

MUELLER
Record

OCTOBER • 1959





Recording Our Thoughts

In the photo below, Harry E. Jordan (center), who retired September 1 after 23 years as Secretary of the American Water Works Association, is presented a permanent "Mr. Water Works" emblem by Lewis S. Finch, Vice-President of the Indianapolis Water Company and past-president of AWWA. The presentation was made at the "Salute to Harry E. Jordan" dinner which was a highlight of the 79th annual conference in San Francisco in July.

Mrs. Jordan (at left) is an interested observer as her husband is honored for 23 years of service during which the Association grew from 3000 to more than 12,500 members.

Mr. Jordan was graduated from Franklin (Ind.) College with a B.S. degree in chemical engineering, and

then joined the Indianapolis Water Company. In 1938 his alma mater conferred on him an honorary Doctor of Science degree. The Association also has established a special "Harry E. Jordan Achievement Award" at Franklin College in honor of his long service to the industry.

Our special thanks to Mr. H. Kenneth Anderson, Chief Engineer, Bureau of Water Works, Portland, Oregon, for his fine story which begins on Page 4.

REMEMBER: IF YOU CHANGE YOUR ADDRESS, PLEASE LET US KNOW. ALSO, IF YOU WISH OTHERS IN YOUR ORGANIZATION TO RECEIVE THE MUELLER RECORD, SEND IN THEIR NAMES.



MUELLER RECORD

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OUR COVER this month depicts that amiable little gent—Willing Water—in new form. This pert statuette will be awarded in each AWWA section annually to the water utility judged to have accomplished the most outstanding community relations project within the previous eighteen months. This award is a part of the overall advancement awards program announced after the 79th annual conference in San Francisco last July.

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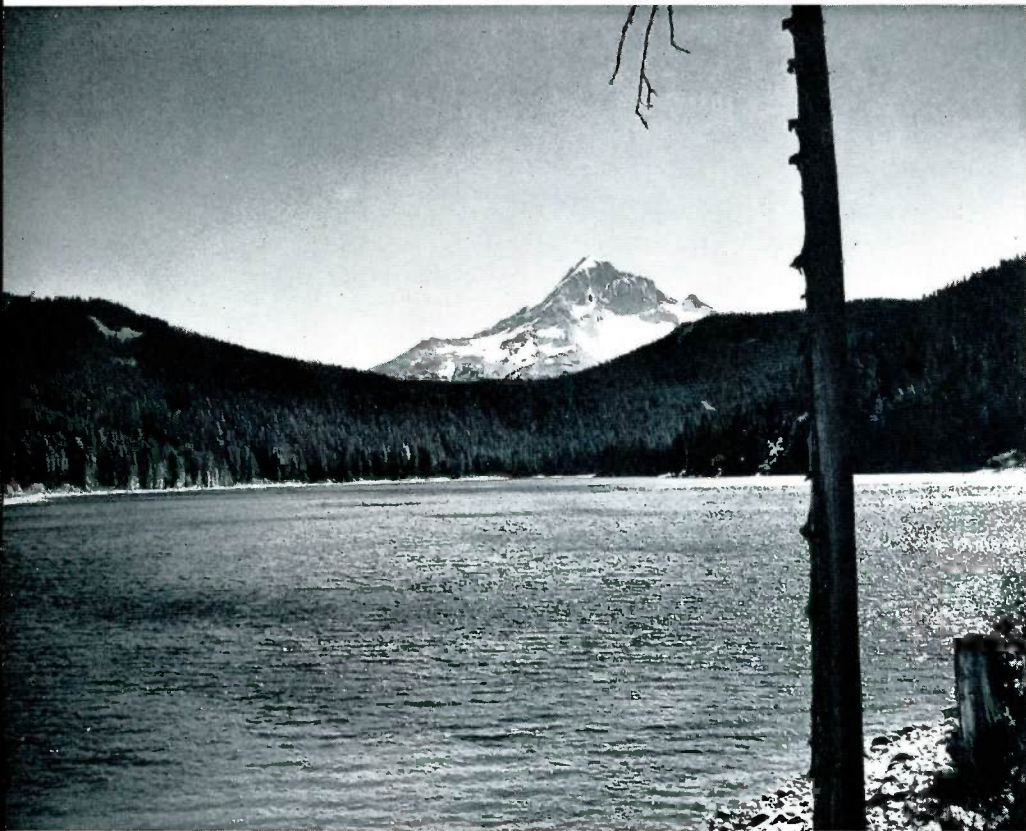
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Preview

The November-December issue of the MUELLER RECORD will reach you just before Christmas with a cover that will add to the holiday decor of your end table or magazine rack.

It will also be full of interesting stories and news items about both the waterworks and natural gas industries.

With the next issue, the MUELLER RECORD proudly begins its FIFTIETH YEAR of publication, a year that will be commemorated by a special Golden Anniversary issue one year from now.



Summer view of Bull Run Lake, with Mt. Hood in the background. A deep valley between the lake and Mt. Hood keeps glacial water from entering the Bureau of Water Works supply.

"City of Roses"

By

H. KENNETH ANDERSON

Chief Engineer

Bureau of Water Works, Portland, Oregon

Portland, Oregon, officially born by incorporation in 1851 and named by the toss of a coin, has experienced growth, "as if by magic," which rivals the fabled growth of "Jack and the Bean Stalk." From a primitive pioneer village, huddled close to the West bank of the Willamette River; with mud streets studded with stumps which were of little concern to the individual arriving by trail, or his horse if he had one; our "City of Roses" justly holds an enviable place of high rank in the eyes of the informed world. At that time, the water courses, the Willamette and the

Columbia Rivers, were the only highways of travel. They carried the native canoes, followed shortly by small commercial craft so very essential to the existence and growth of the community.

As of now, we see before us a great city, covering 70 square miles, where over four hundred thousand people live, with half as many more living so closely as to make the city boundary uncertain. Our brain grows dizzy as we take inventory of our diversified interests, supported by four continental railroads—parts of the spider-webbed steel bands holding to-

gether the land commerce of our continent; by ocean-going ships, to and from every port in the world, having access or in need of access; by truck lines, over ribbons of concrete, to great commercial centers and hamlets everywhere; and by sky routes unlimited, reaching now toward outer space. Our imagination reels a bit, and we wonder what the next hundred years will bring.

As desirable, as important, and as necessary to our economy as—lumber, (about 20% of the merchantable "green glory" of the United States is in Oregon); grain, millions of bushels to insure full stomachs at home, with much to spare for Japan, India, Europe, Central and South America; cattle, uncounted, distilling the living green into streams of flowing gold; sheep, to cram food lockers, and to clothe luxuriously; fruits, of every kind, unexcelled, luring all appetites; our attention centers on the most vital and the most valuable material thing existing in all the world—**WATER**; for, without **WATER**, all things die, all life ends. It replenishes the earth, making "the desert to blossom as the rose," and it is to us literally "the staff of life."

Water, for the youthful village, was supplied first from Carruthers Creek in the Southwest Area; from wells along the West bank of the Willamette River near to the South city limits; and from Balch Creek in the Northwest Area by private parties and/or the Portland Water Company, from whom the Portland Water Committee, authorized and created by the Oregon Legislature in 1885, purchased its entire plant.

The Water Committee was composed of public-spirited businessmen, leaders in their time, and successful in their own right. Even so, opposition to their plans, representing their best judgment, reached top levels when the Governor vetoed a bill which would have authorized financing of the water supply from the Bull Run River. This he did believing that the water in Bull Run River came directly from the snow fields and glaciers on Mt. Hood.

While the Governor's veto, based on misinformation, caused delays



In the beginning, Portland was a real frontier town, cut from the heart of beautiful timberland. Notice the stovepipe hat on the gentleman in the left foreground.

This aerial view shows downtown Portland, with the Burnside Bridge spanning the colorful and economically-important Willamette River. Notice the large off-street parking area at the foot of the bridge.



Another view of Portland, looking north along the River, showing the many dock facilities of this busy port.



This schematic view of the Bull Run Reserve shows various storage facilities and other installations of the Bureau of Water Works.

in the early development of the Bull Run River supply, we hasten to acknowledge what, in the light of present day procedure, may be a record in the annals of the Supreme Court of Oregon; for a suit filed August 20, 1886 to stop the issuance of water bonds reached the court, was reviewed by the court, and a ruling made by it in favor of the city on November 13, 1886—less than 90 days after the case was filed in the local court.

The Water Committee, however, realizing that the Palatine Hill Pumping Station, built in 1886 with a capacity of 16,000,000 gallons per day, would soon be inadequate, and further, that the Willamette River water, the then total source of supply, would soon be totally unfit for domestic use for sanitary reasons, had directed the exploration of the Bull Run River Water Shed and other streams for a suitable water supply. Two reports concerning the topography of Bull Run Water Shed were made—one, by

Frank T. Dodge, the Water Superintendent, and one by T. M. Hurlburt, Surveyor and Engineer, after each had traversed the wilderness canyons, never before seen of record by white men, from the headworks to the source of the river. (The engineer's report, requiring 10 days of mountain climbing, with the usual pack, including food, clothing, bed-roll and camera, cost the Committee only \$129.60) The findings, made irrefutable by photos, established the fact that no part of the water in the Bull Run River comes from off the slopes of Mt. Hood, and this premise was the determining factor. The Water Committee, in full agreement, selected this source of supply—literally a heritage which the users of Bull Run water appreciate in greater degree as comparisons are made with other supplies.

We would not in any way minimize what it meant to the Portland area for Captain Gray to bring his ship to anchor in the Columbia

River in 1792; the benefits accruing from the Lewis and Clark overland trek to Oregon, with the aid of the human compass, the native Indian girl, "Sacagawea"—1805; the spiritual influences credited to the missions established by Jason Lee and Marcus Whitman, 1834-1846; the educational advantages stemming from Willamette University since 1842; the historical significance of the establishment of the Provincial Government at Champoege May 2, 1843—the first American Government on the Pacific Coast and to govern the only area to become a part of the United States except by purchase or conquest; the power of local groups, moving the state capitol from Oregon City to Salem, to Corvallis, and back to Salem; the romance of our becoming a state February 14, 1859 to become "The Nation's Valentine"; or the magic used to assemble and disperse products necessary to transform a village into a great city in 100 years. The Water Committee,

however, in regular session, unattended by anyone other than its members, and certainly without emotional interest or trace of duress, had made a decision holding rank with and matching the importance of epochal historical incidents—a decision affecting advantageously, and to a marked degree, the health of succeeding generations. (Health can be fully appraised only by one who has lost it.) There was no blare of trumpets, or radio or television to announce their action. Scarce mention was made of it in the weekly newspaper, for there was little or no realization of the importance of their decision to bring WATER from the Bull Run River to the City of Portland and adjacent areas.

Our water system had its first transfusion of Bull Run River water January 2, 1895, since which time its use has vindicated the judgment of all who had a part in exploring the water shed as a potential water supply, and concluding that ample quantities of unexcelled-quality water were available, and would be for a long time into the future. We, too, have faith to believe that until the sun fails to orbit, and the laws of nature forget to function, there will be ample quantities of water distilled in the heavens and franked by wind-driven clouds—dwarfing man's motor-driven air carriers—to the water shed of Bull Run River. Annual runoff records account for many times our present requirements, and here is where our responsibility begins, for long ago it was decreed that "Man shall have dominion over all the earth." It is our obligation, in the course of things, to provide storage facilities sufficient to insure uninterrupted service during the time we await nature's deliveries.

From its inception in 1885, the Water Committee and the City Council, after the adoption of the Commission form of government in 1913; and in pursuit of earnest purpose; and in the fulfillment of their obligations, effected sundry improvements, each in turn imposing problems of a political, financial or engineering significance.

The political problems did not involve any "handicapping" situa-

tions for the Water Committee, since its members were appointed and not subject to the processes of elections, and the Water Bureau Management, by the Superintendent and Engineer, both under the direction of the Commissioner of Public Utilities since 1913, has been relatively free from the urge to perform for personal advantage and/or the influence of pressure groups seeking selfish advantage. The overall control of the Water Bureau, its operations and financing, as specifically authorized by our Charter, has been exercised in full compliance with it.

Finance problems are always present. The Water Committee, in 1893, issued bonds in the amount of \$2,200,000, without making a plan to retire them at maturity in 1923. It became necessary to amend our charter and then issue "refunding" bonds which were retired in 1953, sixty years after the original debt was created. This charter amendment wisely made it mandatory that money be made available out of annual revenues sufficient to retire all bonds at maturity. With only slight increases in our water rates, all operations and maintenance and all capital improvements have been financed. Our present rates are surprisingly low, compare favorably with any city our size, are all-comprehensive and are not augmented by such sources as standby charges, meter rentals, fire hydrant rentals, etc. Further, out of these water revenues, a utility tax amounting to \$150,000 and a service and rental charge amounting to \$100,000 are paid into the city's General Fund annually. At the present time, our entire plant, costing approximately \$50,000,000 has an outstanding bonded obligation of only \$15,200,000.

Our engineering problems have been and are of absorbing interest.

We are inclined to believe that the acme of engineering was exhibited in the building of the first headworks, laying the first conduit, and the building of the first four reservoirs. Starting from scratch and under most adverse conditions, the embryo of our present water system was established. It quickly

grew from knee pants into long pants.

To keep pace with the phenomenal increase in the demand for water required vital improvements, including a third and then a fourth supply line, two large reservoirs and many tanks and standpipes within the city, and a steady increase of storage facilities in the Bull Run Watershed. To these last developments and/or additions to our supply, we now direct attention.

For your information, or as a refresher to your memory, the whole Bull Run River area was formed by a stream of glacial ice, although it has not been determined just how far down the course of the present Bull Run River the galciers extended. The many rock exposures are all of volcanic origin. They are disposed in more or less continuous layers or strata with, as a rule, a westward inclination. In physical character, they vary from hard, close-textured andesitic lava to great boulder beds, many of which have been cemented by filling of ash, and other finer volcanic fragments, or of moulten lava into solid, impervious and resistant rock.

In the Bull Run country, bouldery tuffs or agglomerates are present in considerable preponderance over those of a straight lava type. There is no specific assurance that the particular rock stratum will be continuous because of the intermittent and indefinite manner in which all volcanic rocks are erupted and, after issuing, are spread out upon the surfaces of the land.

Another factor which tends, in this region of recent volcanic activity, to interrupt continuity of individual rock beds is the inclusion or breaking through of the formations already in place by liquid lavas from below. In places, earthquake disturbances produce cracks which become lines of weakness and individual lines of least resistance up through which heated lavas can rise to the surface.

The Bull Run Lake region is underlain by Columbia River basalt. This, too, is a variety of volcanic lava. Prior to the uplift of the Cascade Range, many flows of this basalt spread over hundreds of square miles in Oregon, Washington

and Idaho. It thus constitutes, as it were, the foundation on which the superstructure of the range everywhere rests. Hundreds of feet of it may be seen in all major river canyons along both flanks of the Cascades and thousands of feet of thickness in a single section in Columbia Gorge.

Basalt is a type of lava which, in molten condition, is comparatively fluid. On issuing, it spreads rapidly and, if the volume is sufficient, a single flow will cover many square miles of country. This basalt rock, encountered at river bed level, was found to be over 200 feet thick and now is the foundation for Bull Run Dam #1. The basalt level at the location of Bull Run Dam #2 is 75' or 80' below the river bed, and this was a determining factor when it was decided to build an earth-fill structure for Bull Run Dam #2. On account of its fluidity and quantity, individual and successive sheets of it travelled long distances. As a result, we can today trace the uninterrupted outcrops of separate basalt flows, sometimes for miles. Except where broken by later intrusions, or by the strains of mountain uplift, the Columbia basalt is, as a consequence, a relatively continuous formation.

Knowledge of the capers of glaciers, with the aid of volcanoes, over the Bull Run Watershed, enabled our engineers to proceed intelligently with storage of water to be released into our conduits when the normal flow of Bull Run River in the summertime will not meet our requirements.

At Bull Run Lake, over a nine year period from 1917 to 1926, transportation was limited to horse pack-strings, using a 9½ mile mountain trail. Crews, mostly college students from Oregon State College and University of Oregon, employed strictly hand methods (picks, shovels and wheelbarrows). They took the best available fine earth and blanketed a portion of the lake's bottom adjacent to the earth-fill dam which cut off a portion of the lake from which it was determined the leakage would be most difficult to control, if, indeed, it could be controlled. The work season for this operation lasted

from school closing in the spring to school opening in the fall. An average of 50 men were employed. This development, including the earth-fill dam, blanketing a portion of the bottom of the lake and construction of the outlet works, was designed to store three billion gallons of controllable water, enough for the excess demand at that time.

The catchment area of Bull Run Lake, however, is only about five square miles, and it was discovered that only on an average-or-better rainfall season, we would be able to catch enough water to fill the controllable area. Because of this, explorations and investigations led to the building of Bull Run Dam #1 at Bear Creek, where it rests on a basalt layer 200 feet thick. Here, nature furnished a foundation as if by direction of the engineer. Its structure and location met our most exacting needs. This project provides storage of ten billion gallons of water.

Since the basalt lava is too far below the bed of the river at the location of Dam #2 to use as a foundation for a concrete dam, it was decided to build an earth-fill dam. At this point, the lava flow left a bouldery formation, rarely seen in open cliffs, formed by loosening and rolling out of successive individual boulders and crumbling away of the granular filling that formerly held them together. These may have been carried in a quiet overflow of molten liquid rock, oozing out through cracks and fissures, or from the explosive method of erupting by which materials are tossed or blown and projected into the air to fall upon the slopes of the surrounding area, where they may be further distributed as mud-flows or land slips.

A contract was let with Green Construction Company of Seattle, and work was started early last year, on the tunnel and intake structures. Borings were made throughout the area, through which tunnels on both sides of the river were to be driven to divert the river from the dam area. The contractor had the benefit of information furnished by the boring operations, and by consulting engineers who, on the job, "had carefully examined the material ex-

posed in the face of the vertical cut where the tunnels were to be driven." This information indicated:

That the material stands vertically over a high cut and is quite dense, consisting of fine to coarse sand, pebbles and boulders;

That when cutting into the face, material stood up well, giving indication that the material has good cohesion, and that the angle of internal friction would probably be considerably above 30 degrees;

That under general conditions, it could be assumed that the material should arch a short distance above the crown of the tunnel, and that it would not require heavy supporting;

That by the use of heavier material in the liner plates, the H-beam ribs might be omitted—possibly speeding up the erection somewhat and reducing the outside diameter of the tunnel (5/16" liner plates properly installed should carry 12.7 feet of ground above the crown of the tunnel and in full circle should be adequate);

That the subgrade of the tunnel, only slightly above the elevation of the river, might, in event of a slight rise in the river, soften the ground under foot-blocks, resulting in settlement and consequent trouble;

And that any space between the liner plates and the ground would need to be backfilled with pea gravel, placed pneumatically through holes provided in the liner plates, or grout, and may also include tunnel muck, all starting from the bottom and working upward. Filling the overmined space in this manner will provide a bearing between the liner and the ground.

Even with this information available, the tunnel contractor ran smack into trouble where the water seepage and/or water course, sorting and resorting to separate the fine from the course, the light from the heavy, and to dispose in orderly arrangement where and when its carrying capacity was no longer equal to the bearing of its load, has left a honeycombed assembly of detritus rocks possessing heterogeneity. These nested boulders, with voids unfilled, resting

on a compact sand and gravel stratum, below which is a clay extending downward from the tunnel invert to an unknown depth, made progress by the contractor's "selected method" of tunneling virtually impossible.

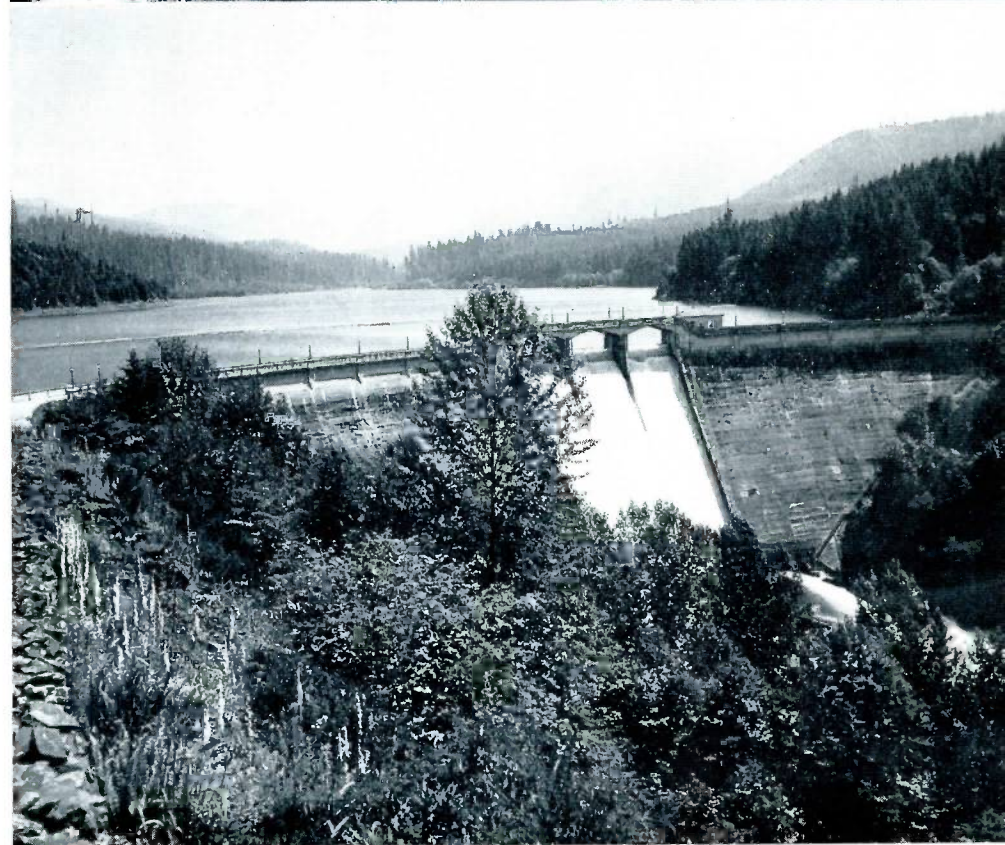
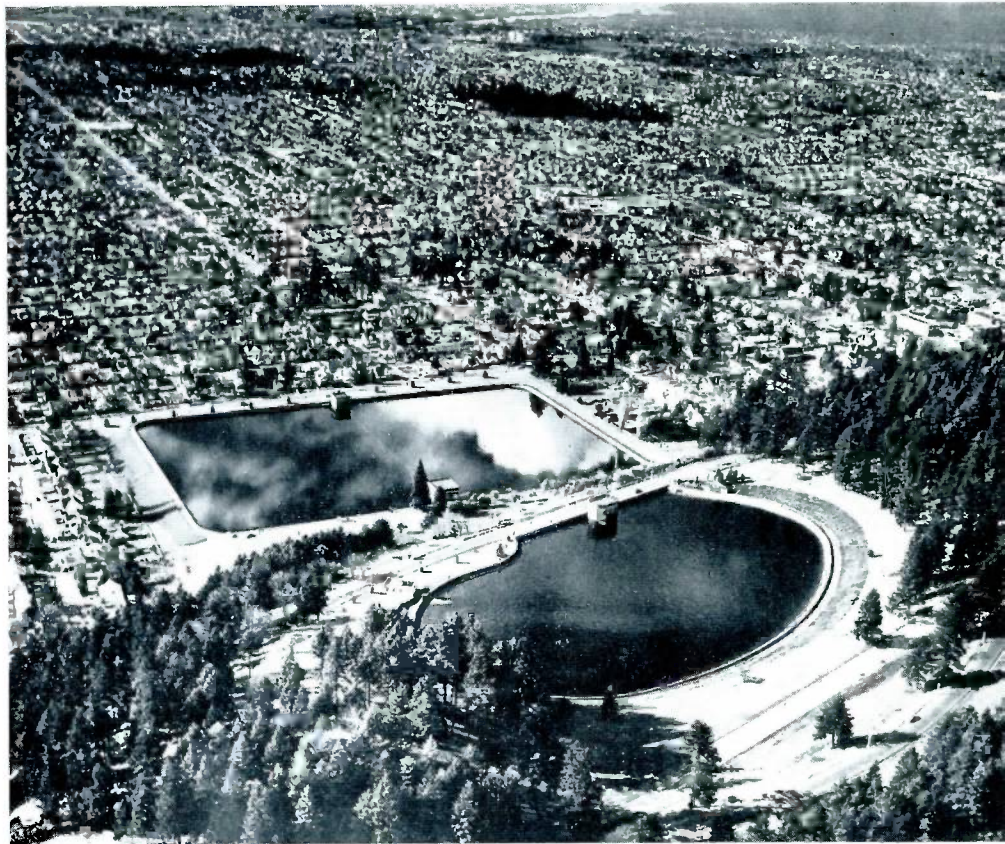
It became necessary to grout, with cement, these voids in line with the tunnel before continuing the tunnel drive. It is believed that the pursuit of this program will enable completion of the North tunnel without any further serious delays. Upon its completion, we will be in position to proceed with the construction of the Dam #2, which, it is hoped, will be finished in time for storing of water for the summer season of 1961.

Then, with the storage of sixteen and one-half billion gallons in Bull Run River and three billion gallons virtually assured in Bull Run Lake, the city's water supply will be ample, well into the future, and in keeping with past experience, and with a well ordered plan for the future, we will preserve the high quality of our water.

In the meantime, we are resolved to do everything needful to preserve, and to develop in keeping with the increasing demand, a water supply richly endowed by nature.

Above right: A view of reservoirs No. 5 and No. 6 atop Mt. Tabor in Portland. In the background is one of the city's newer, well-planned residential areas.

Below right: Bull Run Dam No. 1 was constructed in 1928-29, and remains one of the most important parts of the Portland system.



New Advancement Award Announced

NEW YORK—In recognition of the progress already made in its six-month-old water utility advancement program, the Board of Directors of the American Water Works Association has established a new awards program to recognize the outstanding community relations accomplishments in each of the Association's 31 Sections in the United States, Canada and Cuba.

Details of the new competition were announced after the 79th annual conference, which drew a record-breaking attendance at San Francisco the second week in July, by Fred Merryfield, Professor of Sanitary Engineering at Oregon State College, Corvallis, Oregon, and Chairman of the AWWA Advancement Committee. The Association will provide a statuette of "Willing Water" for each Section to present annually to the water utility judged to have accomplished the most outstanding community relations project within the previous 18 months.

"Establishment of the AWWA Advancement Award at this time demonstrates the gratifying response that has been given to our new Advancement Program since it was officially approved by the Board of Directors in January 1959", Merryfield said. "The Advancement Award is designed to stimulate and encourage water utilities to step up their community relations activities to earn more public support for expansion of need-water supply facilities. Now for the first time the Association will be able to publicly recognize the water utilities which have accomplished outstanding community relations objectives. We are sure this new competition in our 31

Sections will stimulate greater efforts to advance our water industry."

Chairman Merryfield said that rules for the Advancement Award were quite specific and simple. Any Corporate Member, municipal service subscriber or Active Member who is a water utility employee is eligible to submit an entry in his Section's competition.

Each entry must be in the form of a report on accomplishments in community relations activities that have shown definite results in the 18-month period prior to the Section meeting. Entries may be based on an over-all program or on activities in one or several of the following categories: Customer relations, press relations, cooperation with public agencies, stockholder or governing board relations, advertising, production of a local film, development of a speakers program, employee relations within the utility or employee participation in community affairs.

To submit an entry, a utility representative must give written notification to his Section Advancement Chairman at least two months prior to his Section's annual meeting and must deliver the entry, with supporting exhibits, to the Advancement Chairman at least one month before the Section meeting. Each entry should consist of three basic components: (1) a statement of the objectives of the project; (2) a review of measures adopted to attain the objectives and (3) a report on the results of the program. Exhibits must be limited in size to those suitable for mailing.

The award program will be inaugurated in each AWWA Section at its first meeting after January

1, 1960. No Section will be permitted to make an award in any year in which fewer than three entries are submitted.

Introduction of the Advancement Program in the Association's activities drew high praise during the San Francisco conference, where the first annual Advancement Workshop was held. In officially accepting the presidency of the Association, Lauren W. Grayson, general manager and chief engineer of the Glendale, California, Public Service Department, said in part:

"Our six-month-old water utility advancement program is one of the most important Association contributions to individual members and their communities in many years. Your Officers and new Board of Directors recognize that water supply is the most neglected public problem in this nation. We will make every effort to alert the water utility managers and the mayors of the 18,000 communities, now dependent on public water supply, to the need for community-by-community campaigns to obtain public support for advance planning and financing of expanded water facilities."

The reason that neither side will ever win the battle of the sexes is that there is too much fraternizing with the enemy.

—:—

One of the hardest secrets for a man to keep is his opinion of himself.

—:—

No excuse is as good as a satisfactory performance.

—:—

A little girl was showing her playmate her new home. "This is daddy's den," she explained as they entered one room. "Does your daddy have a den?"

"No," was the answer, "my pop just growls all over the house."

—:—

There are bigger things than money. For instance: bills!

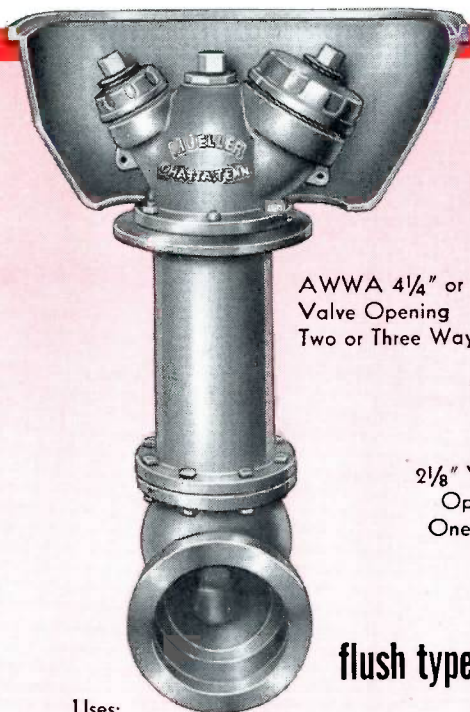
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Sign posted (but not for long) in an Albany, N. Y., hotel: "Executives who have no secretaries of their own may take advantage of the girls in our stenographic pool."

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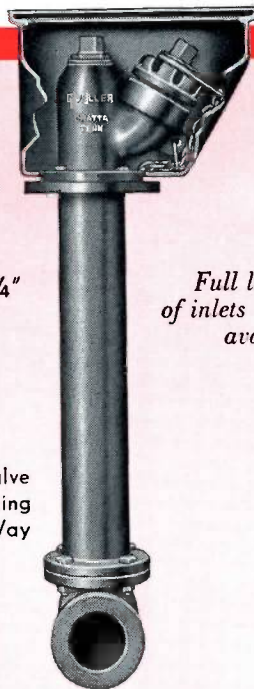
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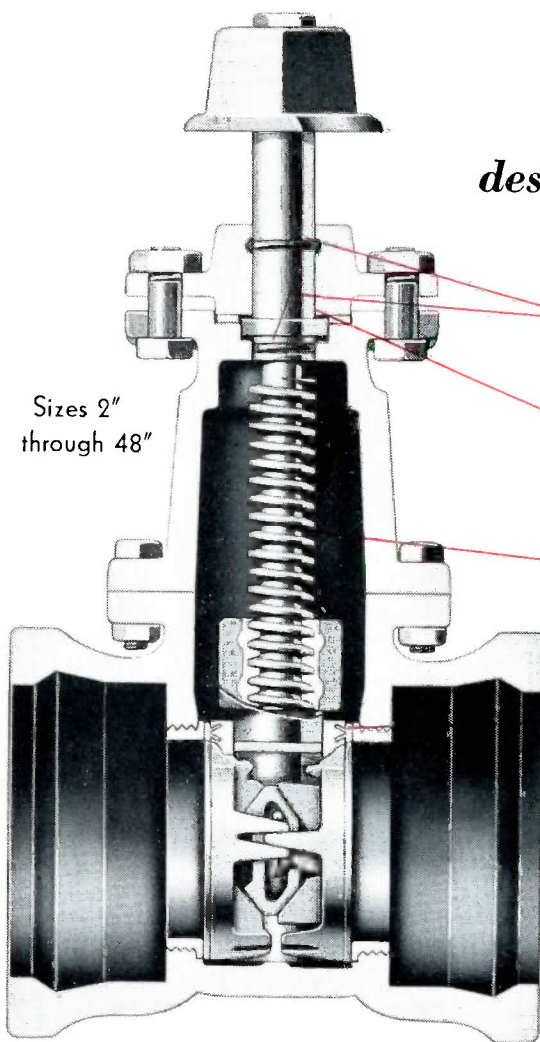
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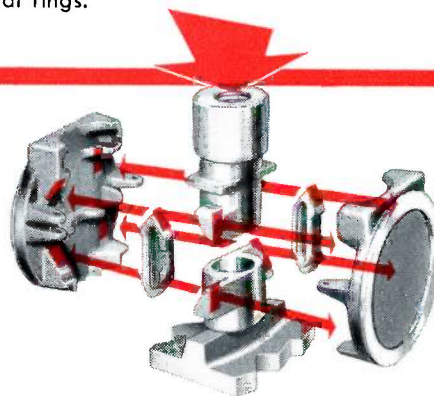
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"O" Ring Stem Seals . . . "O" ring at bottom provides a positive water-tight seal. Upper "O" ring seals dirt and water from bearing surfaces and acts as a reserve pressure seal.

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Bronze Disc Rings . . . are dovetailed to become part of the disc and are then machined for precise mating with the seat rings.



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WSWMA Has New PR Plans

A national program to inform American voters of the necessity for enlarged water and sewage facilities is being launched by the Water and Sewage Works Manufacturer's Association as a result of a six-month study of the problems confronting the industry.

Based upon information gathered from members of the industry themselves (including water utility managers), from editors, from Government authorities and published materials, the Association concluded the public is ill-informed about the requirements for local water and sewage facilities to meet present and growing needs of our population.

The study showed more than \$55 billion dollars invested in water and sewage plants. Yearly operating costs amount to \$933 million in water industry and \$284 in sewage plants. Plant investment and expansion over the past seven years has not come close to reaching requirements. Projected figures for 1959 indicate expansion of about \$1 billion dollars. To catch up with needed improvement and expansion, work should be progressing at a rate of \$2.5 billion a year.

Three main objectives to the WSWMA public relations program are set forth as follows:

First—to double WSWMA business with water and sewage utilities in the next ten years

Second—to alert the 170,000,000 American people—80,000,000 registered voters to the need for adequate water and sewage facilities

Third—to convince the people that to insure the protection of their own health and the health of their families they should provide the funds for adequate water and sewage facilities at fair rates.

Several public relations tests were carried out in recent months

to find out if interest could be aroused in these problems including the following: A survey of the industry leaders revealed major problems. The now famous Fortune article on the "Worst Public Works Problem" was distributed to 7,500 mayors and utility managers as well as 7 hundred newspaper editors.

President Lauren Grayson of American Water Works Association, was placed on the program of the Federation of Women's Clubs at their convention in Los Angeles in June. The facts in his speech were released to the wire services with the result that many newspapers over the country carried the story of the problem of the need for water and sewage utility expansion.

Radio and television commentators received scripts on this subject and over 400 programs used the material. This indicated a definite interest in the problems and opens the door for more material and actual placement of industry leaders in this media.

These testings show that: Editors are by no means fully aware of the water and sewage problems and needs; leadership groups such as the Women's Federation will cooperate; radio and television stations will use materials on this subject; a coordinated NATIONAL public relations program is essential to increase our business and meet existing problems.

The National Public Relations instrument, which the WSWMA has adopted, will be the "National Water Institute." This will be the "mouthpiece" for materials. The theme or slogan will be: BETTER LIVING WITH BETTER WATER SERVICE."

National publicity will be distributed to daily newspapers, weekly newspapers, national magazines, 1200 radio stations, 450 television stations, special publications and special films will be prepared. Also planned: an editorial cartoon program to be mailed to newspapers on a monthly basis. This material will, for the most part, not begin appearing in the press until after next January 1.

These wooden water mains, dug up by workmen at Talmadge Memorial Hospital, served Augusta, Georgia, more than 100 years ago. A contractor said they were in an excellent state of preservation. The woodpipes, once furnishing Augusta its entire water supply, have not been in use for many years. On the left is M. L. Lucky, City Inspector, and on the right is G. L. Higginbotham, construction superintendent for John R. Cook and Co.



Harry B. Shaw Retires



Harry B. Shaw

In June of this year, Harry B. Shaw, for nearly nine years the Chief Engineer of the Washington Suburban Sanitary Commission, retired from active participation in his industry. His associates honored his long and creditable career with a dinner on June 10.

Mr. Shaw was born in Frederick, Maryland, in 1899. In 1920, he was graduated from Johns Hopkins University with the degree of Bachelor of Engineering.

Mr. Shaw was employed by the Washington Suburban Sanitary Commission from 1920-1926 in various capacities, the last of which was assistant to the Chief Engineer, Robert B. Morse.

His activities from 1926 until 1938 included private engineering practice, and employment with various engineering firms. He rejoined Washington Suburban Sanitary Commission in 1938 as Deputy Chief Engineer, and became Chief Engineer in 1951.

Mr. Shaw is a member of the American Society of Civil Engineers; a member, past director and past Executive Committee member of the American Water Works Association; a member and past chairman of the Chesapeake Section, AWWA; and a member of the Inter-American Association of Sanitary Commissions. In addition, he has authored numerous articles and papers on various subjects relating to the field of sanitary engineering.

Mathew B. Brady:

Photographic Historian

How did Brady, the Civil War's greatest portrait photographer, shoot pictures?

He had three cameras in all to operate with. The largest employed a 16 by 20 inch plate, the second used a 5 by 9 inch glass plate, and the third was a twin lens stereo camera that shot pictures in '3D'.

All his cameras used a "wetplate process." This system involved a glass plate $\frac{1}{4}$ of an inch thick that was cut to various sizes. To prepare the plate for use, Brady dipped the plate into a tank solution of egg albumen and collodion. This he did in a traveling dark room wagon, pitched just out of range of the battlefield. The wagon nicknamed by the troops the "What's It" was a complete mobile lab equipped with developing tanks and sleeping quarters for Brady and his assistants.

The wetplate process, so popular with Brady, had been invented by an Englishman, Scott Archer. Once the glass plate was dipped in the collodion and egg albumen, a sticky emulsion formed on the glass. Brady had to be careful that no draft of air passed over the wetplate at this point; otherwise ripples would appear in the final negative.

Once the plate was prepared and just before the picture was shot, the emulsified plate was sensitized in a bath of silver nitrate. The plate was then put in the camera holder and Brady rushed to the battlefield to take his picture. The actual shooting was an involved process. The subjects had to stand still. Brady would take a camera cap off the lens, wait anywhere from thirty seconds to a minute and

a half to make the exposure (cold days took a longer count; hot days a shorter one), and then rush back to his wagon to develop the glass plate. In order for the picture to come out on the glass negative, the wetplate had to be developed and fixed within five minutes of exposure.

The developing process consisted of dipping the plate in a bath of potassium iodide and then bathing it in hypo (sodium hyposulfite). The plate was left in the hypo until the emulsion cleared. When the latent image could be seen on the glass, the glass was immediately washed in water and hung in the sun to dry. Once dried, the glass plate was given a coat of fine artist's varnish to protect the image.

Pictures were never printed on the battlefield. Brady waited until

he could transport a large number of them to his headquarters, either at Bealton or Petersburg, Virginia. To protect against breakage of the glass negatives Brady always shot at least three pictures of every scene.

Back at his headquarters, the printing process commenced. This involved placing the glass negative face down on the sensitized paper. The two were pressed together in glass holders, set in the sun in a rack to print after which the paper was developed—a process taking in all, anywhere from ten to twenty minutes.

The results of this process are the pictures you see in "The American Civil War," taken by Mathew B. Brady, and produced for television by the Westinghouse Broadcasting Company, Inc.

The Brady photos on the following pages are:

Page 16: President Lincoln in one of his first inaugural photographs.

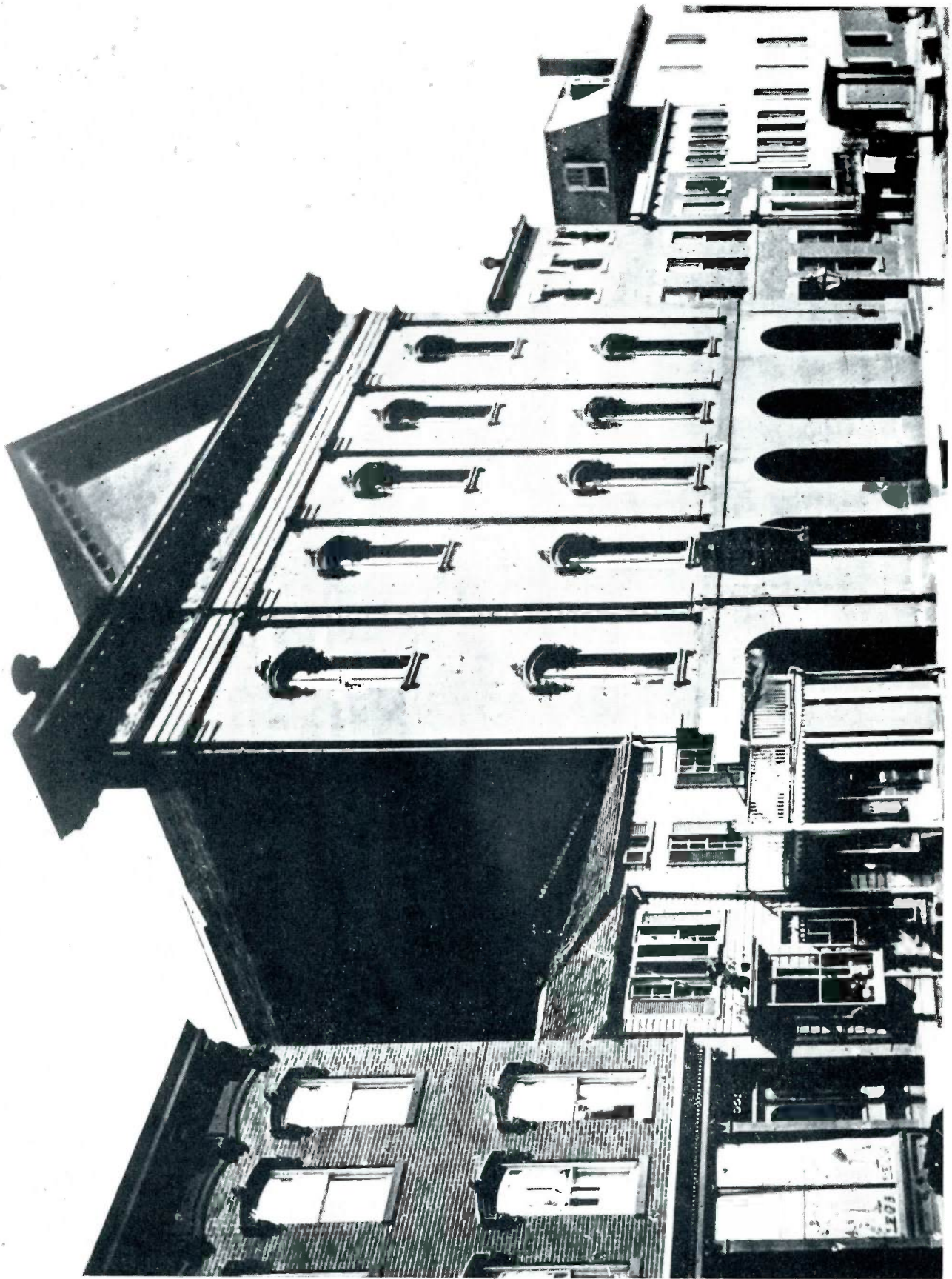
Page 17: Ford's Theatre, where Lincoln was assassinated by John Wilkes Booth. On that fateful night, this building, with its faceless, unmemorable quality, found its place in American history.

Page 18: Self-portrait of Mathew B. Brady.

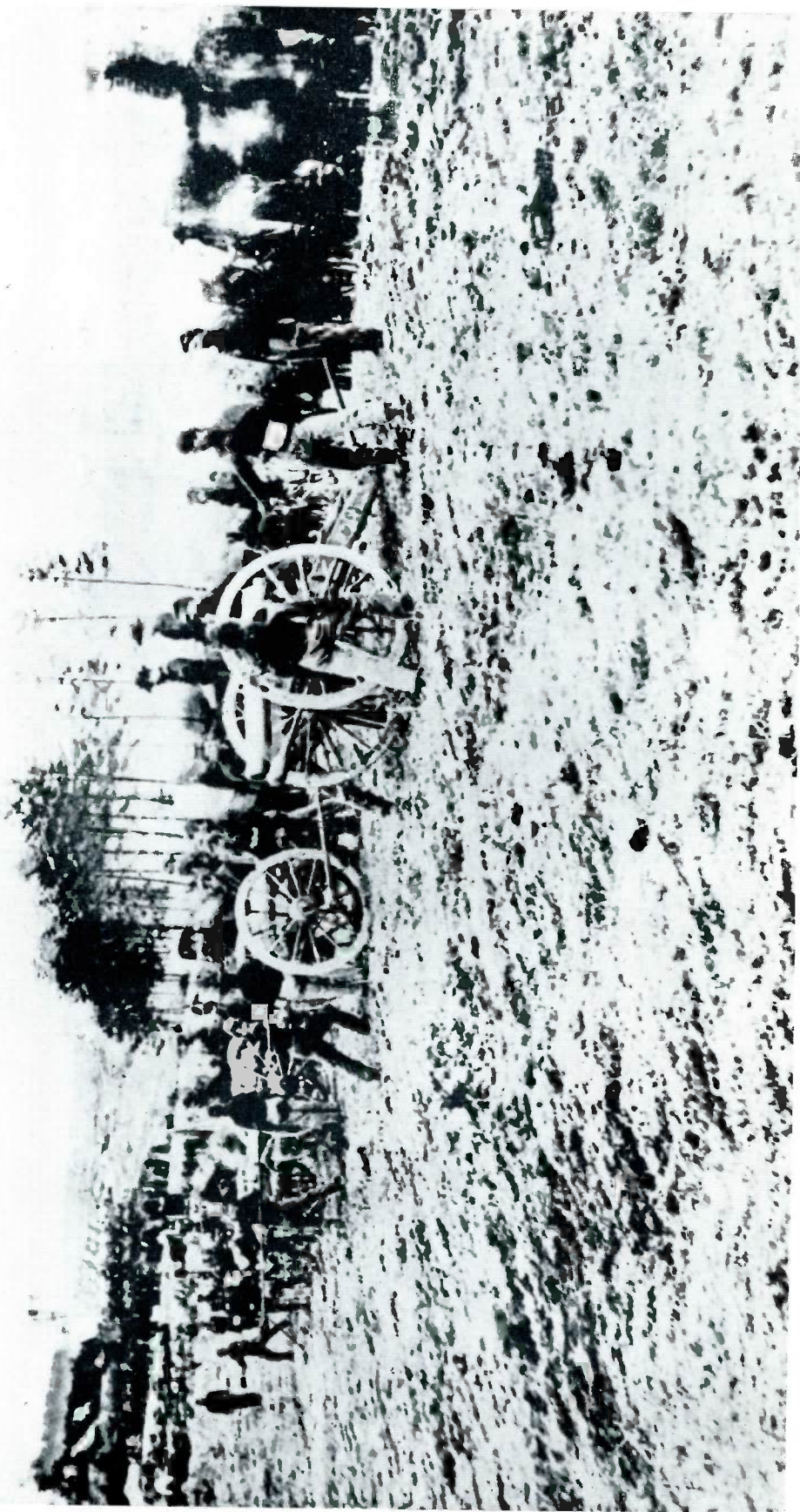
Page 19: Battery D, W.S. Artillery at Fredericksburg, Virginia, prepares to fire a salvo. The soldier at right is ready to pull the string that fires the cannon.

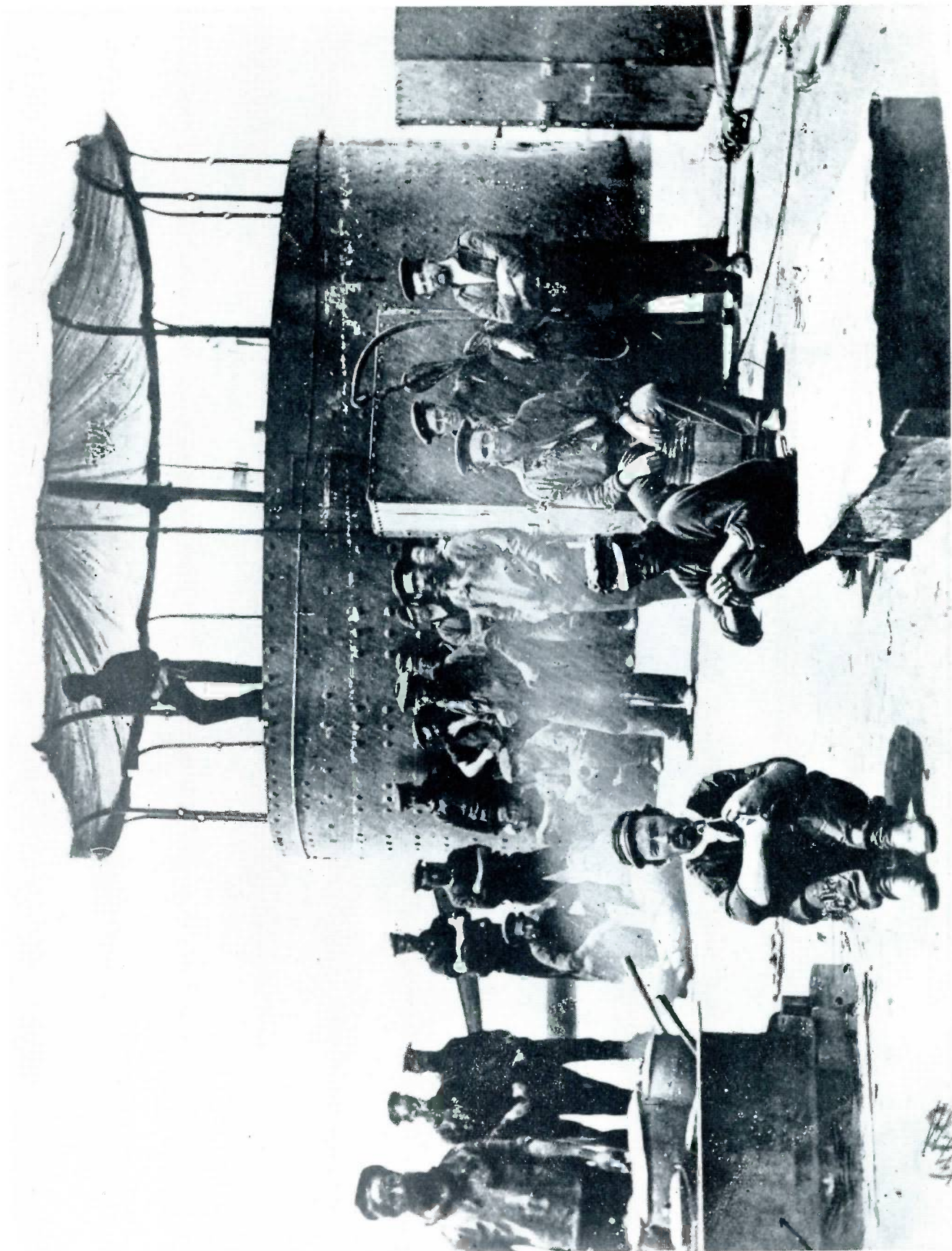
Page 20: The crew of the Monitor, seen on the ship's deck. In the background is the famous John Ericsson revolving gun turret that revolutionized naval architecture and warfare, and ended the age of wooden ships.











Mueller Valve Aids In System Improvement

Of interest in Pawtucket, Rhode Island, recently was the installation of a 24-inch Mueller valve on a new line connecting a 24-inch force main to the new three million gallon tank.

The tank was built so that the 20 million gallon equalizing reservoir could be drained, cleaned and repaired.

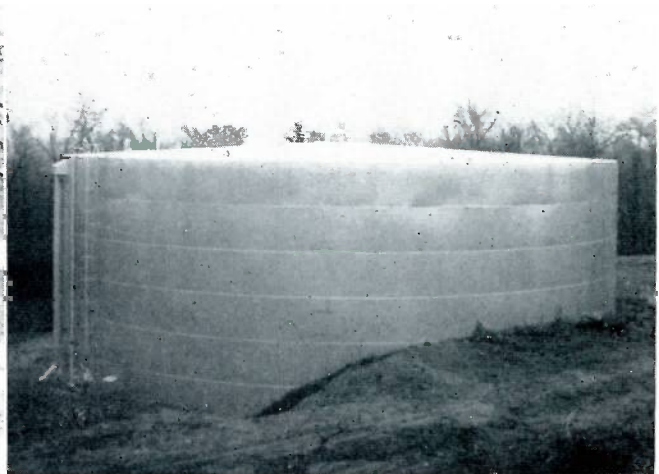
The reservoir, situated in the town of Lincoln, Rhode Island and at the highest point in the system, was built in 1877. It had been drained only one other time since

completion. It was constructed almost entirely with quarried stone of various sizes and shapes.

The accompanying photographs, according to Superintendent Ray Anderson, depict "... one of the many improvements that are being made to our system. Average consumption is about 14 and one-half m.g.d., with a maximum day of around 20 million. Pawtucket serves approximately 130,000 people in Pawtucket, Central Falls, part of Cumberland, and North Providence."



At the left is Ray Anderson, Superintendent in Pawtucket, Rhode Island. Below, a 24-inch Mueller valve is installed on the new line connecting a 24-inch force main to the new three million gallon tank, which you see in the photo at the right. Pawtucket has standardized on Mueller valves.



Strictly

Off the Record

"I don't want to see any callers this afternoon," said an executive to his secretary. "If they say their business is important, just tell them that's what they all say."

During the afternoon a woman called and insisted on seeing him.

"I am his wife," she explained.

And the secretary replied:

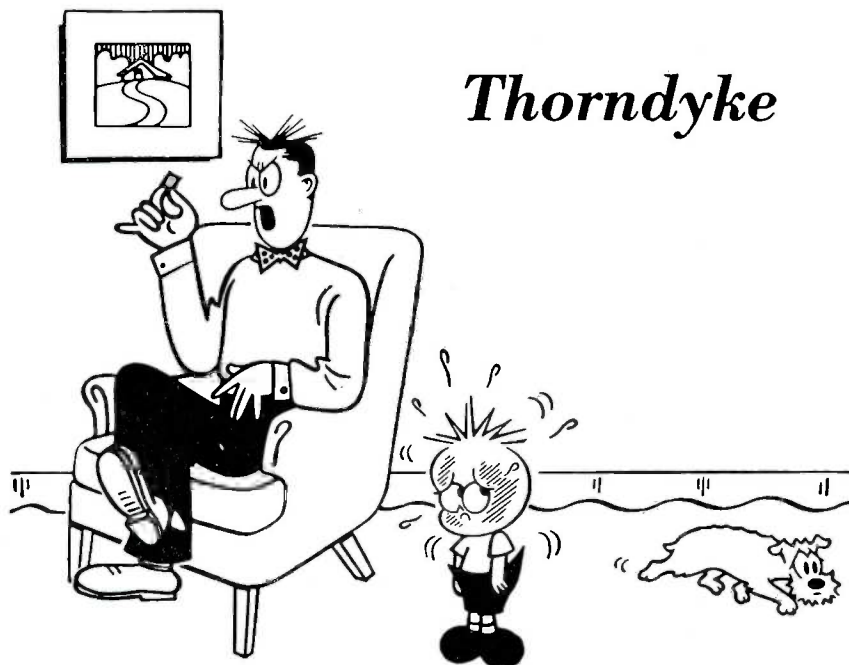
"That's what they all say."

Angry wife: "John, one of those pheasants you were shooting yesterday called and left her number."

"Tell me, sir, who was braver than Lancelot, wiser than Socrates, more honorable than Lincoln, wittier than Mark Twain, and more handsome than Apollo?"

"My wife's first husband."

A small boy debunked the talk in his neighborhood about a painless dentist. "He's not painless at all," said the youngster. "He put his finger in my mouth and I bit it and he yelled just like anybody else!"



Thorndyke

"You say all of the report cards will be on microfilm from now on?"

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By the time a man gets old enough to watch his step, he isn't going anywhere.

Anyone who has ever climbed the streets of San Francisco will appreciate Warner Anderson's observation: "The wonderful thing about this city is when you get tired you can always lean against it."

"It is a statistical fact," said the woman lecturer, "That there are 30 percent more men in mental hospitals than women."

A little man in the back row leaped up and yelled, "Okay, okay, but who put them there?"

Judge: "Who was driving when your car collided with the other one?"

Drunk: "I don't know, offisher. We were all in the back seat."

These days, a bargain is anything you have enough money to buy.

What this country needs is a good five-cent anything!

By the time he whispers "We are made for each other" she is already planning alterations.

These economic terms aren't really so hard to understand. A "readjustment" is when your neighbor loses his job. A "recession" is when you lose your job. A "depression" is when your wife loses her job.

For more than a year a man had eaten at a small restaurant whose sign read "Mary's Home Cooking." Never once, however, had he seen Mary. Finally, his curiosity got the better of him and he said to the waitress, "I've been having lunch here for a long time and Mary is never around. Where is she?"

"She's just where the sign says she is, Mister," the waitress answered. "Home cooking."

Character: To have the same ailment the other person is describing—and not to mention it.

MUELLER RECORD

Efficiency Expert: A man who waits to make up a foursome before going through a revolving door.

Suburbia: A place where people wait for their kids to grow up so they can move back to the city.

Inflation: Something that cost \$5 to buy a few years ago and now costs \$10 to repair.

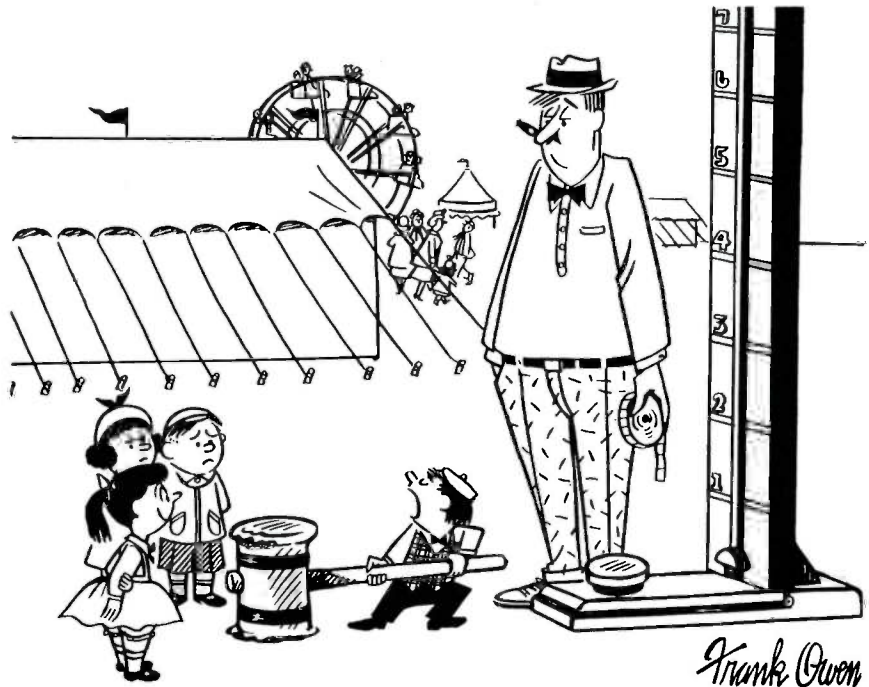
Scientists tell us the average man now lives 32 years longer than in 1800. The poor guy has to—in order to get his bills paid.

No one can deny that a yawn may be bad manners—but at least it's an honest opinion.

Middle age is the time of life when your idea of getting ahead is to stay even.

Civilization is a system under which a man pays a quarter to park his car so he won't be fined a dollar while spending a dime for a nickel cup of coffee.

Many a man is enough of a dope To be easily cleaned by the use of soft soap.



Frank Owen
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"Stand back! Don't get caught in the suction!"

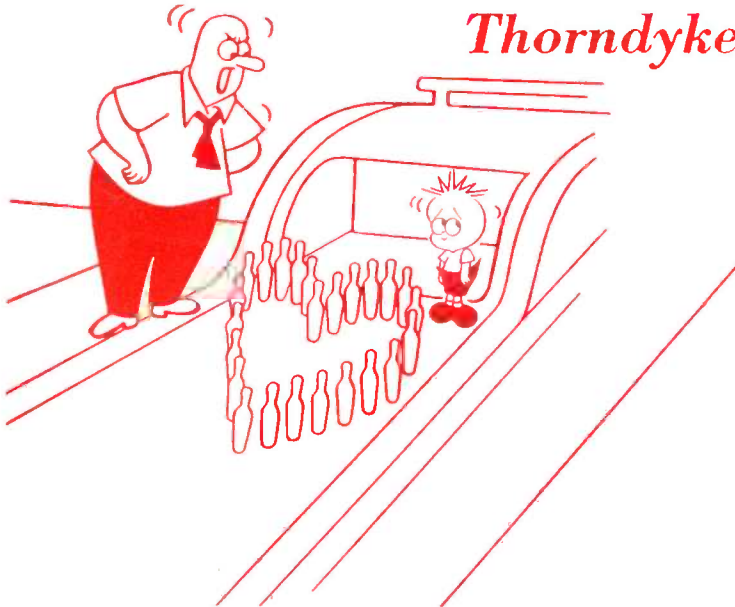
"Pardon me, sir, but aren't you putting your saddle on backwards?"

"Some cowboy you are! You don't even know which way I'm headed!"

A man took his great dane to a vet. "Doctor," he said, "you've got to do something. My dog does nothing but chase sports cars."

"Well, that's only natural," said the doctor. "Most dogs chase cars." "Yes," the man agreed. "But mine catches them and buries them in the back yard!"

Thorndyke



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"Will you forget that girl friend of yours, already!"

The president of a large corporation has instructed his personnel department to step up the hiring of personable young men. He says he's convinced it's the only way the company can attract secretaries.

One of the most difficult things to give away is kindness, for it usually is returned.

Small boy in barber's chair: "I want my hair cut like my daddy's—with a hole on the top."

Two things in life I've had and ample:
Good advice and bad example.

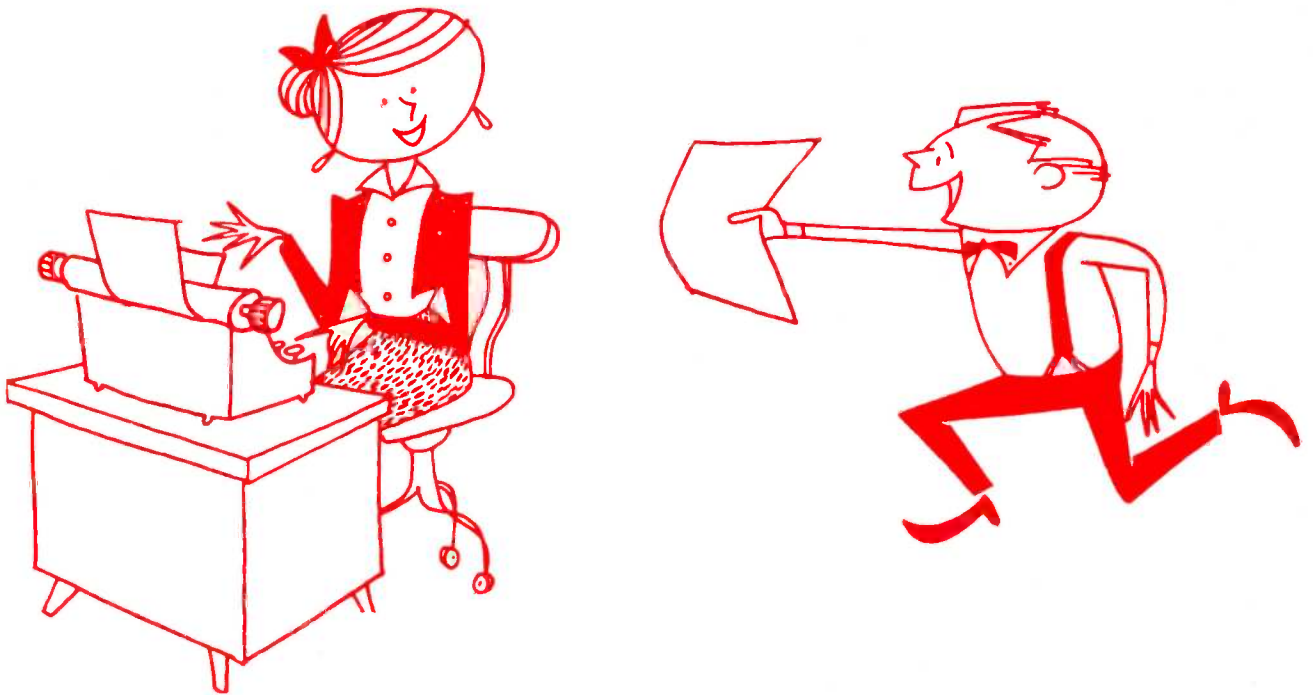
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“Quick, Miss Jones! Send my new title and address change to the Mueller Record editor so I won’t miss next month’s issue!”