflectors	3.00	7.00	10.00

Colorado—Grand County—State—Gravel Surfacing

Switzer Construction Co., Denver, Colo., $199,395, low to the Colorado State Highway Department, Denver, for 2.474 mi. of gravel surfacing between Berthoud Pass and Fraser on State Highway No. 2 (West Portal). Bids were received from the following:

(1) Switzer Construction Co. $199,395
(2) Hamilton & Gleason 204,171
(3) Steinwald & Watts 204,850
(4) Platt Rogers, Inc. 207,114
(5) Pioneer Constr. & Engr. Co. $210,214
(6) J. H. and N. M. Monaghan 210,241
(7) Larson Construction Co. 214,639
(8) Deakin Construction Co. 218,299

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lump Sum	clear and grub 24-ft. road	$1000	$250	$500	$3000	$500	$1125	$2000	$500
Lump Sum	clear and grub 26-ft. road	$3000	$6000	$5500	$5000	$3500	$4000	$2000	$4000
Lump Sum	remove 6 structures	$150	75.00	$120	$300	75.00	$200	$100	$100
1,100	lin. ft. remove fence	.02	.02	.02	.02	.02	.02	.02	.02
800	lin. ft. remove, rebuild fence	.08	.06	.08	.10	.10	.10	.10	.10
25	each line posts, tr. wood	1.00	.75	1.00	1.00	1.25	1.00	1.00	1.00
270,000	cu. yd. unclass. excav.	.42	.43	.42	.46	.48	.46	.49	.48
2,000	cu. yd. unclass. ditch excav.	.50	.75	.75	.50	.50	.80	.70	.75
515	cu. yd. dry rock excav. str.	1.50	1.50	2.50	2.00	2.00	1.25	2.00	1.50
775	cu. yd. dry com. excav. str.	1.00	1.00	1.25	1.00	1.50	1.00	1.50	1.00
345	cu. yd. wet rock excav. str.	3.00	3.50	4.00	3.00	2.50	3.50	3.00	5.00
515	cu. yd. wet com. excav. str.	2.50	3.00	3.50	2.00	2.00	1.75	3.00	3.00
527	hr. mechanical tamping	3.00	3.50	3.00	3.00	3.00	3.50	3.00	3.50
584,000	sta. yd. overhaul	.01	.01	.015	.01	.01	.01	.01	.01
15,200	yd. mi. overhaul	.20	.10	.15	.10	.10	.20	.10	.15
11,000	ton gravel surfacing	.60	.90	.80	.80	.70	.75	.70	.80
5,500	ton gravel stockpile	.55	.90	.75	.80	.70	.80	.70	.75
1,900	ton mi. gravel overhaul	.07	.15	.10	.10	.10	.10	.10	.08
467	cu. yd. class A concrete	23.75	24.00	24.50	22.00	25.00	25.00	23.00	26.00
42,800	lb. reinforcing steel	.08	.08	.08	.075	.075	.075	.08	.08
300	lb. structural steel	.12	.15	.10	.12	.15	.12	.15	.15
112	cu. yd. cement rub. mason.	18.00	22.00	20.00	15.00	15.00	22.00	20.00	20.00
68	lin. ft. relay pipe	.50	1.00	.60	.50	1.00	1.00	1.00	1.00
60	lin. ft. 18-in. C. M. P. culvert	2.00	1.75	1.90	1.80	2.00	1.75	1.80	1.60
1,674	lin. ft. 24-in. C. M. P. culvert	3.00	2.75	2.75	2.50	2.40	3.00	2.80	2.50
146	lin. ft. 30-in. C. M. P. culvert	4.00	3.50	3.50	3.30	3.00	3.50	3.50	3.10
734	lin. ft. 36-in. C. M. P. culvert	5.50	5.00	5.20	5.00	4.50	4.70	5.00	4.80
288	lin. ft. 48-in. C. M. P. culvert	9.00	7.00	6.95	6.80	7.50	9.00	8.00	8.00
240	lin. ft. 120-in. multi-plate C. M. P.	75.00	65.00	70.00	58.00	70.00	62.00	65.00	70.00
178	sq. yd. grout rubble pave., 12-in. T	5.00	4.00	5.00	5.00	4.00	4.50	4.00	5.00
15	sq. yd. dry rubble pave., 12-in. T.	4.00	4.00	3.00	4.00	3.00	2.00	4.00	3.00
1,542	lin. ft. 8-in. perf. C.M.P. un'drain	3.00	1.75	1.50	2.00	2.00	2.25	2.00	3.00
1,320	lin. ft. wire cable guard fence	1.10	1.15	1.15	1.00	1.00	1.00	1.20	1.10
1,000	lin. ft. barbwire fence, T.W.P.	.12	.15	.15	.12	.12	.15	.15	.15
1	ea. project marker	25.00	30.00	25.00	25.00	25.00	25.00	25.00	25.00
49	ea. R. O. W. marker	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
312	ea. timber guard post	2.75	3.00	2.50	2.50	3.00	2.50	3.00	3.00
200	cu. yd. salvage, pile oil surf.	3.00	4.00	3.50	1.00	.30	1.50	1.50	1.00
2	ea. masonry manhole	$100	$125	75.00	$150	$100	$100	$100	$100
940	lin. ft. 30-40-lb. steel rail	.60	.43	.75	.75	.40	.60	.60	.60

CENTRIFUGAL REINFORCED
CONCRETE PRESSURE PIPE
FOR CAMP SAN LUIS OBISPO

Camp San Luis Obispo line—Salinas River Project. 50,000 feet of 24-inch Centrifugal Reinforced Concrete Pipe. Test Pressure 72 pounds.

Approximately 50,000 feet of 24-inch centrifugal concrete pressure pipe with rubber gasket joints, furnished for Salinas River Project—main water supply line for Camp San Luis Obispo. Maximum operating head, 140-feet. Leeds, Hill, Barnard and Jewett, Architect-Engineer for Quartermaster General's office, U. S. Army.

AMERICAN CONCRETE AND STEEL PIPE COMPANY

LOS ANGELES • OAKLAND • SAN DIEGO • TACOMA

CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $10,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information on many of these projects is often available, and will gladly be furnished upon your request to the Editor, WESTERN CONSTRUCTION NEWS, 503 Market Street, San Francisco.

Large Western Projects...

CONTRACTS AWARDED

Fredericksen & Westbrook & Paul J. Tyler, Sacramento, Calif., $989,280, by Bureau of Reclamation, Sacramento, for 5½ mi. Friant-Kern Canal, from 600 ft. W. of Friant Dam to Clovis-Auberry Hwy., at Little Dry Creek, Central Valley project, Calif.

Henry J. Kaiser Co., Oakland, Calif., $5,624,000 (negotiated contract), by Bureau of Yards & Docks, Navy Dept., Washington, D. C., for 5 additional double ways, machine and electric shops, for additional shipbuilding facilities at Mare Island, Solano County, Calif.

James I. Barnes Construction Co., Santa Monica, Calif., $517,688, by U. S. Engineer Office, Los Angeles, Calif., for grading and paving a landing field for the Air Corps Ferrying Command, Long Beach, Los Angeles County, Calif.

Allied Engineering & Shipbuilding Corp., and **Tavares Construction Co.,** Los Angeles, Calif., $3,000,000 (joint bid), by U. S. Maritime Commission, Washington, D. C. for 5 concrete bulk cargo barges at a shipyard to be built on a 40-acre site in National City, San Diego County, Calif.

Pittsburgh-Des Moines Steel Co., San Francisco, Calif., $5,202,320, by Natl. Advisory Commission of Aeronautics, Moffett Field, Calif., for a 40 x 80 ft. fabricated steel wind tunnel at Moffett Field, Santa Clara County, Calif.

Zoss Construction Co., Los Angeles, Calif., $1,414,420, by Architect Eugene Weston, Jr., Los Angeles, for Federal Works Administration, Washington, D. C., for a 600-unit housing project in the Los Angeles Harbor Area for the FWA, Div. of Defense Housing, in Los Angeles County, Calif.

Fritz Ziebarth, Long Beach, Calif., $3,000,000 (est. cost), by Basic Magnesium, Inc., Las Vegas, Nev., for approx. 40 circuit mi. of 230 kv. transmision line betw. Boulder Dam and the site of the new plant of Basic Magnesium, Inc., in Clark County, Nev.

E. C. Hall Co., Eugene, Ore., and **J. C. Compton,** McMinnville, $1,128,841 (supplemental), by U. S. Engineer Office, Portland, for additional runways and taxiways at municipal airport of Eugene, Lane County, Ore.

United Engr. & Foundry Co., Pittsburgh, Pa., $20,000,000 (est. cost), by Aluminum Co. of America, Pittsburgh, for general const. of an aluminum fabricating plant on a 115-acre site at Fairview, Multnomah County, Ore.

Ross B. Hammond Co., Portland, Ore., $12,000,000 (est. cost of plant), by Aluminum Co. of America, Portland, for excavation and foundations of plant capable of producing 90,000,000 lbs. aluminum annually, at Troutdale, Multnomah County, Ore.

Austin Co., Seattle, Wash., $4,500,330, by Bureau of Yards & Docks, Navy Dept., Washington, D. C., for additional facilities as follows: Whidby Island, Wash., $3,370,020; Seattle, Naval Air Station, $284,200; Bainbridge Island, radio station, $70,560; Indian Island, naval magazine, $826,300.

J. C. Boespflug, Miles City, Mont., $2,535,000, by Seattle Housing Authority, Seattle, for 700-unit Gatewood Heights defense housing project in W. Seattle, King County, Wash.

Hawaiian Dredging Co., Raymond Conc. Pile Co., Turner Construction Co., Morrison-Knudsen Co., J. H. Pomeroy, W. A. Bechtel Co., Utah Construction Co., & Byrne Organization, Naval Aid Station, Alameda, Calif., $59,887,910, by Bureau of Yards & Docks, Navy Dept., Washington, D. C., for additional facilities for naval ships and planes in Hawaiian and Pacific Islands.

Highway and Street...

CONTRACTS AWARDED

Arizona

COCHISE CO.—**Jas. S. Maffeo,** Box 39, Bisbee—$31,439, for 5.5 mi. roadmixed bitum. surf., SC-3, on the Benson-Douglas Hwy. from Tombstone southeasterly—by Arizona State Highway Commission, Phoenix. 11-12

COCONINO CO.—**Packard Construction Co.,** 412 Luhrs Tower Bldg., Phoenix—$62,058, for 4 mi. grade, aggr. base course, and spec. bitum. surf. treat., SC-2, on the Flagstaff-Ft. Valley Hwy., from 3 mi. N. of Flagstaff to Ft. Valley—by Arizona State Highway Commission, Phoenix. 11-12

GREENLEE CO.—**George W. Orr,** Box 127 El Paso, Texas—$154,457, for 3.8 mi. grading, aggregate base course, and special bituminous surface treatment on the Duncan-Clifton Highway from 3 mi. southeast of Clifton southeasterly—by Arizona State Highway Commission, Phoenix. 11-12

YUMA CO.—**Tanner Const. Co.,** Security Bldg., Phoenix—$12,000, for furn. and stockpiling 12,000 T mineral aggregate on the Yuma-San Luis Hwy., about 3.75 mi. from Yuma—by State Highway Engineer, Phoenix. 11-12

California

KERN CO.—**Louis Biasotti,** P. O. Box 587, Stockton—$130,686, for 8 mi. grade and apply penetr. treatment between Deepwell Ranch and ¼ mi. north of Kern-Tulare Co. line—by California Division of Highways, Sacramento. 11-19

LOS ANGELES CO.—**J. E. Haddock, Ltd.,** 3578 E. Foothill Blvd., Pasadena—$259,824, for 3 mi. grade and AC pave on conc. base between Long Beach traffic circles and Carson St.—by California Division of Highways, Los Angeles. 11-14

LOS ANGELES CO.—**Griffith Co.,** 1060 So. Broadway, Los Angeles—$13,953, for grade and surf. on Alpine, Ohio and Oswego Sts., and Summit Ave., Pasadena—by City Clerk, Pasadena. 11-24

LOS ANGELES CO.—**Krieger Oil Co.,** 225 West Compton Blvd., Clearwater—$29,875, for furn. and spreading 25,000 bbl. road oil near Long Beach—by U. S. Treas. Dept., Los Angeles. 10-30

SACRAMENTO CO.—**J. R. Reeves,** P. O. Box 1072, Sacramento—$12,438, for asph. conc. pave, grade, sewers, etc., in the Fifth Ave. Tract—by City Clerk, Sacramento. 11-24

SAN DIEGO CO.—**V. R. Dennis Const. Co.,** Box "F", Hillcrest Sta., San Diego—$42,636, for grade and pave Buena Vista St., La Manche Drive and other streets—by City Clerk, San Diego. 11-24

SAN DIEGO CO.—**Griffith Co.,** 1060 South Broadway, Los Angeles—$10,568, for grade and surf. Hugo St., San Diego—by City Clerk, San Diego. 11-18

SAN FRANCISCO CO.—**Chas. L. Harney,** 443 Call Bldg., San Francisco—$10,764, for improvement of 36th Ave. betw. southerly Ortega St. and southerly Pacheco St.—by Department of Public Works, San Francisco. 11-13

SAN LUIS OBISPO CO.—**J. E. Haddock, Ltd.,** 357 North Chester Rd., Pasadena—$93,103, for surfacing on roads, motor vehicle parking area, runways and taxiways at Sherwood Field airport, Paso Robles—by Constructing Quartermaster, Camp San Luis Obispo. 11-6

SAN MATEO CO.—**Union Paving Co.,** 310 California St., San Francisco—$324,547, for 3.2 mi. grade and asph. conc. pave., betw. Charter Street in Redwood City and San Francisquito Creek bridge—by California Division of Highways, Sacramento. 11-6

SHASTA CO.—**Poulos & McEwen,** P. O. Box 1017, Sacramento—$25,458, for 1 mi. grading betw. Sulphur Creek and Boulder Creek—by California Division of Highways, Sacramento. 11-6

STANISLAUS CO.—**S. M. McGaw,** 425 Lexington Ave., Stockton—$13,584, for grading, surfacing, etc., on "D" St. betw. 9th and 14th Sts. in Modesto—by City Clerk, Modesto. 11-26

Colorado

DOUGLAS CO.—**DeRemer-Atchison,** P. O. Box 111, Littleton—$341,881, for 7.082 mi. gravel surf. and const. bridges on S. H. 83 betw. Parker and Colorado Springs—by State Highway Engineer, Denver. 11-25

GRAND CO.—**Hamilton & Gleason Co.,** 505 Tramway Bldg.,

Denver—$85,942 for 9.223 mi. gravel surfacing project located between Tabernash and Granby, on S.H. No. 2—by State Highway Engineer, Denver. 11-10

GRAND CO.—**Switzer Const. Co.,** 822 University Blvd., Denver—$199,395, for 2.474 mi. gravel surfacing on S.H. No. 2, betw. Berthoud Pass and Fraser——by State Highway Engineer, Denver. 11-7

LOGAN CO.—**Frank M. Kenney,** 56 Steele St., Denver—$114,765, for 1.559 mi. gravel surfacing approaches and const. of two structures, on S.H. No. 2 and No. 14, betw. Brush and Sterling and east of Sterling—by State Highway Engineer, Denver. 11-10

RIO BLANCO CO.—**M. J. Sears,** 509 15th St., Denver—$51,718, for 1.192 mi. grav. surf. betw. Craig and Meeker, on State Hwy. No. 13—by State Highway Dept., Denver. 11-3

Idaho

BONNER CO.—**Chas. A. Power,** E. 27 8th Ave., Spokane, Wash.—$34,680, for 2.829 mi. grade, drain and crush. grav. surf. on Colburn-Culver Rd.—by Dept. of Public Works, Bur. of Highways, Boise. 11-4

JEROME CO.—**Hoops Construction Co.,** Twin Falls—$92,624, for roadbed, drainage structures and cr. gravel surfacing on the Tipperary Corner Road, and 1.224 mi. roadbed, etc., on the "J" Coulee Road—by Commissioner of Public Works, Boise. 11-10

SHOSHONE CO.—**G. D. Lyon & Co.,** W. 503 14th St., Spokane, Wash.—$50,914, for 1.063 mi. grade, const. drain. structures and crush. rock surf. on Coeur d'Alene-Yellowstone Trail Hwy., east of Kellogg—by Dept. of Public Works, Bur. of Highways, Boise. 11-4

Montana

BIG HORN CO.—**Albert Lalonde Co.,** Sidney—$92,876, for 4.865 mi. grade, surf. with cr. gravel, road mix oil treatment of surf. course and const. of small drain. structures on Sec. B of the Hardin-Custer Road—by State Highway Commission, Helena. 11-27

CASCADE CO.—**E. W. Howe,** Great Falls—$40,461, for 1.858 mi. regrade, surf. with cr. gravel, road mix oil treatment of surf. course and const. of small drain. structures including a std. 11-ft. treated timber stockpass at Survey Station 1215-58.0 on Sec. B. of the Choteau-Sun River Road—by State Highway Commission, Helena. 11-27

DAWSON CO.—**John Holm,** Glendive—$17,783, for conc. sidewalk and sudsidiary work on the Yellowstone River Bridge and approaches at Glendive—by State Highway Commission, Helena. 11-27

McCONE CO.—**Albert Lalonde Co.,** Sidney—$124,988, for 18.995 mi. surfacing with cr. gravel and the bituminous surface treatment of the wearing surface on Sections "D" and "F" of the Jordan-Circle Road, on the line between Garfield and McCone Counties easterly to one mile north of Brockway—by State Highway Commission, Helena. 11-27

MISSOULA CO.—**L. A. Woodward Co.,** Missoula—$93,598, for 5.187 mi. grade, surf. with cr. gravel and const. of small drain. structures on Sec. G of the Bonner-Ovando Road, begin. at North end of the Big Blackfoot River Bridge, northeasterly—by State Highway Commission, Helena. 11-27

MISSOULA CO.—**Union Const. Co.,** Great Falls—$257,816, for 3.212 mi. regrade, surf. with cr. gravel, roadmix oil treatment of surf. course and const. of small drain. structures on the Turah Hill and adj. sec. of Missoula-Clinton Road—by State Highway Commission, Helena. 11-27

POWELL CO.—**Frank J. Haas,** Great Falls—$12,660, for 4.476 mi. surf. with cr. gravel of Sec. D of Avon-Helmville Road—by State Highway Commission, Helena. 11-27

ROSEBUD CO.—**Peter Kiewit Sons Co.,** 1024 Omaha Natl. Bank Bldg., Omaha, Neb.—$216,955, for 13.049 mi. grade, surf. with cr. gravel, oil treatment of surf. course, and const. of small drain. structures on Sec. I of the Round-up-Forsyth Road, in the town of Melstone, easterly—by State Highway Commission, Helena. 11-27

SWEETGRASS CO.—**Nilson-Smith Const. Co.,** Old Great Northern Freight Depot, Great Falls—$157,150, for 9.454 mi. grade, surf. and const. small drain. structures on Sec. B of the Big Timber-Harlowton Road—by State Highway Commission, Helena. 11-27

YELLOWSTONE CO.—**Chas. Shannon,** Butte—$29,377, for 7.281 mi. blading subgr., surf. with cr. gravel and const. of small drain. structures on Sec. F of Billings-Broadview Road—by State Highway Commission, Helena. 11-27

Nevada

CLARK CO.—**Silver State Const. Co.,** Fallon—$87,571, for 4.46 mi. grade, drain, gravel surf. on Rt. 60, Sec. A, between Nelson and 4.5 mi. W. of Nelson—by Directors of Department of Highways, Carson City. 11-18

LANDER CO.—**Isbell Const. Co.,** P. O. Box 2351, Reno—$128,450, for 10.71 mi. grade, three timber bridges, install structures, place type 1 and 2 gravel base courses, etc., from 48 mi. south of Battle Mountain to 30 mi. north of Austin—by Directors of Department of Highways, Carson City. 11-18

New Mexico

CATRON CO.—**Mark L. Terry,** Deming—$17,891, for 1.767 mi. grade, structures, etc., For. Proj. 21-M, Datil-Reserve-Dry Creek—by Public Roads Administration, Santa Fe. 11-12

Oregon

CLATSOP CO.—**A. H. Saxton & Son,** Corvallis—$16,160, for 8,000 cu. yd. cr. rock in stockpiles, Klaskanine Summit-Jewel Rock Prod. Proj., on Nehalem Sec. Hwy.—by State Highway Commission, Portland. 11-21

LAKE CO.—**Rogers Const. Co.,** Dayton, Wash.—$13,842, for 7,100 cu. yd. cr. rock in stockpiles on Drews Valley Rock Prod. Proj., Klamath Falls-Lakeview Hwy.—by State Highway Commission, Portland. 11-19

MARION CO.—**C. J. Montag & Sons,** Worcester Bldg., Portland—$148,028, for 2.22 mi. grade and pave Illahee-Steiwer Hill Section, Pacific Hwy. eastwardly in Marion Co.—by State Highway Commission, Portland. 11-21

MULTNOMAH CO.—**Edlefsen-Weygandt Co.,** North Peninsular Ave. and Columbia Blvd., Portland—$181,871, for 0.24 mi. grade and pave, Front Ave. (Ankeny St.-Washington St.) Section, Pacific Hwy. west—by State Highway Commission, Portland. 11-19

MULTNOMAH CO.—**Colonial Const. Co.,** W. 326 1st Ave., Spokane, Wash.—$87,340, for 0.57 mi. rock toe embankment on Corbett Sec., Columbia River Hwy.—by State Highway Commission, Portland. 11-19

POLK CO.—**Independence Sand & Gravel Co.,** Independence—$10,500, for furn. 6,000 cu. yd. cr. rock or cr. gravel in stockpiles on St. Highways near Rickreall—by State Highway Commission, Portland. 11-21

TILLAMOOK CO.—**Independent Sand & Gravel Co.,** Independence—$18,170, for 7,900 cu. yd. cr. rock or cr. gravel in stockpiles, Willamina Rock Prod. Proj., on State Hwys. near Willamina—by State Highway Commission, Portland. 11-19

UMATILLA CO.—**Dail & Warren Bros.,** 8919 S.E. Foster Blvd., Portland—$26,288, for 2.97 mi. grade, surf. and oil, Gerking School-Athena Section of the Athena-Holdman Sec. Hwy.—by State Highway Commission, Portland. 11-21

WASHINGTON CO.—**Porter W. Yett,** 6500 N.E. Ainsworth St., Portland—$100,664, for 1.44 mi. grade and pave, Sylvan-West Slope Sec. of the Tualatin Valley Highway—by State Highway Commission, Portland. 11-21

YAMHILL CO.—**Independent Sand & Gravel Co.,** Independence—$12,350, for 6500 cu. yd. cr. rock or cr. gravel in stockpiles, McMinnville Rock Prod. Proj., on State Hwys. near McMinnville—by State Highway Commission, Portland. 11-19

Utah

DAVIS CO.—**Carl E. Nelson,** 341 Boulevard, Logan—$42,643, for 4.413 mi. cr. rock or cr. gravel surf. between Layton & Hill Field, and Hill Field to U. S. 89—by State Road Commission, Salt Lake City. 11-17

JUAB CO.—**Atherley Bros.,** Eureka—$46,965, for 5.018 mi. cr. rock or gravel surf. betw. Eureka and Jericho—by State Road Commission, Salt Lake City. 11-24

Washington

KING CO.—**Northwest Construction Co.,** 3950 Sixth Ave., N.W., Seattle, $306,701, for clear, grade, drain and constr. 3 reinforced conc. bridges on about 2.5 mi. of Prim. St. Hwy. No. 2, and constr. about 1.1 mi. of RR. grade and 2 treated pile and timber RR. bridges, Issaquah to Preston—by Director of Highways, Olympia. 11-27

KING CO.—**Peter Kiewit Sons Co.,** 1024 Omaha Natl. Bank Bldg., Omaha, Neb., $263,899, for 2.0 mi. clearing, grading, draining and const. of 4 reinforced conc. bridges on Prim. St. Hwy. 2, Issaquah to Preston—by Director of Highways, Olympia. 11-27

Wyoming

CAMPBELL CO.—**Big Horn Const. Co.,** Sheridan—$174,037, for cr. rock base course, oil treatment by road-mix method, stone chip seal coat and misc. work on 17.271 mi. of Sheridan-Gillette Road—by State Highway Commission, Cheyenne. 10-31

CAMPBELL CO.—**Tony J. Pelesky,** Sheridan—$11,350, for 6.5 mi. pit run Scoria base course surf. of Gillette-Broadus Road—by State Highway Commission, Cheyenne. 11-17

CAMPBELL CO.—**Sharock & Pursel,** Casper—$174,706, for 18.699 mi. grade, drain, etc., on the Gillette-Douglas Road—by Wyoming State Highway Commission, Cheyenne. 11-6

CARBON CO.—**Teton Construction Co.,** Cheyenne—$78,723, for 2.891 mi. grade, drain, surf., const. two timber bridges and three culverts on Creston-Baggs Road—by State Highway Commission, Cheyenne. 11-17

CROOK CO.—**J. J. Dooling,** Denver, Colo.—$117,725, for grading, draining, treated timber bridge and misc. work on 10.834 mi. of Upton-Sundance Road—by State Highway Commission, Cheyenne. 10-31

FREMONT CO.—**Peter Kiewit Sons Co.,** Omaha, Neb.—$358,891, for grading, draining, base course surfacing, treated timber bridge and misc. work on 12.683 mi. of Lander-Farson Road—by State Highway Commission, Cheyenne. 10-31

PARK CO.—**Taggart Const. Co.,** Rapid City, S. Dak.—$157,703, for grading, draining, base course surf, oil treatment by roadmix method, two reinf. conc. culverts and misc. work on 6.46 mi. of the Cody-South Fork Road—by Wyoming State Highway Commission, Cheyenne. 10-31

SWEETWATER CO.—**Northwestern Enginering Co.,** Rapid City, South Dakota—$162,279, for 8.626 mi. grading, draining, etc., on the Granger Junction-Green River Road—by Wyoming State Highway Commission, Cheyenne. 11-6

SWEETWATER CO.—**Summit Const. Co.,** Rapid City, So. Dakota—$22,510, for 16.783 mi. base course surf. on the Rock Springs-Hiawatha Road—by Wyoming State Highway Commission. 11-6

UINTA CO.—**Woodward Construction Co.,** Rock Springs—$53,387, for 2.292 mi. base course surf., stone chip seal-coat, and misc. work on Evanston-South Road—by State Highway Commission, Cheyenne. 11-17

UINTA CO.—**Wyoming Const. Co.,** Laramie—$47,003, for 2.564 mi. grade, drain, surf., seal coat, 1 treated timber bridge, on the Urie-Carter Road—by Wyoming State Highway Commission, Cheyenne. 11-6

Bridge & Grade Separation...

CONTRACTS AWARDED

California

MERCED CO.—**C. B. Cameron & Son,** P. O. Box 244, Merced—$12,100, for const. and repairing bridges No. 331, 333, 332, 334, 335 and 336, in Merced County—by Merced County Clerk, Merced. 11-17

VENTURA CO.—**Hensler & McDonald,** 3702 Foothill Blvd., La Crescenta—$23,763, for rigid frame reinforced conc. bridge, 163 ft. long, consist. of 3-45 ft. spans and 2-14 ft. cantilevers with solid piers resting on conc. pile supported footings—by Ventura County Supervisors, Ventura. 11-5

Colorado

EAGLE CO.—**Henry Shore,** P. O. Box 189, Littleton—$35,961, for a conc. and steel bridge and 0.481 mi. gravel surfacing on S.H. 4, between Avon and Wolcott—by State Highway Engineer, Denver. 11-25

Idaho

ADA CO.—**Felix Plastino,** Jerome—$16,817, for 52 ft. conc. bridge over Farmers Union Canal, on Boise Valley Hwy., near Collister—by Department of Public Works, Bureau of Highways, Boise. 11-17

JEROME CO.—**Dan J. Cavanagh,** Twin Falls—$15,528, for one timber culvert on Tipperary Corner Rd., and 3 conc. and timber bridges on "J" Coulee Rd.—by Commissioner of Public Works, Boise. 11-10

Montana

BIG HORN CO.—**W. P. Roscoe Co.**, Billings—$14,283, for 5 treated timber pile trestles on Sec. B of Hardin-Custer Road—by State Highway Commission, Helena. 11-27

MINERAL CO.—**Roy L. Bair,** 1220 Ide Ave., Spokane, Wash.—$173,578 for const. or improving a steel and reinf. conc. bridge, 786 ft. in length, over the Clark Fork River and tracks of the No. Pacific Rwy. Co. (0.1489 mi. bridge); together with 0.383 mi. approach grading, surf. and bitum, surf. on Yellowstone Trail Hwy., Montana For. Road Proj., located within or partly within the Cabinet Natl. For.—by Public Road Administration, Missoula. 11-17

MISSOULA CO.—**Cahill-Mooney Const. Co.**, Butte—$30,917, for conc. box culvert, 4 timber stockpasses and 1 conc. and steel bridge, on Sec. G of Bonner-Ovando Road—by State Highway Commission, Helena. 11-27

SWEETGRASS CO.—**Union Const. Co.**, Great Falls—$30,866, for 2 treated timber pile trestles, 2 conc. and steel bridges and 3 treated timber stockpasses, on Sec. B of Big Timber-Harlowton Road—by State Highway Commission, Helena. 11-27

Nevada

LANDER CO.—**Isbell Construction Co.**, P. O. Box 2351, Reno—$128,450, for 10.71 mi. grade, construct 3 timber bridges, install structures, place Type 1 and 2 gravel base courses, etc., from 48 miles south of Battle Mountain to 30 miles north of Austin—by Directors of Department of Highways, Carson City. 11-13

Utah

WASATCH CO.—**Miner Bros. Const. Co.**, 519 E. 1st South, Provo—$47,502, for 0.687 mi. const. a conc. T-beam bridge and roadmix bitum. surf. road between Heber and Midway—by State Road Commission, Salt Lake City. 10-31

Washington

KING CO.—**Manson Const. & Engineering Co.**, 129 Canadian Natl. Pier, Seattle—$14,530, for untreated timber and pile navigation fenders at the Lake Washington Bridge and East Channel Bridge, on Primary St. Highway 2—by Director of Highways, Olympia. 11-27

Wyoming

CAMPBELL CO.—**Etlin E. Peterson,** Casper—$35,332, for 2 treated timber bridges and 8 R.C. culverts, on Gillette-Douglas Road—by Wyoming State Highway Commission, Cheyenne. 11-6

PARK CO.—**Chas. M. Smith,** Thermopolis—$51,739, for two 52-ft. and one 62-ft. I-beam span bridges and misc. appr. work across Greybull River at Meeteetse, on Cody-Meeteetse Road—by State Highway Commission, Cheyenne. 11-17

SWEETWATER CO.—**J. H. & N. M. Monaghan,** 332 S. Race, Denver, Colo.—$31,632, for 2 R.C. culvert extensions, on the Granger Jct.-Green River Road—by Wyoming State Highway Commission, Cheyenne. 11-6

Water Supply . . .

CONTRACTS AWARDED

California

MARIN CO.—**Underground Const. Co.**, 354 Hobart St., Oakland—$2,925, for extension to water system at Fort Baker—by Constructing Quartermaster, Fort Mason. 11-26

MONTEREY CO.—**Western Well Drilling Co., Ltd.**, 522 W. Santa Clara, San Jose—$13,988, for a const. and competion of 2 wells for water supply at Camp Roberts—by Constructing Quartermaster, Camp Roberts. 11-26

RIVERSIDE CO.—**Ocean Shore Iron Works,** 550 Eighth St., and **A. C. LoPrest,** 560 7th St., San Francisco—$198,455, for water treatment plant, reservoir, etc., at Camp Haan, Riverside—by Construction Quartermaster, Camp Haan. 11-13

SAN BERNARDINO CO.—**Ford J. Twaits Co.,** 816 W. 5th St., Los Angeles—$46,540, for a pumping station and pipeline at Victorville Military Airport—by U. S. Engineer Office, Los Angeles. 11-18

SANTA CRUZ CO.—**R. S. Friend,** 309 Stanford St., Watsonville—$16,985, for wells and pumping facilities, Camp McQuaide—by Construction Quartermaster, Ford Ord. 11-13

Nevada

CLARK CO.—**Engineers, Limited,** 605 West Olympic, Los Angeles— ? ? ? ?, for steel cantilever structure to carry pumps and intake at Lake Mead—by Basic Magnesium, Inc., Las Vegas. 11-13

CLARK CO.—**Engineers, Limited,** 605 West Olympic, Los Angeles— ? ? ? ?, for 16 mi. of 40-in steel pipeline—by Basic Magnesium, Inc., Las Vegas. 11-13

Washington

WAHKIAKUM CO.—**Soule & Walters,** Elma—$65,534, for a domestic water supply system for the inhabitants of Puget Island —by Commission of Public Utilities, Dist. 1 of Wahkiakum Co., Cathlamet. 11-12

Sewerage . . .

CONTRACTS AWARDED

Arizona

MARICOPA CO.—**Del E. Webb,** 1633 W. Jefferson, Phoenix—$105,358, for sewage treatment plant at the Mesa Military Airport—by U. S. Engineer Office, Los Angeles. 11-10

California

ALAMEDA CO.—**John Pestana,** 4039 Fruitvale Ave., Oakland —$3,069, for vitrified storm sewer conduit in Redwood Road and Tract—by City Clerk, Oakland. 11-14

ALAMEDA CO.—**John Pestana,** 4039 Fruitvale Ave., Oakland —$2,316, for drainage structures in Snake Road northeast of Hemlock St., and in Wild Currant Way—by City Clerk, Oakland. 11-14

HUMBOLDT CO.—**Morganti, Pearl & Worswick,** 465 Wabash Ave., Eureka—$7,762, for storm sewers and appurt. curbs and gutters, in portions of Broadway, from Third St. to Murray St.—by City Clerk, Eureka. 11-13

LOS ANGELES CO.—**C. O. Brand,** 3696 Everest St., Arlington—$2,678, for sewer and sidewalk on Fair Oaks Ave., betw. Mound Ave. and Columbia St. in South Pasadena—by City Clerk, South Pasadena. 11-28

LOS ANGELES CO.—**Leko & Bosnyak,** 3014 Worthen, Los Angeles—$3,570, for sewers in 220 St. betw. Grace St. and Avalon Blvd.—by County Supervisors, Los Angeles. 11-19

LOS ANGELES CO—**Ivan M. Metkovich,** 143 E. 81st St., Los Angeles—$3,951, for sewers in 121st St. betw. Main and San Pedro Sts.—by Los Angeles Co. Supervisor, Los Angeles. 11-19

LOS ANGELES CO.—**Oberg Bros.,** 612 E. 80th St., Los Angeles—$54,500, for the const. of a reinforced conc. blanket along portions of Section 6, North Outfall Sewer, in Cabora Drive betw. 640 ft. easterly and 400 ft. westerly from Gulana Walk—by Board of Public Works, Los Angeles. 10-30

ORANGE CO.—**G. E. Kerns,** 3712 Gaviota Ave., Long Beach —$41,301, for sewer line connection betw. army flying cadet ground training school along Newport Blvd. and the joint outfall sewer line—by Santa Ana City Council (as contracting city for Joint Outfall Sewer District). 11-17

ORANGE CO.—**R. A. Wattson Co.,** 1026 N. McCadden Place, Los Angeles—$42,188, for an outfall sewer at Air Corps West Coast Replacement Center, Santa Ana—by U. S. Engineer Office, Los Angeles. 11-25

SAN DIEGO CO.—**Walter H. Barber,** P. O. Box 1523, San Diego—$44,291, for 1.6 mi. drainage system in city of San Diego, on Pacific Hwy. betw. Bean St. and Smith, and on Barnett Ave. from Pacific Hwy. to ¼ mi. W.—by Calif. Division of Highways, Los Angeles. 11-17

SAN FRANCISCO CO.—**Fay Improvement Co.,** Phelan Bldg., San Francisco—$1,225, for vitr. clay sewer in Quesada Ave. east of Quint St.—by Department of Public Works, San Francisco. 11-14

SAN FRANCISCO CO.—**M. J. McGuire** and **M. Hester,** 799 66th Ave., Oakland—$4,638, for extending existing drain from Mountain Lake 2200 ft. to connection with existing city storm drain on the Funston Ave. approach to Golden Gate Bridge within limits of Presidio Military Reservation—by State Director of Public Works, Sacramento. 11-26

SAN LUIS OBISPO CO.—**F. C. Stolte,** 203 Pine St., Pacific Grove—$118,100 (alt.), for a sewage disposal plant—by City Clerk, San Luis Obispo. 11-18

SANTA BARBARA CO.—**Western Motor Transfer Co.,** 118 State St., Santa Barbara—$7,031, for storm drains in Gillespie St., and in Mission St.—by City Clerk, Santa Barbara. 11-26

Washington

KLICKITAT CO.—**Brady Const. Co.,** 1166 Mercer St., Seattle—$16,400, for sewage disposal plant at Goldendale—by Goldendale City Council. 10-31

Waterway Improvement . . .

CONTRACTS AWARDED

California

ORANGE CO.—Awards, as follows, by City Clerk, City Hall, Seal Beach, for construction of jetties, groins and dredging in Seal Beach Harbor: Prop. No. 1—Stone Work—to **A. S. Sparkes,** Costa Mesa—$49,250. Prop. No. 2—Timber Groins—to **Tavares Const Co.,** 4657 Sheila, Los Angeles—$27,404; and to **A. S. Sparkes,** Costa Mesa—$36,813. Prop. 3—Dredging—to **A. S. Sparkes,** Costa Mesa—$98,900. Prop. 4—Relocate Utilities—All bids rejected. 11-19

ORANGE CO.—**Mojave Corp.,** Los Nietos—$21,899, for cement conc. and steel pipe bulkhead on peninsula near harbor entrance, approx. 495 lin. ft. long—by City Clerk, Newport Beach. 11-19

SACRAMENTO CO.—**Poulos & McEwen,** P. O. Box 1017, Sacramento—$53,335 for 28,810 ft. enlarge, raise and strengthen levee along West Levee of Reclamation District No. 2068, from Dist. No. 2068 pump northerly—by U. S. Engineer Office, Sacramento. 11-5

SAN DIEGO CO.—**Standard Dredging Corp.,** Los Angeles—$75,000 (approx.), for approx. 400,000 cu .yd. dredging for Mooring No. 49, Area N, San Diego Harbor—by Bureau of Yards & Docks, Navy Dept., San Diego. 10-31

SOLANO CO.—**Henry J. Kaiser Co.,** Latham Square Bldg., Oakland—$5,624,000 (negotiated contract), for five additional double ways, machine and electric shops, for additional shipbuilding facilities at Mare Island—by Bureau of Yards & Docks, Navy Department, Washington, D. C. 11-19

Oregon

CLATSOP & COLUMBIA CO.—**Eldon & Dennis,** Box 5686, Kenton Station, Portland—$25,268, for clearing, grubbing, stripping, enlarging 0.7 mi. levee, const. 0.7 mi. new levee, drain. structures and appurt., remove tideboxes and backfiill levee, const. pile and timber canal weirs and const. stone revetments in Diking Dist. No. 15 (Westport Area)—by U. S. Engineer Office, Portland. 11-4

Washington

KING CO.—**Austin Co.,** Dexter Horton Bldg., Seattle—$4,500,330 (supplemental contract) for constructing additional facilities as follows: Whidby Island, Wash.—$3,370,020; Seattle—Naval Air Station, $284,200; Bainbridge Island—Radio Sta., $70,560; and Indian Island—Naval magazine, $826,300—by Bureau of Yards & Docks, Navy Dept., Washington, D. C. 11-7

Territories

HAWAIIAN & PACIFIC ISLANDS—Supplemental contracts awarded to **Hawaiian Dredging Co., Raymond Conc. Pile Co., Turner Const. Co., Morrison-Knudsen Co., J. H. Pomeroy, W. A. Bechtel Co., Utah Const. Co.** and **Byrne Organization,** Naval Air Station, Alameda, Calif.—$59,887,910, for additional facilities for naval ships and planes in Hawaiian and Pacific Islands. 11-24

Irrigation . . .

CONTRACTS AWARDED

California

FRESNO CO.—**Fredericksen & Westbrook** and **Paul J. Tyler,** 212 13th St., Sacramento—$989,280, for 5½ mi. Friant-Kern Canal, from 600 ft. W. of Friant Dam to Clovis-Auberry Hwy., at Little Dry Creek, Central Valley project—by Bureau of Reclamation, Sacramento. 11-10

Montana

TETON CO.—**Williams Const. Co.,** P. O. Box 1124, Helena—$44,880, for earthwork and structures for open drains, Green-

fields Div., Sun River proj. Work is located near Fairfield and Ashuelot—by Bureau of Reclamation, Fairfield. 11-21

Oregon

DESCHUTES CO.—**Chester T. Lackey,** Ontario—$48,880 (Sched. No. 1), for furn. 10,000 T sand and 16,000 T gravel for North Unit Main Canal, Sta. 1000-1665, delivered in stockpiles, Deschutes project—by Bureau of Reclamation, Bend. 11-4

Washington

YAKIMA CO.—**Henry L. Horn,** Caldwell, Idaho—$217,785, for earthwork, conc. lining and structures approx. 0.9 mi. of the Yakima Ridge Canal, Rosa Div., Yakima Proj.—by Bureau of Reclamation, Yakima. 11-18

Tunnel...

CONTRACTS AWARDED

Colorado

GRAND CO.—**Platt-Rogers, Inc.,** P. O. Box 153, Pueblo—$283,-180, for diversion and outlet tunnel at Granby Dam, Colorado-Big Thompson project—by Bureau of Reclamation, Denver. 11-6

Buildings...

CONTRACTS AWARDED

Arizona

PIMA CO.—**M. M. Sundt Const. Co.,** Box 2244 Tucson—$157,-270, for ordnance building at Tucson Municipal Airport, Tucson —by U. S. Engineer Office, Los Angeles. 10-31

California

LOS ANGELES CO.—**Engineers, Ltd.,** 605 W. Olympic Blvd., Los Angeles—$410,500, for 3 new units at U. S. Rubber Co. plant, 5675 Anaheim-Telegraph Rd., Los Angeles. The 3 units comprise a rubber cement processing bldg., a tank testing bldg., and a main factory bldg. to be used for the manufacture of self-sealing gas tanks for bombers and fighting planes—by U. S. Rubber Company, Los Angeles. 10-31

LOS ANGELES CO.—**E. P. Dentzel,** 453 N. Rodeo Dr., Beverly Hills—$386,931, for the Hacienda Village Housing Proj.—by Housing Authority, Los Angeles. 11-18

LOS ANGELES CO.—**Myers Bros.,** 3407 San Fernando Rd., Los Angeles—$97,313, for U.S.O. bldg., Burbank—by the 9th Zone Construction Quartermaster, San Francisco. 10-31

LOS ANGELES CO.—**H. W. Baum & Co.,** 232 S. Van Ness Ave., Los Angeles, $329,600, for a 4-story Clas A addition (270 x 40 ft.) to Bldg. No. 62, office bldg., at the Vega Plant, 2555 N. Hollywood Way, Burbank—by Defense Plant Corp., Vega Airplane Co., agent. 11-24

LOS ANGELES CO.—**Myers Bros.,** 3407 San Fernando Road, Los Angeles—$459,130, for a warehouse and incidental work at the company's plant at 2555 N. Hollywood Way, Burbank—by Defense Plant Corp., Vega Airplane Co., agent. 11-24

LOS ANGELES CO.—**R. D. Merrill Construction Co.,** Helena, Montana—$438,181, for buildings for the Air Corps Ferrying Command at Long Beach—by U. S. Engineer Office, Los Angeles. 10-30

LOS ANGELES CO.—**Zoss Const. Co.,** 1037 Cole Ave., Los Angeles—$1,414,420, for a 600-unit housing project in the Los Angeles Harbor Area for the FWA, Div. of Defense Housing—by Architect Eugene Weston, Jr., Los Angeles. 10-31

SAN DIEGO CO.—**M. H. Golden,** 531 Bank of America Bldg., San Diego, $350,000 (cost-plus-a-fixed-fee basis with gtd. max.), for 2-story, reinf. conc. type 3 junior-senior high school, housing classrooms, lab. and cafeteria-assembly unit, on Kearney Mesa, Linda Vista housing development, a PBA proj.—by San Diego Board of Education, San Diego. 11-25

Idaho

TWIN FALLS CO.—**R. D. Merrill Const. Co.,** Helena, Mont.—$181,943, for a 56-unit Washington Courts housing project in Twin Falls—by Twin Falls Housing Authority, Twin Falls. 10-30

New Mexico

SAN MIGUEL CO.—**Vincent-Peterson Co.,** Dooly Bldg., Salt Lake City, Utah—$215,000, for 2 reinforced conc. store bldg. at Las Vegas for the Sears-Roebuck Co.—by Sears-Roebuck Co. 11-27

Oregon

CLATSOP CO.—**John Helstrom,** Astoria—$100,000, for U.S.O. recreation bldg. at Astoria—by Zone Constructing Quartermaster, San Francisco. 11-28

CLATSOP CO.—**John Helstrom,** Astoria—$99,900, for a recreation bldg. and armory at Fort Stevens, Camp Clatsop, Tongue Point Naval Air Station and Naval Section base, personnel—by Constructing Quartermaster, Fort Lewis, Wash. 11-24

CLATSOP CO.—**The Austin Co.,** 16,112 Euclid Ave., Cleveland, Ohio—$12,250, for a radio station at Astoria—by Bureau of Yards and Docks, Navy Dept., Washington, D. C. 11-17

Utah

WEBER CO.—**James I. Barnes Const. Co.,** Central Tower Bldg., Santa Monica, Calif.—$98,989, for 1 utility shop bldg., and 1 fire and ambulance station and utility at Ogden Ordnance Depot, Ogden—by Constructing Quartermaster, Ogden. 11-26

Washington

KING CO.—**J. C. Boespflug,** Miles City, Mont.—$2,535,000, for 700-unit Gatewood Heights defense housing project in West Seattle—by Seattle Housing Authority, Seattle. 11-18

KING CO.—**Sound Construction & Engineering Co.,** Northern Life Tower, Seattle—$188,500 (award recommended), for a cantonment at Fort Lawton for the second interceptor command—by Constructing Quartermaster of Seattle. 11-21

KITSAP CO.—**Lloyd Johnson and Max J. Kuney,** Hutton Bldg., Spokane—$150,757, for additional wing on main bldg. at Naval Hospital, Puget Sound Navy Yard, Bremerton—by the Bureau of Yards and Docks, Navy Dept., Washington, D. C. 11-12

PIERCE CO.—**J. W. Bailey Const. Co.,** 228 9th Ave. North, Seattle—$59,900, for const. of housing for heavy maintenance company at Fort Lewis—by the War Department, Washington, D. C. 10-30

PIERCE CO.—**MacDonald Building Co.,** 1517 S. Tacoma Way, Tacoma—$222,000, for const. and completion of baracks and misc. housing at 4th Echelon Base, Fort Lewis—by Constructing Quartermaster, Lt.-Col. E. P. Antonovich, Fort Lewis. 11-17

BAINBRIDGE ISLAND—**The Austin Co.,** 16,112 Euclid Ave., Cleveland, Ohio, $70,560, for a radio station—by Bureau of Yards and Docks, Navy Dept., Washington, D. C. 11-17

INDIAN ISLAND—**The Austin Co.,** 16,112 Euclid Ave., Cleveland, Ohio, $826,300, for a naval magazine—by Bureau of Yards and Docks, Navy Dept., Washington, D. C. 11-17

Territories

CANAL ZONE—**MacDonald Const. Co.** and **G. I. Tarlton,** Box O, Balboa, C. Z.—$476,812, for elementary school buildings at Albrook Field and Howard Field, C. Z.—by The War Department, Washington, D. C. 10-31

Miscellaneous . . .

CONTRACTS AWARDED

Arizona

PIMA CO.—**Pearson & Dickerson,** Box 471, Prescott—$190,098 (2½ in. asph. conc. alternate), for grade and pave at Tucson Municipal Airport No. 2—by U. S. Engineer Office, Los Angeles. 11-14

PIMA & MARICOPA CO.—**Fritz Ziebarth,** 1122 Security Bldg., Long Beach, Calif.—$143,417, for transmission lines from Phoenix to Tucson, and from the Gila pumping plant to the Drop No. 4 power plant, and const. of an overhead ground wire on transmission line from the Parker power plant to the Gila pumping plant, Parker Dam power project, Arizona-California—by Bureau of Reclamation, Phoenix. 11-6

California

HUMBOLDT CO.—**John Carlin Const. Co.,** P. O. Box 879, Redding—$295,332 (recomended), for runways, taxiways, apron and appurt. facil., Eureka Airport—by U. S. Engineer Office, San Francisco. 11-26

KINGS CO.—**Atlas Systems, Inc.,** New York City, N. Y.—$128,186, for air corps gasoline fueling system at Flying School near Lemoore—by U. S. Engineer Office, Sacramento. 11-13

LOS ANGELES CO.—**Alco Construction Co.,** 5423 Flemish Village Lane, Los Angeles— ? ? ? ? for freight warehouse 321 x 300 ft.; storage and shed, 2400 x 22 ft.; office bldg. and 8 acres paving, for Douglas Aircraft Corp. on the P. E. tracks near Clover Field, Santa Monica—by Edward Cray Taylor and Ellis Wing Taylor, architects, Los Angeles. 11-5

LOS ANGELES CO.—**James I. Barnes Const. Co.,** Central Tower Bldg., Santa Monica—$517,688, for grading and paving a landing field for the Air Corps Ferrying Command, Long Beach —by U. S. Engineer Office, Los Angeles. 11-25

LOS ANGELES CO.—**Myers Bros.,** 3407 San Fernando Road, Los Angeles—$302,654, for utilities for 600-unit defense housing project in Los Angeles Harbor area—by Federal Works Agency, Washington, D. C. 11-25

LOS ANGELES CO.—**Geo. J. Bock Co.,** 1120 N. Las Palmas, Los Angeles—$117,500, for 12,732 lin. ft. 7-duct conduit line between Harbor Steam Plant and Receiving Station C, in Wilmington—Purch. Agent, Dept. Water and Power, Los Angeles. 10-31

LOS ANGELES CO.—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles— , for foundations for aluminum fabrication plant in Torrance—by Aluminum Co. of America, Vernon. 12-8

MENDOCINO CO.—**Macco Const. Co.,** 815 Paramount Blvd., Clearwater—$143,414, for runway (4000 x 150 ft.), taxiways (50 x 575 ft.), conc. apron (300 x 100 ft.), and appurt. facilities at Ukiah Airport, 1 mi. south of Ukiah—by U. S. Engineer Office, San Francisco. 11-24

MERCED CO.—**Flotation Systems, Inc.,** New York, N. Y.—$118,760, for gasoline fueling system at Flying School near Merced—by U. S. Engineer Office, Sacramento. 11-18

MONTEREY CO.—**Oilfields Trucking Co.,** Box 751, Bakersfield—$77,000, for oil treatment to infantry drill and parade grounds at Camp Roberts—by Constructing Quartermaster, Camp Roberts. 11-6

ORANGE CO.—**Vinson & Pringle,** 2020 West Grant St., Phoenix, Ariz.—$236,041, for sewer, water and gas systems at Air Corps West Coast Replacement Center, Santa Ana—by U. S. Engineer Office, Los Angeles. 11-18

ORANGE CO.—**R. R. Jones Electric Co.,** 925 Meridian, S. Pasadena—$56,565, for an electric distribution system at the Air Corps West Coast Replacement Center, Santa Ana—by U. S. Engineer Office, Los Angeles. 11-7

SACRAMENTO CO.—**Morrison-Knudsen Co., Inc.,** Boise, Ida. —$17,328 (suppl.), for grade aux. landing field at Mather Field, Sacramento—by War Dept., Washington, D. C. 11-24

SAN DIEGO CO.—**John H. Simpson Co.,** 516 S. Raymond Ave., Pasadena—$132,524, for expansion of facilities at the Naval Training Station, San Diego—by the Bureau of Yards & Docks, Navy Dept., Washington, D. C. 11-13

SAN DIEGO—**Allied Engineering & Shipbuilding Corp.,** 416 W. 8th St., Los Angeles, and **Tavares Const. Co.,** 4657 Sheila St., Los Angeles—(joint bid) $3,000,000, for five conc. bulk cargo barges at a shipyard to be built on a 40-acre site in National City—by U. S. Maritime Commission, Washington, D. C. 11-17

SAN FRANCISCO CO.—**Fay Improvement Co.,** Phelan Bldg., San Francisco—$20,213, for asph. conc. pave, sewers, etc. on Sunnydale Ave. betw. Hahn and Schwerin Sts.—by Dept. of Public Works, San Francisco. 11-7

SAN JOAQUIN CO.—**A. Teichert & Son, Inc.,** 1846 37th St., Sacramento—$301,631, for landing strips, taxiways and warmup apron at Air Corps Cadet Flying School, near Stockton—by U. S. Engineer Office, Sacramento. 11-7

SAN JOAQUIN CO.—**Morrison-Knudsen Co., Inc.,** Title Guarantee Bldg., Los Angeles—$231,569, for earthwork and subgrade preparation at Air Corps Cadet Flying School, near Stockton—by U. S. Engineer Office, Sacramento. 11-7

SAN LUIS OBISPO CO.—**J. E. Haddock, Ltd.,** 3578 E. Foothill Blvd., Pasadena—$93,103, for runways and taxiways at Sherwood Field, Paso Robles—by War Department, Washington, D. C. 11-26

SAN LUIS OBISPO CO.—**Leonard Coates Nurseries, Inc.,** 2201-05 The Alameda, San Jose—$83,354, for landscaping Infantry and Cavalry replacement center, etc., at Camp Roberts—by the War Department, Washington, D. C. 11-4

SAN MATEO CO.—**L. C. Smith,** 1st and Railroad Ave., San Mateo—$31,767, for grading, paving, sewers, etc., in Mills Park Subdivision No. 2—by City Clerk, San Bruno. 11-6

SAN MATEO CO.—**L. C. Smith,** 1st and Railroad Ave., San Mateo—$22,799 (only bid), for cement conc. curbs, gutters and sidewalks, asph. conc. pavement, vitr. clay pipe sanitary sewers, etc., in San Mateo Terrace No. 7, Unit No. 1—by City Clerk, San Mateo. 11-4

SANTA CLARA CO.—**Pittsburgh-Des Moines Steel Co.,** Rialto Bldg., San Francisco—$5,202,320, for const. of a 40 x 80 ft. fabr. steel wind tunnel at Moffett Field—by Natl. Advisory Commission of Aeronautics, Moffett Field. 11-7

SHASTA CO.—**R. G. Clifford,** 33 El Camino Real, South San Francisco—$68,369, for const. of the Balls Ferry fish rack and trap, Migratory Fish Control, Kennett Div., Central Valley Project. The work is located about 18 mi. southeast of Redding—by U. S. Bureau of Reclamation. 10-29

STANISLAUS CO.—**Standard Materials Co.,** 1411 Ninth St., Modesto—$46,639, for bituminous treated soil base and placing asph. conc. at Modesto Airport—by U. S. Treasury Department, San Francisco. 11-21

TEHAMA CO.—**Fredericksen & Westbrook,** 212 13th St., Sacramento—$233,892, for addn. landing strip, runways, taxiways, apron and appurt. facilities at Municipal Airport, Red Bluff—by U. S. Engineer Office, Sacramento. 11-21

Idaho

ADA CO.—**C. W. Watkins,** Box 1564, Boise—$124,727, for an ordnance storage facilities at the Boise Air Base, Boise—by U. S. Engineer Office, Portland. 10-30

Nevada

CLARK CO.—**Fritz Ziebarth,** 820 W. Esther St., Long Beach, Calif.—(Est. cost of project $3,000,000) for approx. 40 circuit

mi. of 230 kv. transmission line between Boulder Dam and the site of the new plant of the Basic Magnesium, Inc., P. O. Box 1150, Las Vegas, Nev. The line is to be constructed of 500,000 CM copper conductor, with a capacity of 200,000 kva.—by Basic Magnesium, Inc., Las Vegas. 11-12

LINCOLN CO.—**Lincoln Co. Power District No. 1,** Pioche—$21,730, for 27 mi. of electric distribution line to serve 76 members—by Alamo Power District No. 3, Alamo. 11-5

MINERAL CO.—**Anderson & Rowe,** 84 Page St., San Francisco, Calif.—$189,690 (Items 1, 3, 4, and 5), for furn. and install. a complete autom. telephone sys., a proprietary fire alarm sys., both having sentry reporting features; and auxil. gasoline engine generator set and electric panelboard equip., at Naval Ammunition Depot, Hawthorne—by Public Works Office, 12th Naval District, San Francisco. 11-10

WHITE PINE CO.—**Isbell Const. Co.,** 1300 E. 4th St., Reno—$222,986, for clear, grade, pave, etc., at Ely Airport—by U. S. Engineer Office, Los Angeles. 11-17

New Mexico

CURRY CO.—**Henry Thygesen & Co.,** Albuquerque—$271,980, for const. of an airport at Clovis—by U. S. Engineer Office, Caddoa, Colorado. 11-21

Oregon

DOUGLAS CO.—**Tri-State Const. Co.,** Portland—$129,985, for 42.3 mi. of transmission line from Eugene to Drain, a 33,000-volt wood pole project—by North Douglas Co-op., Roseburg. 11-5

LANE CO.—**E. C. Hall Co.,** 1st Natl. Bank Bldg., Eugene, and **J. C. Compton,** McMinnville—$1,128,841 (supplemental), for additional runways and taxiways at municipal airport of Eugene—by U. S. Engineer Office, Portland. 11-19

MULTNOMAH CO.—**United Engr. & Foundry Co.,** 1st Natl. Bank Bldg., Pittsburgh, Pa.—$20,000,000 (estimated cost), for general const. of an aluminum fabricating plant on a 115-acre site at Fairview—by Aluminum Co. of America, Pittsburgh, Pa. 11-25

MULTNOMAH CO.—**Ross B. Hammond Co.,** Spalding Bldg., Portland—$12,000,000 (est. cost of plant), for excavation and foundations of plant capable of producing 90,000,000 lbs. aluminum annually, at Troutdale—by Aluminum Co. of America, Portland. 11-17

UNION CO.—**Warren Northwest, Inc.,** P. O. Box 5072, Portland—$131,721, for bituminous surfacing of La Grande airport—by State Procurement Office, Portland. 10-29

Washington

KING CO.—**The Austin Co.,** 16,112 Euclid Ave., Cleveland, Ohio—$284,200, for additional work at Naval Air Station, Seattle—by Bureau of Yards and Docks, Navy Dept., Washington, D. C. 11-17

KING CO.—**Henrik Valle Co.,** 700 22nd N. Seattle—$183,354, for office bldg., laboratory, powerhouse, gatehouse, shipping bldg., exterior rail tracks, fences, oil storage tanks, const. footings and floors for forging, heat treating and machine shops for a forging plant at 8531 East Marginal Way, Seattle, to be operated by Isaacson Iron Works—by Inspector Naval Materials, Seattle. 11-26

KITSAP CO.—**K. L. Goulter,** 212 W. Hudson St., Seattle—$242,253 (supplemental award), for grade, drain, facil., and pave addn. runways and taxiways at Kitsap Co. airport, Bremerton—by U. S. Engineer Office, Seattle. 11-14

KLICKITAT CO.—**Roy L. Bair,** 1220 Ide Ave., Spokane—$360,-696 (award rec.), for 354 mi. of transmission line—by Klickitat County Public Utility District, Goldendale. 11-19

KLICKITAT CO.—**Leonard & Slate,** 7805 S.W. 40th Ave., Portland, Ore.—$148,455 (supplemental award), for additional runway and taxiway at munic. airport of the Dalles, Ore., loc. at North Dalles, Washington—by U. S. Engineer Office, Portland. 11-14

SPOKANE CO.—**Clifton & Applegate** and **Henry Georg,** Hutton Bldg., Spokane—(est. cost of plant, $9,000,000), for grading and foundations of a new aluminum plant ½ mi. north of Hillyard—by Alumnum Co. of America, Pittsburgh, Pa. 11-19

WHIDBY ISLAND—**The Austin Co.,** 16,112 Euclid Ave., Cleveland, Ohio—$3,307,020, for additional work—by Bureau of Yards and Docks, Navy Dept., Washington, D. C. 11-17

TRADE WINDS

News of Men Who Sell to the Construction West

A WELL-KNOWN equipment manufacturer recently celebrated the 25th Anniversary of its founding.

Barber-Greene Company

At a dinner party held in Aurora, Ill., on Oct. 21, **W. B. Greene,** vice-president and treasurer and co-founder of the *Barber-Greene Co.,* reviewed the history of the organization's founding. **D. G. McIlwraith,** secretary of the company, awarded service pins to 203 employees whose service ranged from five to twenty-five years. Barber-Greene Co. was founded by **Harry H. Barber** and **William B. Greene** in 1916. The first product was a portable belt conveyor, and shortly afterward a self-feeding bucket loader was added to the line. The first of a long line of typical portable conveyors was manufactured in 1917, and production of crawler loaders began in 1919. The following year, the company began experiments with a ditcher, and in 1924 undertook full production of the machine. The next item of major equipment to be produced was a bituminous mixer in 1930, followed by a 10-ft. bituminous finisher in 1935. Two years later, dryers and central mixing plants were brought out, and in 1939 the company began the manufacture of gradation control plants. Barber-Greene Co. is headed by Harry H. Barber, president, and William B. Greene, vice-president, co-founders of the organization.

* * *

A new West Coast parts warehouse has just been established by the *Koehring Co.,* at 2417 Seventeenth St., San Francisco, Calif. Under the direction of **Otto Scott** the new warehouse will carry an adequate stock of parts to serve all Koehring equipment in the Western territory. The new warehouse was organized and installed by **R. C. Sell, Sr.,** who turned over the management to Scott on Nov. 15. Scott has worked in the service department of the company for a number of years and is well qualified to serve the requirements of Koehring customers.

* * *

Loggers and Contractors Machinery Co., 240 S.E. Clay St., Portland, Ore., has been appointed as dealer for the *Diamond Iron Works, Inc.,* manufacturers of rock crushing, conveying and transmission machinery.

* * *

Frank Castellucci has been appointed sales manager of the *Peterson Tractor and Equipment Co.,* 645 Watkins St., Hayward, Calif., succeeding A. M. Holman who re-

OFFICIAL BIDS

WANTED BY THE PANAMA CANAL ON THIRD LOCKS CONSTRUCTION FOR DUTY WITH SPECIAL ENGINEERING DIVISION ON ISTHMUS OF PANAMA: FOUNDATION ENGINEER, $395.83 month or ASSOCIATE FOUNDATION ENGINEER, $333.33 month. To serve as foundation engineer and staff advisor on excavation for massive structures for the third locks, including foundation investigations, determination of suitable foundations, planning and conduct of foundation grouting problems and field and laboratory investigations regarding uplift, settlement and similar problems. Applicants must have successfully completed a four year course leading to a Bachelor's degree in civil or mining engineering, or in geology or engineering geology at a college or university of recognized standing. For entrance salary of $395.83 month applicants must have ten years engineering experience with at least five years in responsible charge on foundation and excavation problems including subsurface explorations and grouting. Applicants for entrance grade of $333.33 must have six years engineering experience with at least two years specializing in foundation and excavation problems. Graduate study may be substituted year for year for the general engineering experience up to a maximum of two years. Applicants must be American citizens, preferably not over 45 years of age and physically sound. Free transportation from port of embarkation, transportation to be by boat or plane at discretion of The Panama Canal. Wages to begin at date of sailing. Duration of employment two years or more. Applicants should apply to "Chief of Office, The Panama Canal, Washington, D. C.", setting forth personal data with special emphasis on experience applicable to position and stating type of rock formation in which experienced.

cently resigned. Castellucci has been with the Peterson Tractor and Equipment Co. for more than two years, and prior to that time was connected with the San Jose Tractor and Equipment Co.

* * *

Harry G. Ferris, president of the *Hofius-Ferris Equipment Co.*, Spokane, Wash., and well known equipment distributor of the Pacific Northwest, died, on Nov. 2, at his home in Spokane.

* * *

C. W. Moore, Pacific Coast credit manager of the *Wickwire Spencer Steel Co.* since 1936, has been appointed general credit manager of the company, with headquarters in Worcester, Mass. Moore has been with the organization since 1930, serving first at Tulsa, Okla., and then for five years at Worcester, Mass.

* * *

Among the Manufacturers

Johns-Manville Production Corp. is constructing an asbestos mill in Chrysotile, Ariz., for the processing of asbestos bearing rock in that vicinity. The new mill is expected to be in operation early next year, and will add substantially to the available supply of asbestos fibre.

Caterpillar Tractor Co., Peoria, Ill., has accepted a contract from the Ordnance Department of the U. S. Army for production of tank transmission and final drive assemblies in the Peoria plant.

* * *

A new postage stamp just issued by the Union of South Africa reproduces the well known trademark of the *Lincoln Electric Co.* Photographs of a welder, using modern shielded electric arc equipment and dressed in a protective head shield, gloves and other special clothing, are depicted on the stamp.

LITERATURE...

West Coast Lumbermen's Assn., Seattle, Wash., presents the 3 following bulletins: 1—Blue Ox Series—No. 2 gives the specimen plans for flat top roof trusses with Douglas fir timbers for strength. This set of roof-truss plans has been prepared to furnish the professional architect and engineer with a specimen set of designs of modern timber trusses as a guide for estimating and designing. 2—Supplement No. 3, Strengths of Lag Screws in Douglas Fir, contains table of safe loads on lag screws in Douglas fir based on Technical Bulletin No. 597 of the U. S. Department of Agriculture, Forest Products Laboratory, Forest Service. And 3—The Scholten Nomograph for solution of the Hankinson Formula, Supplement No. 4 to the Douglas Fir Use Book, gives two charts for determining the bearing strength of wood on wood, and of bolts, lag screws, pins, etc., on wood, at any angle of the grain.

Diamond Iron Works, Inc., Minneapolis, Minn.—Leaflet describing and illustrating the many advantages of the Porta Crane (the portable hoist).

Kimball-Krogh Pump Co., Division of the Food Machinery Corp., Los Angeles, Calif.—Bulletin 120-A describes and illustrates the Kimballectric Horizontal Centrifugal Pumps. Brief specifications are also given.

Worthington Pump and Machinery Corp., Harrison, N. J.—Bulletin S-500-B38A describes and illustrates the Worthington DD Diesel engine which is of the four-cycle type, fitted with trunk pistons, and utilizes a direct fuel-injection system. Brief specifications are included.

Fairbanks, Morse & Co., Chicago, Ill.—Publication APB236.4 describes propeller pumps for the biofiltration system of sewage disposal. The biofiltration process is fast becoming recognized as an important contribution to progress in the field of municipal sanitation. Brief specifications are included for vertical propeller pumps.

Mine Safety Appliances Co., Pittsburgh, Pa.—Bulletin No. CM-5 summarizes the features and advantages of the new M.S.A. single filter dustfoe respirator. The bulletin points out that the "dustfoe" is particularly suited to concerns having programs of regular cleaning and maintenance of respirators.

AMERICAN TRACTOR EQUIPMENT CORPORATION

Phone OLympic 0111
1401 Park Avenue

Cable Address
"ATECO", Oakland

OAKLAND, CALIFORNIA
U. S. A.

December 18, 1941

TO ALL OUR CUSTOMERS AND FRIENDS:

Gentlemen:

W E - W I L L

W E - A R E

W E - S H A L L

with your continued loyal support manufacture for our GOVERNMENT'S DEFENSE and for your TRACTOR EQUIPMENT NEEDS.

My son and our entire organization of picked equipment men THANK YOU for the largest sales volume in the history of this Corporation.

Confidently we submit that with all shoulders to the wheel, united in our every endeavor, we in the construction industries will blaze the way to an American victory.

Very sincerely yours,

AMERICAN TRACTOR EQUIPMENT CORPORATION

Mack Wooldridge

President.

ROADBUILDERS
BULLDOZERS
SCRAPERS
LEVELERS
TAMPERS
RIPPERS
LOADERS
PUMPS
HOISTS

NEW EQUIPMENT

Mulch Machine

Manufacturer: Kay-Brunner Steel Products, Inc., Los Angeles, Calif.

Equipment: Compaction Scratcher.

Features claimed: Kay-Brunner Steel Products, Inc., announced a tool known as a Compaction Scratcher. It is designed for application on large earthfill dams for providing a mulch. Its use provides a more uniform compaction of the fill. It is a shallow working tool, operating in connection with tamping rollers. It is built in sizes from 12-ft. to 20-ft. widths. Provision is made for bolting on 4-ft. extensions if needed. Frame is all welded construction. Cable controlled by power unit on tractor. Standards and points are replaceable and quickly removed. The two rows of standards are staggered and set at proper spacing for best mulching of packed ground.

Compaction Scratcher

Power Control Units

Manufacturer: The Buckeye Traction Ditcher Co., Findlay, Ohio.

Equipment: Controls for Model HD hoist.

Features claimed: An improvement has been announced in the design of the control levers and linkage on Buckeye Model HD power control units for tractors. The change incorporates relocated horizontal control levers which are placed within easier reach of the operator. Better leverage is now secured and operation is simpler and more positive. The fair lead swivel sheaves have been lowered, thus bringing the direct line pull closer to the tractor drawbar, resulting in better tractor balance. Complete control lever and linkage assemblies are interchangeable with the older style mechanisms and are available for replacing them.

Welder Protector

Manufacturer: The Lincoln Electric Co., Cleveland, Ohio.

Equipment: Device to protect welding sets against burn-out.

Features claimed: Protection against heat or excessive current, or both, is provided by a new protective control device for arc welding machines. The device consists of two current transformers, the primaries of which are connected in series with the motor leads, and the

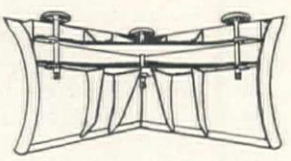
secondaries supplying power to operate two snap-action thermostats which are mounted directly on the motor lamination. These thermostats are connected to the lamination in such a way that they operate by means of heat conduction as well as by current passing through the thermostat. The thermostats automatically reset when the motor returns to a safe operating temperature or when the current is reduced, and no manual operation is required to start the machine, except pushing the start button. A special circuit allows the starter button to be held in after the welder thermostats have been tripped. This allows the machine to rotate with no load and the welder ventilation speeds up the cooling of the welder after the trouble has been rectified.

Snow Plow

Manufacturer: Kay-Brunner Steel Products, Inc., Los Angeles.

Equipment: V-type snow plows.

Features claimed: Improved snow removal equipment, which consists of complete snow plows, hydraulically or cable controlled, with



"V" type or sidecasting blades. Complete unit consists of blade, frame, superstructure, controls and everything needed for operating the unit. Available for mounting on "Caterpillar" D-6 and larger size tractors.

Drill Hole Plugs

Manufacturer: National Automotive Fibres, Inc., Oakland, Calif.

Equipment: Tampcot Stemming material.

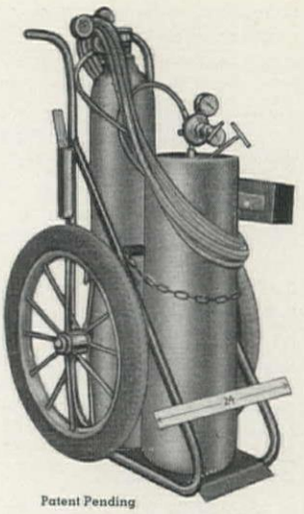
Features claimed: After experimenting with various materials for stemming or tamping powder loaded drill holes in an effort to increase the efficiency of the powder charge, a light, non-combustible stemming material was selected. This fibrous material was produced, then made into resilient plugs 1½ in. in diameter by 6 in. in length. The composition of the material is not affected by freezing or moisture as clay or moist sand tamping dummies are. It is devoid of moisture, therefore no special care is required in storing it. Being light and conveniently packed, 52 plugs to the bag, it is easily carried by the miner to headings, up raises, and down winzes, presenting none of the troublesome drawbacks of bulky and heavy clay-filled dummies. Under the trade name Tampcot stemming, this material was offered to the mining trade. Within six months from its introduction, many users had reported increased efficiency in blasting, savings in powder, better broken rounds, and improved air conditions after shooting.

Acetylene Cart

Manufacturer: Garlinghouse Brothers, Los Angeles, Calif.

Equipment: Gar-Bro Acetylene Tank Cart.

Features claimed: The new Gar-Bro Acetylene Tank Cart is unusual in three respects:



Patent Pending

(1) it has a total width of 24 in., enabling it to pass through narrow doors or passageways; (2) instead of carrying the two tanks side by side, this cart has one set behind the other, making possible the narrow width; (3) the chassis is mounted on two large pneumatic tired wheels with fully depressed hubs and 30 x 3½-in. heavy duty tires, so that the carts may be wheeled over rough, uneven ground or littered floors. Either tank may be removed independently of the other, as the acetylene cylinder is inserted at the front while the oxygen tank is placed in the rear of the cart.

Carryall

Manufacturer: R. G. LeTourneau, Inc., Peoria, Ill.

Equipment: Model DLS Carryall, 8½ cu. yd.

Features claimed: The Model DLS is similar to the Model LS, which has proved successful with the Model C Tournapull. It has the steep, long blade base, which causes material to boil in and flow back into the bowl and forward into the apron; also the same high sides and built-up apron. Chief changes are in the yoke for mounting on the pulling tractor and the position of the power control unit. Cutting edge is 8 ft. 6 in. With the apron cable dead ended on the apron, all hoist and unloading cables are now placed up and out of the dirt, eliminating abrasive cable wear. The Model DLS has a rated capacity of 8½ cu. yd., struck, and 11 heaped, for use with the new Caterpillar four-wheel tractor.

Sight-feed Lubricator

Manufacturer: The Roto Company, Newark, N. J.

Equipment: Lubricator for air-driven equipment.

Features claimed: A new type sight-feed lubricator for air-driven equipment which operates successfully regardless of its position in the line has just been developed by the manufacturers of tube cleaning equipment. Because the new type lubricator has no baffle, it can be turned to any position convenient for visibility. Another feature of the new sight-feed lubricator is that it requires only a single regulating valve instead of the three separate valves used on previous types. Oil is added by removing a simple screw plug at the top of the

lubricator. Roto lubricators are installed in an ordinary Tee in the air line. They are made in 4/5-pint and quart sizes, and can be regulated to drop as few as 5 drops of oil per minute.

Scrapers

Manufacturer: Wooldridge Manufacturing Co., Sunnyvale, Calif.

Equipment: Model BB Scrapers.

Features claimed: Designed for fast loading and dumping, the new Woolridge Model BB Scrapers embody many new features of construction. Enlarged apron opening of 53½ in. results from high front apron lift. New Durabelt construction features heavy, large yoke and inner-braced, double, one-piece bottom. With fewer sheaves and 42 ft. less cable required, the new 3-line scraper shows a considerable reduction in cable wear, upkeep and repair. Further simplification has been brought about by the elimination of the spring box and 60 parts. These new scrapers, although more rugged in construction, will save nearly three-quarters of a ton in weight, permitting larger loads and a greater heaped capacity. The Model BBR is the largest of the new BB series, having a heaped capacity of 17¾ yd.

Wire Rope

Manufacturer: R. G. LeTourneau, Inc., Peoria, Ill.

Equipment: Tournarope (wire rope).

Features claimed: Tournarope, a 6 x 9 filler wire right lay wire rope with an independent wire rope center and an identifying galvanized core strand, is made especially for cable-operated, tractor-drawn equipment. Tournarope is made of 199 fine steel wires, drawn to LeTourneau's specifications, each wire bathed in oil as it goes into the strand die. Equipment shipped from the LeTourneau factory has been equipped with this new, specially made wire rope for over a year, so that Tournarope has been thoroughly tested by hard usage. Tournarope comes in the six following sizes: ⅜-in., ½-in., ⅝-in., ⅝-in., ¾-in. and ⅞-in.

Drill Jumbo

Manufacturer: Cleveland Rock Drill Co., Cleveland, Ohio.

Equipment: Model MDR Mining Machine.

Features claimed: This jumbo is designed to take care of 1, 2, or 3 drifters, the idea being to easily, accurately, and quickly position the drifter for proper spacing and angular directing of the drilled holes in a round. The machine is generally mounted on an ordinary mine car. Built integrally into its base are the air and water manifolds, individual line oilers for each drifter, the worm-actuated screws used for setting the drill-supporting arms, air and water control valves, drain cocks, and safety racks. The manufacturer claims the following advantages over the usual column mounting: quicker and safer setting-up and tearing-down; the prevention of excessive wear and tear on drills due to shifting set-ups and binding steels; accurate spacing and angles of the drilled holes, resulting in up to 25% more rock breakage; saving the operator the heavy lifting and resulting fatigue attendant upon the usual column set-up.

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