MUELLER
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See . . .

THE GAS INDUSTRY'S

1961 FORTUNE

on Page 4

Blue Flame Whispers

Congratulations to the always safety-conscious gas industry for thirteen straight years of safety record improvement. A sampling of representative companies by the American Gas Association indicates that accident frequency in 1960 was at an all-time low, and nearly thirteen percent lower than in 1959.

The preliminary report indicated there were 6.24 injuries per million man-hours in 1960. The record high was in 1947, when the frequency was 21.86 injuries per million man-hours.

The sampled group included 83 gas distribution and pipeline companies.

Stanley B. Finch, executive secretary of Gas, Inc., has been named chairman of the board of directors of the newly-formed New York World's Fair Exhibitors Association. Mr. Finch served as executive secretary of the 1939-40 New York World's Fair Exhibitors Association.

As part of a continuing effort to promote more efficiency in the natural gas industry, automation and the use of computers will be stressed at the transmission conference of A.G.A. May 25-26 in Denver.

Topics ranging from cooking to the use of liquefied natural gas have been announced for the Distribution and Production Conference of A.G.A., to be held May 8-12 at the Sheraton Hotel in Philadelphia. Speakers and discussion leaders during the five-day conference will total 169.

Two signatures—one on a contract, the other on a $100,000 check — have clinched another "first" for the gas industry. The industry is the first exhibitor to contract for space at the 1964-65 New York World's Fair. John E. Heyke, president of the Brooklyn Union Gas Co., turned the check over to the New York World's Fair Corp. in early January. The signing of the contract January 13 followed by one day the dedication of the fair's new administration building, where gas is used for all heating, air conditioning, water heating and cooking.

A late-January announcement by A.G.A. was of great interest to the nation's taxpayers. The announcement concerned a revolutionary plan for producing low-cost energy in the modern school which could save $2 billion in taxes in the next ten years. This whopping tax saving can be realized, according to A.G.A., by installing natural gas turbines in new-type compact schools built to accommodate increasing secondary school enrollment during the coming decade.

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Contents

AGA President Reports

Unequalled Growth Expected For 1961

By Lester T. Potter
President, American Gas Assn.
and
President, Lone Star Gas Co.

The gas utility and pipeline industry set new highs in all areas of activity during 1960, closing the year with increased confidence that its companies will do even more business and experience greater growth in 1961.

Gas industry sales in 1960 climbed 12 percent, to a record-shattering total of nearly $5.7 billion—and they will pass the $6 billion mark in 1961.

Our 1,400 gas transmission and distributing companies served an all-time peak of 33.5 million customers at year's end. Customers set a new high in gas use, consuming more than 93 billion therms of gas during the year.

While 1960's gains continue the dynamic growth pattern our industry has established in recent years, they actually reflect more than the normal expansion a fuel or energy industry can expect in a rapidly-growing nation with constantly-increasing energy requirements, rising standards of living and higher levels of industrial productivity. These gains present striking evidence of this industry's intensified efforts to consolidate and mobilize its forces for increasingly effective service to present customers and to the consumers of tomorrow.

Today, the gas industry is larger, stronger and better informed than ever. And, by working together through such national organizations as the American Gas Association, we now stand on the threshold of doing the best job yet in defining our future roles and responsibilities as a major supplier of energy.

In a most thorough and businesslike way, this industry is projecting itself into tomorrow and, more important, preparing to meet its challenges with the most aggressive and imaginative action programs in the history of the gas business. With these programs, we believe we will create a climate wherein we will achieve more spectacular growth and strength in the Sixties than in the past 100 years.

Foremost among these programs is the American Gas Association's Promotion, Advertising and Research Plan (PAR), which spearheads our drive to protect and expand gas markets in the energy industry's most competitive decade. PAR in 1960 invested about $7¼ million in coordinated, hard-hitting national programs in gas sales promotion, research and public information.

PAR promotion and advertising —the powerful and persuasive voice of gas directed to the consumer— serves as the backbone of the industry's advertising, accounting for nearly eight out of every 10 dollars invested in national media on behalf of gas and gas appliances.

The constantly-expanding scope of PAR promotional programs gives

AGA President Lester T. Potter

greater impact and salespower to local merchandising campaigns of gas utilities and gas appliance dealers, arming them with the newest and most effective weapons for the "battle of the fuels."

Promotion highlights include the production and distribution of new sales aids on behalf of gas air conditioning equipment, gas refrigerators and Gold Star "top-of-the-line" gas ranges. In addition, intensive promotional effort was focused on the key field of residential gas heating, where more than two-thirds of the industry's 30.4 million domestic customers now heat with gas.

The 14 - month - old Blue Star Home program promoting gas-equipped homes now is supported by 135 gas utilities representing nearly 17 million residential customers. We expect utility and manufacturer participation will grow substantially in 1961 because of increased trade advertising and the possible introduction of Blue Star Home advertising directed to consumers.

New Freedom kitchen and laundry exhibits, together with appliance manufacturer displays, appeared in unified gas areas at seven 1960 national trade shows attended by more than 76,000 builders, architects, lumber retailers, plumbing contractors, home economists, educators, school administrators and gas utility representatives.

Through PAR, the Association in 1961 will introduce its first industrial gas promotion program, promoting in depth new gas applications in the metals, textile and chemical industries. A.G.A. will also continue its participation in such industrial and commercial activities as the National Restaurant Show, the American Dietetic Association Show, International Heating and Air Conditioning Exposition, National Hotel Exposition, National Metal Exposition and the American School Food Service Show.

At the same time, industrial and commercial promotion programs will be stepped up in the fields of gas air conditioning, incineration, and commercial cooking and water heating.

PAR's expanded national advertising programs in 1960 demonstrate the healthy spirit of urgency developing over the business of selling gas and gas appliances in the new era of stiffening competition.

The industry's growing determination to maintain and extend its markets is evidenced in positive terms by PAR's response to challenges in the basic load field of home heating. A new consumer campaign, aimed at selling the advantages of gas for heating, was added to the gas industry's advertising program in 1960.

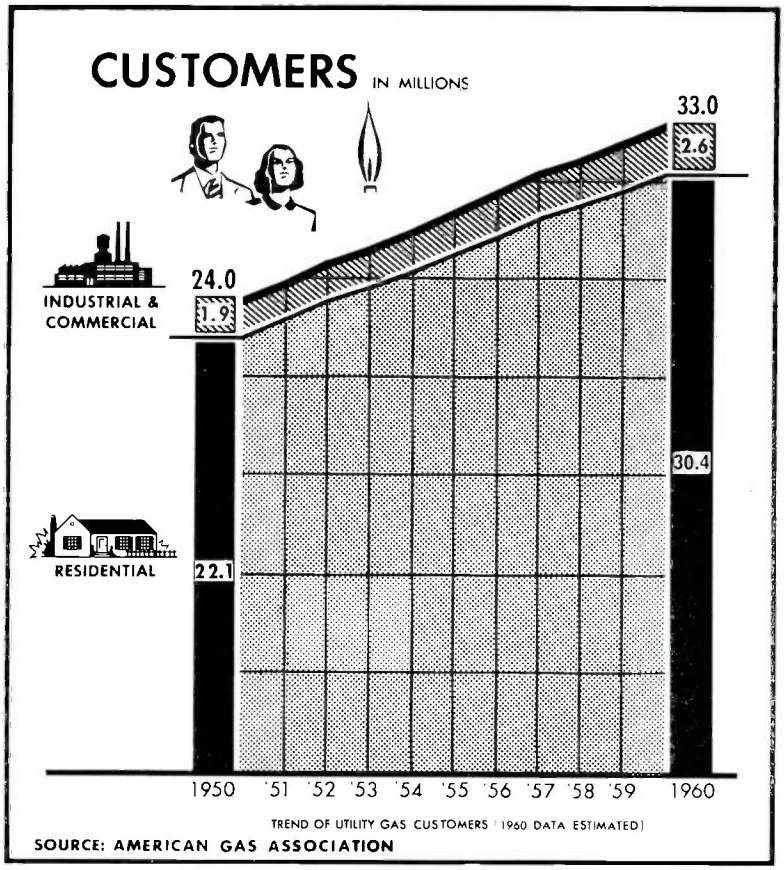
During the fourth quarter of the year, more print and television advertising was devoted to heating than was used in the years 1958 and 1959 combined. Campaigns on behalf of gas heating and gas air conditioning will be greatly expanded in 1961, making this the second most important gas advertising effort of the year in terms of dollars invested.

The Gold Star Range program drew the largest share of the industry's national advertising effort in 1960 and will continue to hold the spotlight in 1961. More than half a million dollars of A.G.A. and Gold Star funds were spent in 1960 to advertise in leading women's service, shelter and general consumer magazines and in builder, home economist and appliance dealer publications.

Strong gains also are indicated in PAR'S industrial and commercial advertising, which in 1960 carried the gas message to influential readers of nearly 40 magazines with combined circulations totaling 2¼ million.

A major factor helping to accelerate this program was the increased interest shown by manufacturers in A.G.A.'s industrial and commercial cooperative program. Thirteen manufacturers now participate, nearly doubling our activities in comfort heating and cooling, water heating, and commercial cooking. Cooperative budgeting is expected to extend the program to incineration and industrial processing in 1961.

Additional impact for PAR's national advertising and promotion is provided by the PAR Public Information program, now in its seventh year of building a more favorable climate for gas.



As a follow-up to A.G.A.'s 1959 public opinion survey of the gas industry, Public Information in 1960 spearheaded a comprehensive, objective audit of the industry's public relations resources and needs. Armed with this new knowledge, A.G.A. has charted a 1961 program of accelerated action for public relations action at all levels of the industry.

Research conducted under PAR in 1960 increased to include nearly 85 projects in gas air conditioning, gas operations, pipeline research, domestic, industrial and commercial utilization, and special research. Outlays for research, which climbed from $1.8 million in 1959 to about $2.6 million in 1960, are expected to reach $3 million in 1961.

Solar Aircraft, in cooperation with PAR Research, is developing a natural gas turbine which the gas industry views as a prime mover with tremendous potential for use in the residential and commercial markets. Turbines fueled with natural gas may be used to drive compressors, pumps, generators and air conditioners, and the exhaust heat also may be harnessed for heating and absorption refrigeration uses.

Other developments among manufacturers cooperating with PAR include the Worthington Corporation's work on a 50-ton gas engine-driven air conditioning system for industrial and commercial applications; field-testing of new gas-fueled internal combustion engines by D. W. Onan & Sons; Continental Motors' continuing development of a gas engine-driven heat pump for residential use; and the expansion of Continental's line of commercially-available internal combustion engines fueled with natural gas.

In pipeline research, PAR researchers now are completing the industry's first comprehensive study of noise abatement, a 3½-year program which concludes in mid-1961 with a series of field tests at pipeline compressor stations.

PAR pipeline research also has developed prototype equipment for the non-destructive inspection of steel pipe, which will be field-tested in 1961. Completed projects include testing studies on pipeline flow efficiency, development of flow tracer techniques, and field-testing of the foam method for removing water from flooded gas wells.

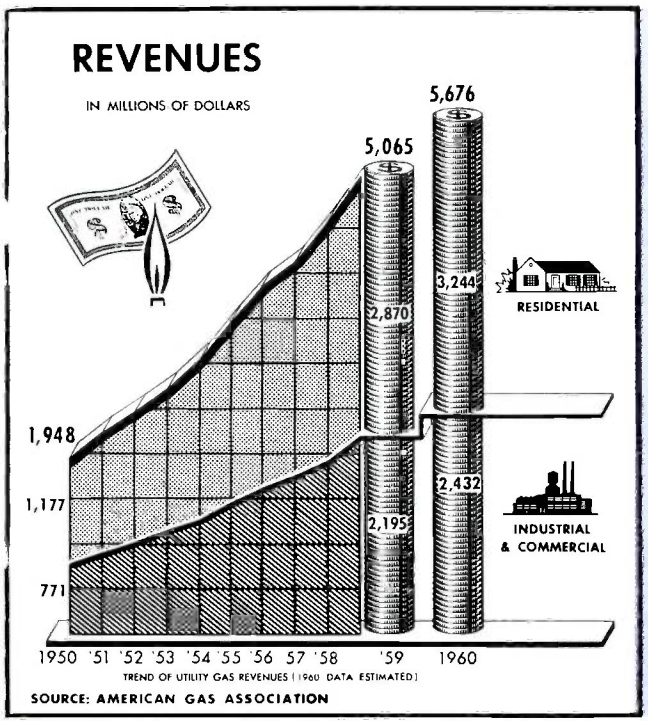
Gas operations research projects included continuing development of base load processes for producing synthetic gas from coal and oil. Emphasis now is being shifted to hydrogasification, wherein hydrogen is reacted directly to produce a high-Btu gas equivalent to natural gas.

New emphasis also was placed on gas distribution system development during the year. Researchers note significant progress in pinpointing leaks by sonic methods, the development of techniques for evaluating plastic pipe and internal leak sealants, development of a new method for the quantitative analysis of natural gas odorizing compounds, and a new concept for liquefied natural gas storage.

In commercial and industrial utilization research, PAR's 1960 projects indicated a trend toward increased use of gas-fired infrared burners in these fields, and improvements in techniques for baking foundry cores. During the year, important studies were undertaken in the field of commercial kitchen ventilation, and studies also were initiated on the reconstitution of frozen foods.

Among domestic utilization research projects carried out by the A.G.A. Laboratories was the development of prototypes of a high-recovery, non-integral water heater installation above floor level; a direct-fired gas baseboard convector; a sealed combustion chamber bathroom heater; and a high-speed oven and broiler unit incorporating infrared burners.

The Laboratories also developed prototypes of a windproof gas appliance pilot; a transistorized, battery-ignited gas range requiring no pilot; and a self-energizing electric ignition system for a gas-fired room heater in which the battery can be recharged thermoelectrically.



Gas Industry Development

While the industry gathered new sinew and muscle through PAR's 1960 programs in gas sales promotion and research, industry leaders mobilized to lay down new guidelines for the continuing development of the gas business in its most challenging decade.

During the year, A.G.A.'s Gas Industry Development Committee carried out a broad study of all phases of the industry to determine where the industry is going and to recommend what the long-range goals should be.

From this study is evolving an

intensified program for gas industry action, as well as plans to achieve the recommended goals.

Gas Use Increases in 1960

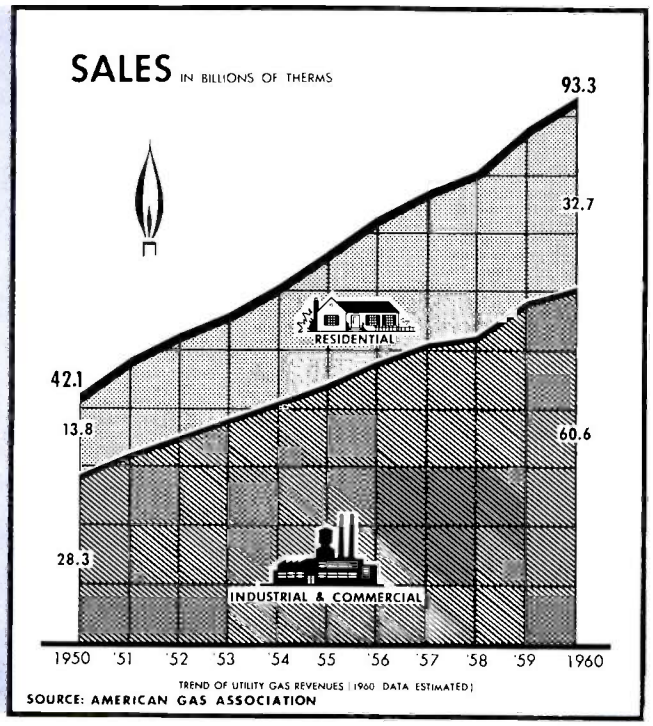
As the industry set out to define its future course, the nation's gas companies were advancing to unprecedented highs in sales, revenues and number of customers served.

Gas was delivered to an average of 33 million residential, commercial and industrial customers in 1960, compared with 32.1 million the previous year. We expect to serve 34.1 million in 1961, and A.G.A.'s long-range forecasts indicate customers will increase steadily throughout the Sixties, climbing to at least 43 million by 1970.

tion as the major home heating fuel. Residential heating customers currently total about 21 million, up from 19.5 million a year ago. We expect this number to exceed 22 million in 1961 and 32.5 million by 1970.

Our sales to commercial gas customers showed a 13.5 percent year-to-year gain, reaching 9.4 billion therms by December 31. Revenues of nearly $736 million compare with $633 million in 1959. Commercial consumers served at year's end totaled 2.5 million.

Gas used by industrial consumers also showed improvement in 1960, despite the general slackening in the nation's industrial activity



The nation's consumption of gas continued to advance in 1960, reaching a new high of 93.3 billion therms—twice the amount used 10 years ago. The year's gain represents a 6.1 percent increase over 1959's 87.9 billion therms.

The strongest gains during the year were scored in the residential and commercial markets. Sales to domestic customers increased 10 percent, to nearly 33 billion therms, and returned revenues of some $3.2 billion. An average of 30.4 million residential customers were served during 1960.

Gas also strengthened its position which characterized much of the year.

Industrial sales totaling nearly 47 billion therms were up 3 percent and accounted for half of all gas industry sales. Revenues of $1.56 billion compare with $1.43 billion in 1959.

Total gas industry revenues from sales to ultimate consumers, which rose from $5,065 million in 1959 to $5,676 million in 1960, will increase to an estimated $6,006 million in the coming year. By the end of the decade, sales are expected to produce annual revenues of more than $11 billion.

Gas Industry Construction

All previous construction records fell during the year, when gas companies spent almost $1.9 billion to expand their systems. Prospects are even better for 1961, when construction outlays will soar to more than $2.2 billion.

Completion of the $193 million Transwestern Pipeline Co. transmission line from West Texas to California was a major construction development in 1960. The new 1800-mile pipeline now makes substantially larger volumes of gas available to meet the rapidly-mounting requirements of consumers in Southern California.

Through this and other expansion projects, our industry extended its pipeline and utility main network by approximately 29,000 miles, to a new total of 629,000 miles.

Following significant and long-awaited decisions by regulatory authorities in Washington and Ottawa, the gas industry took giant steps in 1960 toward joining Canadian natural gas fields with markets in the United States. Construction is underway or planned on at least four U.S. pipelines, through which more than one billion cubic feet of gas per day will be imported from Canada during 1961.

First of the new links opened is a 565-mile system of trunk pipelines and laterals built by Midwestern Gas Transmission Corp. Canadian gas now flows through the company's Minnesota and Wisconsin lines, supplied from a Trans-Canada Pipe Lines connection at Emerson, Manitoba.

Construction also has started on the Pacific Transmission Company's $133 million 614-mile line, which will carry natural gas from the Idaho-British Columbia border to the facilities of Pacific Gas & Electric Co. in California.

New pipelines or extensions to the Canadian border also are being built by Montana Power Co. and El Paso Natural Gas Co. In addition, Tennessee Gas Transmission Co. has applied for Federal Power Commission approval to import Canadian gas at Niagara Falls.

Alaska will become the nation's 47th natural gas consuming state in mid-1961 with completion of an 80-mile pipeline and a utility sys-

tem in Anchorage. Started in the summer of 1960 by Alaska Pipeline Co. and Anchorage Natural Gas Corp., the new $17 million pipeline and distribution system will supply consumers with gas from wells discovered on the Kenai Peninsula in 1959.

New evidence of our industry's increased ability to meet peak winter consumer demands is reflected in the growth of facilities for the underground storage of natural gas.

At the start of 1960, our companies operated 209 storage pools capable of holding in reserve some 2.5 trillion cubic feet of gas—enough to serve the nation's needs for the two coldest months of the year. Ten years ago, the industry's 80 pools had a capacity of less than 500 billion cubic feet.

A December survey by A.G.A. shows the gas industry spent about $76 million to expand its storage facilities in 1960. Approximately $700 million now has been invested in underground storage, and construction programs in the next several years will push this investment to more than $1 billion in 1963.

Growth of Gas Industry's Gross Plant

The gas industry's gross plant, which has almost tripled in the past 10 years to meet growing demands for gas, totals an estimated $21,850 million, up from $19,840 million a year ago. We forecast this figure will reach $23,576 million at the end of 1961 and nearly $45 billion by 1970.

Natural Gas Reserves

While gas use has climbed to an unprecedented high, proved recoverable reserves of natural gas in the United States also has risen to a new peak, assuring adequate long-range supplies for our customers.

Reserves reached 262.6 trillion cubic feet at the start of 1960. Despite net production amounting to 12.4 trillion cubic feet during 1959 (the last year for which official statistics are available), reserves were 8.5 trillion cubic feet greater than at the end of the preceding year. New reserves discovered in 1959—nearly 6 trillion cubic feet—were the third highest on record, exceeded only by discoveries in 1957 and 1953.

Gas Appliances and Equipment

Substantial sales increases are anticipated in all major gas appliance and equipment categories in 1961, according to a year-end survey by the Gas Appliance Manufacturers Association. Sales are expected to exceed 8.7 million units, excluding gas refrigerators, air conditioners and gas lights. The estimate compares with 1960 sales of approximately 8 million.

The introduction of exciting and significant new appliances and components in 1960 reflects the gas industry's increased emphasis on the development and production of modern, competitive gas appliances and equipment for the home.

New gas ranges on the market can be hung on kitchen walls, mounted on cabinets or used as built-ins, with oven, broiler and rotisserie located above range-top level. Doors swing out rather than drop down, and one model features a "sliding drawer" top burner section. Other new ranges use advanced top burners with wide heat dispersion, permitting lower temperature turn-downs and more even heating of utensil bottoms. Still another new range, slated for 1961 production, employs a gas infrared top burner under glass for fast, cool cooking.

New gas refrigerators marketed in 1960 banish forever the need for defrosting; frost never forms, even in freezer compartments.

A new instantaneous, through-the-wall gas water heater provides hot water without a storage tank. Mounted against the outside wall of a room, it draws combustion air from outdoors and exhausts directly outdoors, eliminating the need for a chimney connection.

Low-temperature oven controls gained wider acceptance during the year as more manufacturers incorporated these devices in residential ranges. Settings as low as 140 degrees permit homemakers to prepare meals hours in advance and hold them at proper temperatures until ready to serve.

A trend also was noted toward compactness of gas appliance design, resulting in a blending of the space-saving advantages of free-standing appliances with the modern appearance of built-ins.

A.G.A. Laboratories

Activities at the A.G.A. Laboratories reached all-time highs in 1960, when thousands of gas appliances and accessories were tested for compliance with rigid gas industry standards. Items meeting these requirements were awarded the Laboratories' "Blue Star" approval seal or Listing Symbol.

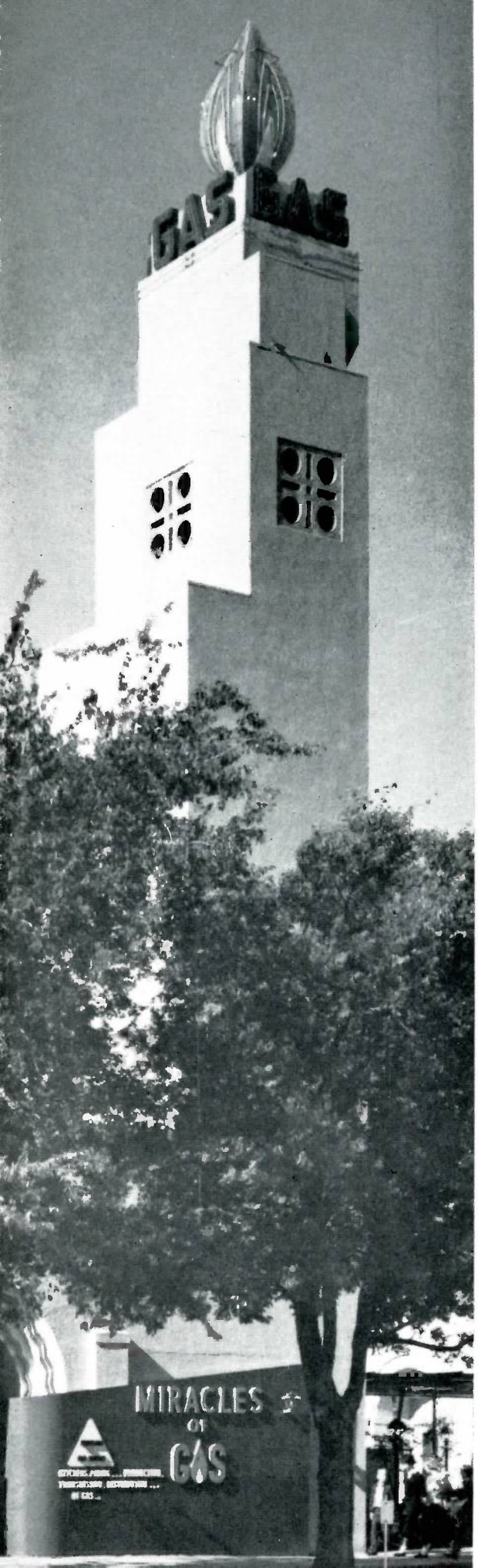
Appliances submitted by manufacturers for A.G.A. testing and approval continued to incorporate new features of advanced design, performance and styling. The Laboratories also note manufacturer interest in the use of gas infrared burners, in appliances with sealed combustion chambers, and in equipment intended for installation in mobile homes.

A new department of approval and listing services, established in 1960, assumed administrative activities formerly under the testing and inspection departments. Organizational changes were made in both the testing and inspection departments, with emphasis placed on expanding services to manufacturers.

Requirements activities included the preparation of revisions and additions to 25 gas industry approval and listing standards. These were adopted by A.G.A.'s Approval Requirements Committee and later approved as American Standards (ASA). Seven requirements investigation studies completed during the year provided data for various standards groups, and 23 approval and listing standards were undergoing re-evaluation at year's end.

The Laboratories' role in gas industry research also continued to strengthen in 1960. Thirteen major research projects were conducted under A.G.A.'s Promotion, Advertising and Research program, and 11 research publications were distributed to the industry.

Throughout this revitalized, forward-moving industry we see dramatic evidence that the gas business is mobilizing to meet its challenges with more vigor and determination than ever. We are confident that these signs on every hand point to continued gas industry growth and progress in 1961 and the years beyond.



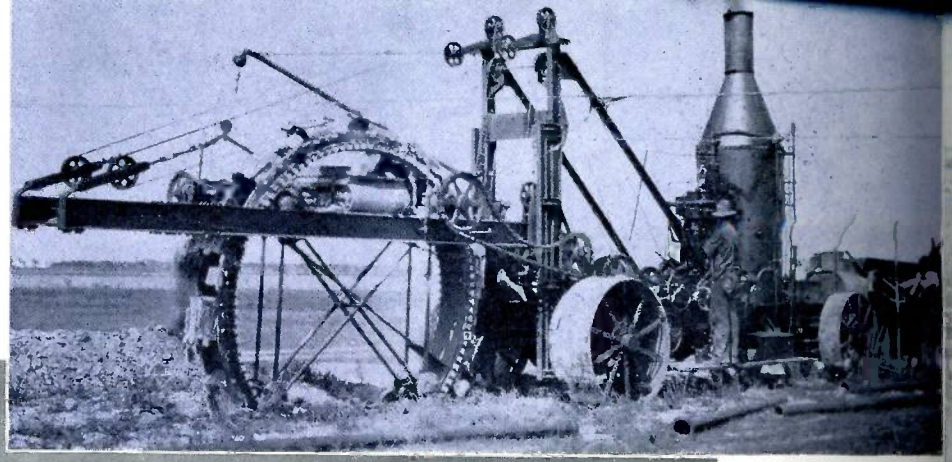
Lone Star Shines Brightly In Texas

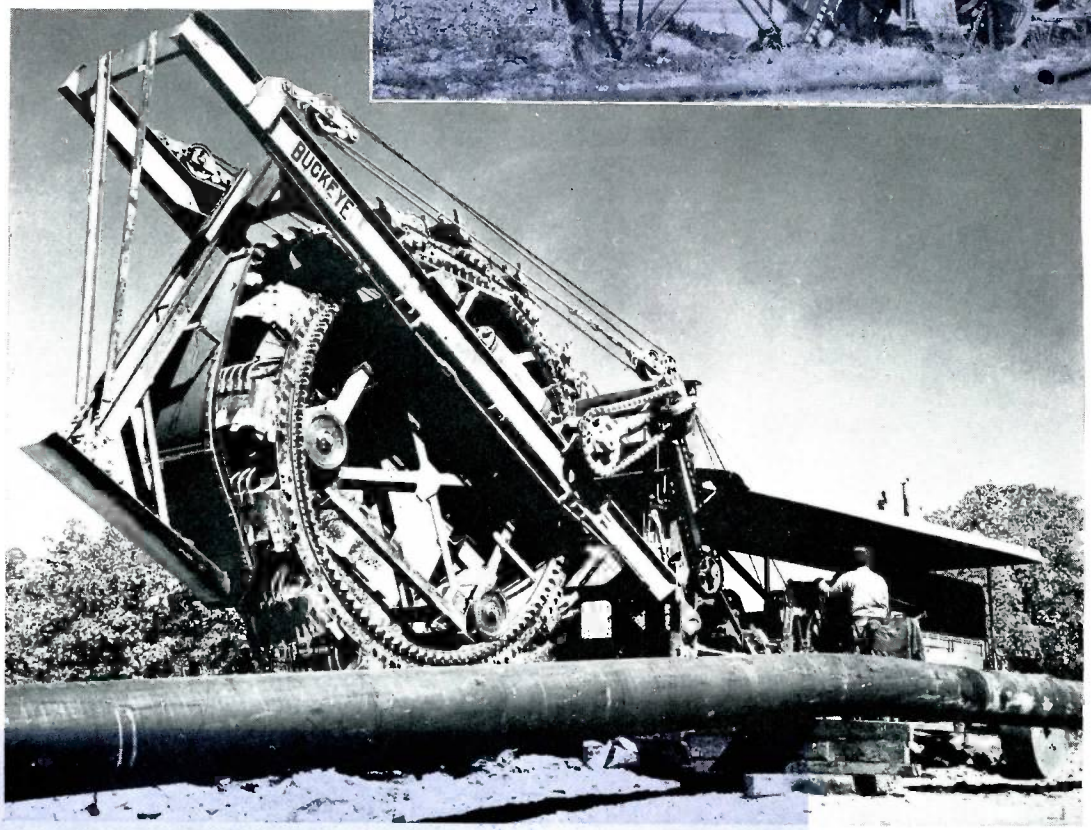
For Lone Star Gas Company of Dallas, Texas, now in its 51st year of operation, the outlook for continued growth is bright, but also challenging —just as challenging as the first 50 years.

As President L. T. Potter stated it, "We are confident that we have the organization, supply, production, transmission and distribution facilities, the research-mindedness, the promotion drive, the growing market and the financial stability we need in order to take full advantage of the opportunities available to us in the future."

Lone Star Gas Company exhibit building at Texas State Fair.

Fifty years of progress are shown at the right and below. A steam trenching machine was used in Dallas in 1909 while today's "Big Wheel" ditching machine is shown below.





Lone Star sells natural gas to more than 857,000 residential, commercial and industrial customers in 462 cities, towns and communities in Texas and Oklahoma.

Its more than 8,600 miles of transmission and gathering pipelines and service area stretch nearly 400 miles east and west and nearly 400 miles from north to south.

"As we move into our second 50 years of progress, some of us will be recalling that in 1961, the miracles of natural gas were only just on the threshold of development," Mr. Potter said.

Lone Star is already making plans to carry its increasing share of the future energy requirements of the nation. It is expected that an average of 323 to 407 billion cubic feet will be required annually to supply demand through 1968. Gearing for this growth, Lone Star would spend many millions of dollars on pipline facilities alone during the next 10 years to extend lines beyond the present limits for new gas supply.

Lone Star and its wholly-owned subsidiary, Lone Star Producing Company, have announced a record initial investment budget of $33,600,000 for 1961. According to Mr. Potter about two-thirds of this year's initial budget will be invested to maintain and strengthen natural gas service in its area.

The Producing Company will spend the balance on drilling and deepening oil and gas wells, new leases, seismographic service and other exploration costs, Mr. Potter noted.

"The record investment budget reflects Lone Star's confidence in growth of energy demands in its present market areas during 1961 and the years to come," he said.

He went on to say, "We anticipated adding approximately 26,000 new customers this year in our company-owned and operated distribution systems."

One of the big expenditures will be the construction of an 18-inch, 52-mile natural gas transmission pipeline, dehydration plant and compressor station in the West Texas area.

The project, estimated to cost about 3 million dollars, will increase the total capacity of Lone Star's transmission facilities by more than 100 million cubic feet of gas daily.

At its birth in 1909, the outlook for infantile Lone Star Gas Company was not nearly as bright and was filled with uncertainties.

Lone Star was born during a year of great activity among the natural gas interests in Texas. The state boasted 5,035 domestic customers

Even the plodding machines of 1909 were a big improvement over the use of shovels and back muscles. Here workmen are shown laying Lone Star's first long distance line from Petrolia Field to Fort Worth and Dallas, a distance of 126 miles.

and 130 industrials by the end of 1909. A year later, the domestic meters had jumped to a new high of 14,719 in the state, the majority of them served from Lone Star supply.

At its very beginning, Lone Star laid the first long-distance, large-diameter transmission pipeline in the Southwest. It was to be 15 years before any other company laid such a pipeline in Texas. Lone Star, then, was truly a pioneer in Texas in hazarding major transmission investment to bring gas supply and customer together. This basic activity continues as one of the predominant characteristics of the company.

During its embryonic stages management became keenly aware of the compelling and sometimes almost insurmountable problems resulting from a dwindling gas supply and a shortage of funds and materials.

For the first 17 years, Lone Star continued to sell gas wholesale at city gates to unaffiliated distribution companies and these and its own customer demands increased so rapidly that it was soon necessary to test outside territory for new sources of supply.

The first few years were a period of bitter struggle with lines being extended to new fields only to find the supply exhausted. The science of conservation was virtually unknown at that time and vital gas supplies were being blown into the air and wasted.

World War I brought additional hardship. The company lacked money and credit. Materials and labor were at a premium. By removing and relaying portions of other lines, an extension was made into south central Oklahoma.

During this same period a 100-mile line was extended into West Texas, but for five years this line didn't even pay operating expenses.

It was a dark hour. The company was paying as much as 15 per cent for borrowed money, and on three occasions it faced receivership because of its inability to meet customer demands for gas.

The possibilities of tapping num-

Today, Lone Star's transmission and gathering pipelines stretch 8,600 miles in a 400-mile radius. During 1961 a 16-inch, 52-mile line is scheduled to be laid into west Texas.

erous small low-pressure gas fields were being studied by Lone Star engineers. If only they could devise some method of producing and boosting this gas into the pipelines, many of their supply problems could be solved.

Finally, in 1918, while working with engineers from the C. and G. Cooper Co. of Ohio, a compressor unit tailored to meet the needs of low-pressure fields was tested.

The problems of supply were eased still further in the early 1920's when Lone Star engineers developed a process for utilizing residue and casinghead gas. Having no commercial value up to this time, the gas was being flared except in some instances where it was being processed for the recovery of natural gasoline. Rich in butane and propane, the gas had not been interchangeable with existing pipeline gas and could not be utilized as fuel.

Lone Star's solution to the problem, through special processing, is still hailed as a conservation milestone of tremendous importance.

As the result of its pioneering efforts in this gas conservation pro-

In the wake of floods and disasters, Lone Star crews worked in dangerous conditions to keep service to customers.

gram begun more than 30 years ago, trillions of cubic feet of casinghead gas have since been utilized instead of wasted. In 1960, casinghead and residue gas amounted to more than 60 per cent of all gas distributed by Lone Star.

The early engineering developments marked a turning point in the fortunes of the company, and management began turning its attention to expansion of its distribution system and the search for new markets for its gas.

Plans were made to combine production, transmission and distribution facilities under a common ownership which would assure a complete "well-to-burner-tip service" to its customers.

Small distribution companies adjacent to its pipelines were purchased and within the period from 1925 to 1930, Lone Star constructed 200 town plants of its own in Texas and Oklahoma.

Lone Star Gas Corporation was organized and properties of its two major distribution customers, Dallas Gas Company and Fort Worth Gas Company, were purchased. Gradually other distribution properties were acquired and combined with gas production operations.

To effect a more compact operating organization, the Company was re-organized in 1942. Lone Star Gas Corporation was dissolved as a holding company and two companies, Lone Star Gas Company and Lone Star Producing Company, emerged.

Lone Star began to reach its financial maturity in 1938 with the launching of a 31 million dollar financing program.

During the next 20 years, company investments for new plants and properties brought added prosperity to many communities within its service area.

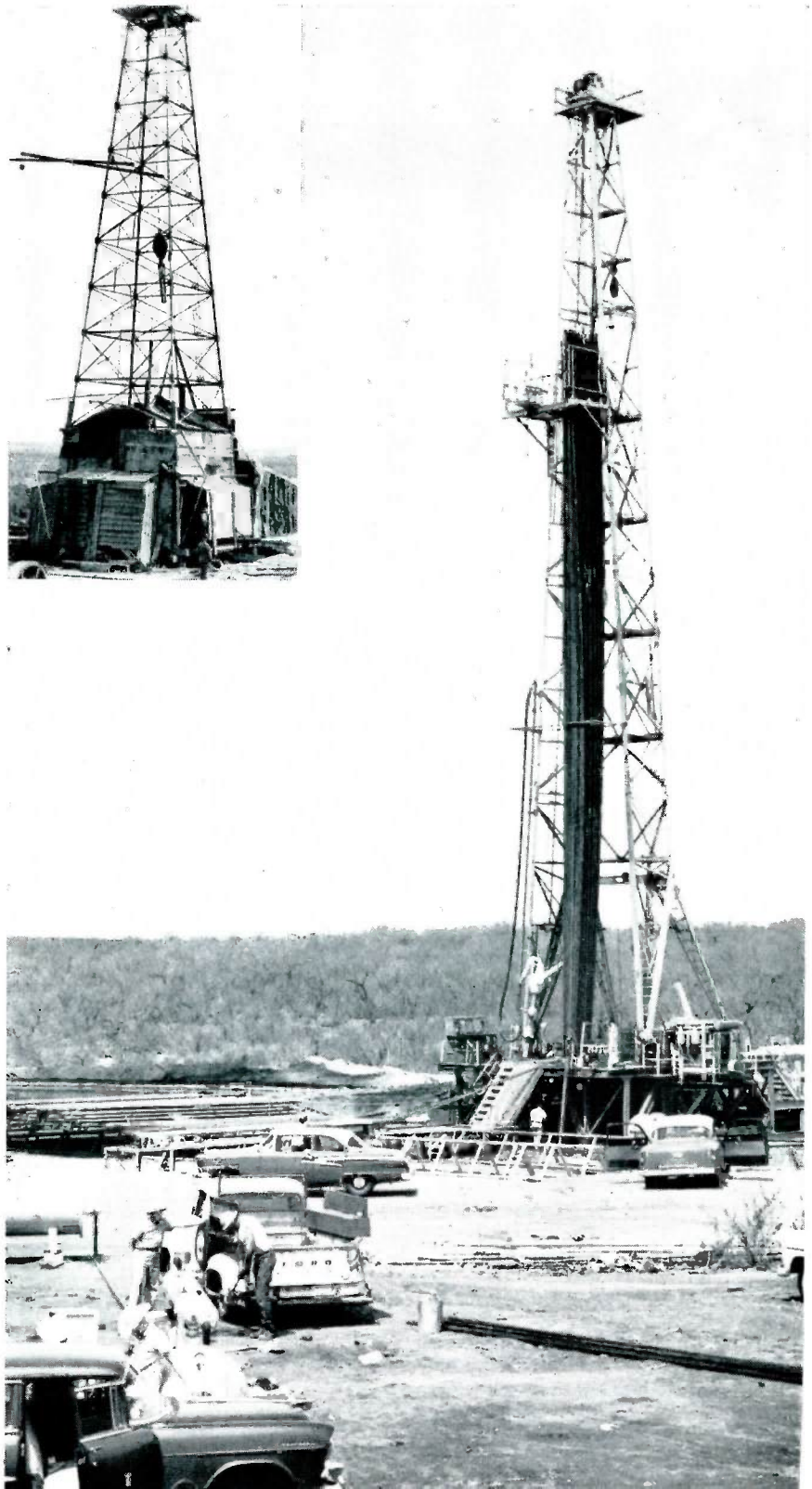
No small part of the company's soundness today lies in its gas supply and reserves position. At the end of 1960, the total gas reserves under contract amounted to approximately 3.6 trillion cubic feet. The company also has five underground storage projects with capacity of some 53 billion cubic feet.

As the supply seems to increase, so does the demand.

Gas sales reached a new high of more than 297 billion cubic feet in 1960, which is 29,700 times the amount produced by the single source of supply when the company began more than a half-century ago.

Lone Star Gas Company can review its 51 years of progress with pride; but its future lies ahead, as alive with promise as in the year 1909, when Lone Star came into existence.

Lone Star Producing Co.'s most important discovery came in 1956 at the Atascosa County, Texas field. One of the first wells in the field is shown below while a well from 1918 is shown in the inset.



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YOUR

Help

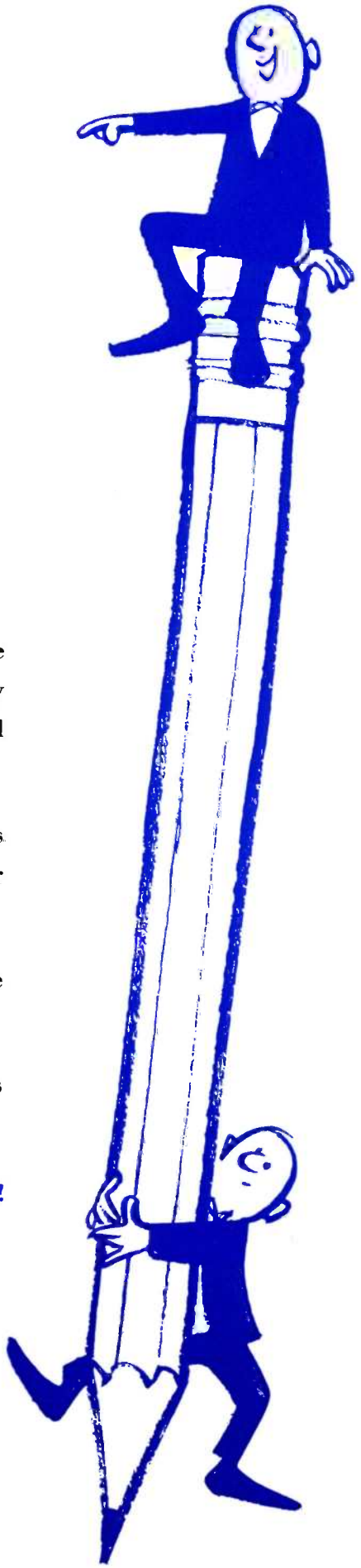
In an effort to determine your opinion of the MUELLER RECORD, we will include in the June-July issue a self-addressed, stamped card, on which we will ask you to indicate your opinion of the magazine.

It will not be necessary to sign your name (unless you wish to do so). We are merely interested in your thoughts concerning this fifty-year-old publication.

Your ideas are our editorial guideposts, and are important to us in planning future issues.

We sincerely hope you will take a few minutes to complete the card and return it to us.

In advance . . . **THANKS FOR YOUR HELP!!!**



Long Beach, Calif.

Work of Art, Does Work Better

"A work of art in engineering" is one term used to describe the octagonally-shaped building which houses the new gas compresser station at Long Beach, Calif.

A push-button system puts this $2,700,000 addition under the control of one man. Included in the project is a five million cubic gasholder which has a diameter of 215 feet and is tall as a 17-story building. It is believed to be the largest dry-seal holder of its type.

The compressor plant and gas holder took two years to build and was completed last year. The first octagonally-shaped compressor station is called an important advance in function and economy, and is believed to be the most fully automated plant of its kind in the nation.

Because of the unusual design of the building it is believed that an ideal distribution to and from the compressors has been achieved. No unit has the tendency to starve out another, and the overall advantage can well reflect greater plant efficiency.

The hub of operation is a sphere, 10-feet in diameter for gas suction, and a doughnut-type ring header encircling the sphere for gas discharge. The compressor station being built around the sphere makes possible a very short radial transmission of gas to and from the compressors.

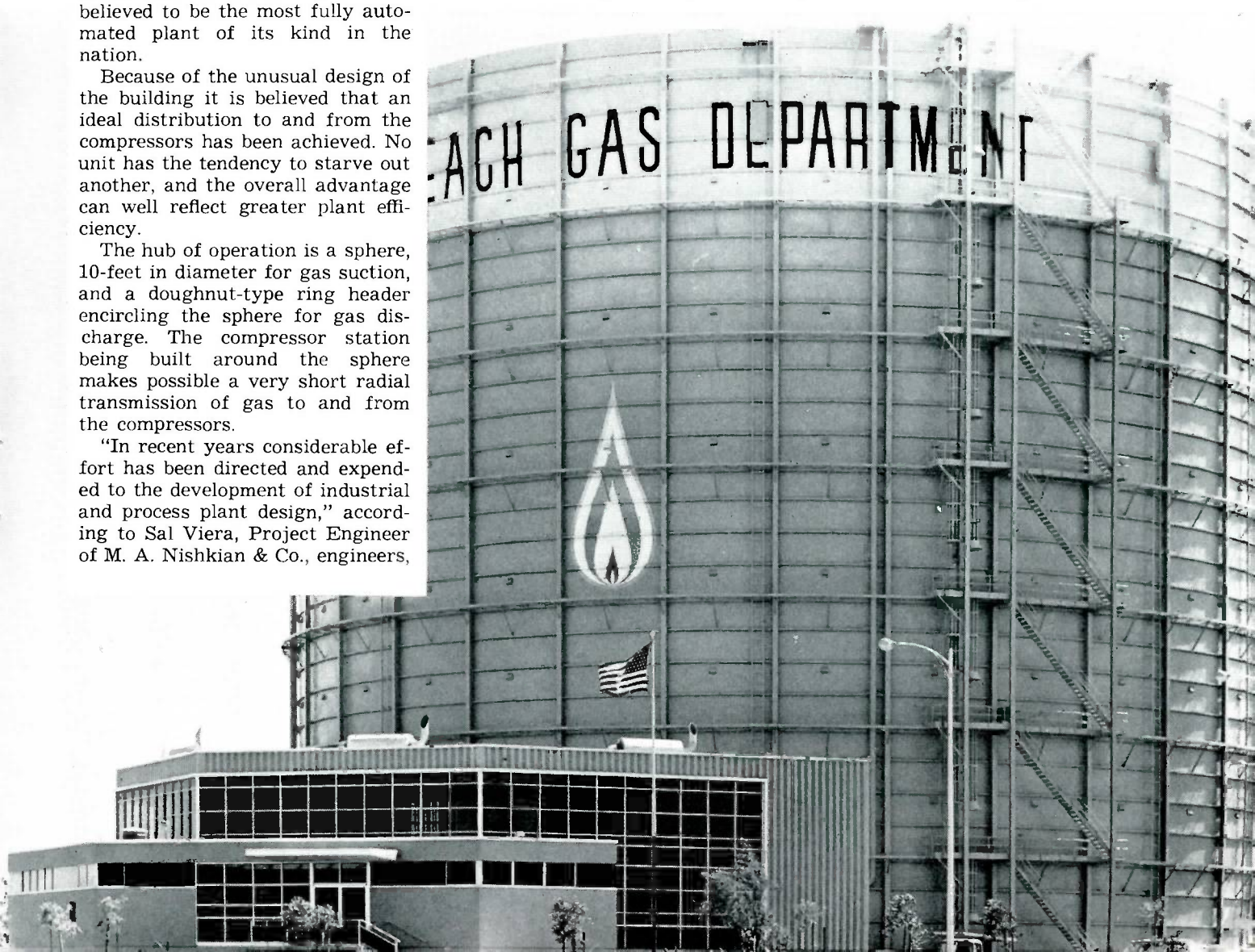
"In recent years considerable effort has been directed and expended to the development of industrial and process plant design," according to Sal Viera, Project Engineer of M. A. Nishkian & Co., engineers, constructors and consultants of Long Beach, Calif., who designed and engineered the Long Beach project.

"These efforts have been made not only to fulfill basic functional process requirements, but to provide aesthetic qualities and eye appealing color selection, which today are an integral and important part of our existence," he said.

Mr. Viera said, "The unattractive appearance of yesteryear plants, factories, offices and institutions are being transformed into pleasant, work-inspiring areas to blend with the fast and modern development of our metropolitan and suburban areas. Progress in plant design must parallel progress in process design and devlopment."

Tracing the plant flow, we find that excess gas in the city distribution system fills the gasholder through a back pressure control valve, which is set to open at any predetermined point.

When a continual pressure drop in the city system is detected, the dispatcher calls for the plant to start up and to commence repressuring and supplementing the system. Gas is drawn then from the holder into the sphere. The sphere then becomes the plant suction header and feeds the four, 550-horsepower compressors. The compressors then discharge into the



24-inch diameter ring header which encircles the sphere. The radial distribution from the sphere affords nearly perfect even flow to all units.

The magic fingers, hands and muscles of automation make it possible to run the operation or control valves from the plant merely by the press of a button or two.

From the main instrument control panel which is 7½ feet by 15 feet long, the operator can see all the plant's indicating pressure and temperature guages, process recording and controlling instruments, gas chromatograph control unit and recorder and semi-graphic flow diagram presentation which indicates the main plant flows, valves, equipment etc.

This entire $2,700,000 operation is run by one man seated at a console. It takes the push of only one button to simultaneously activate five valves which are needed to take gas from the holder and send it through part of the 750 miles of distribution line in the system.

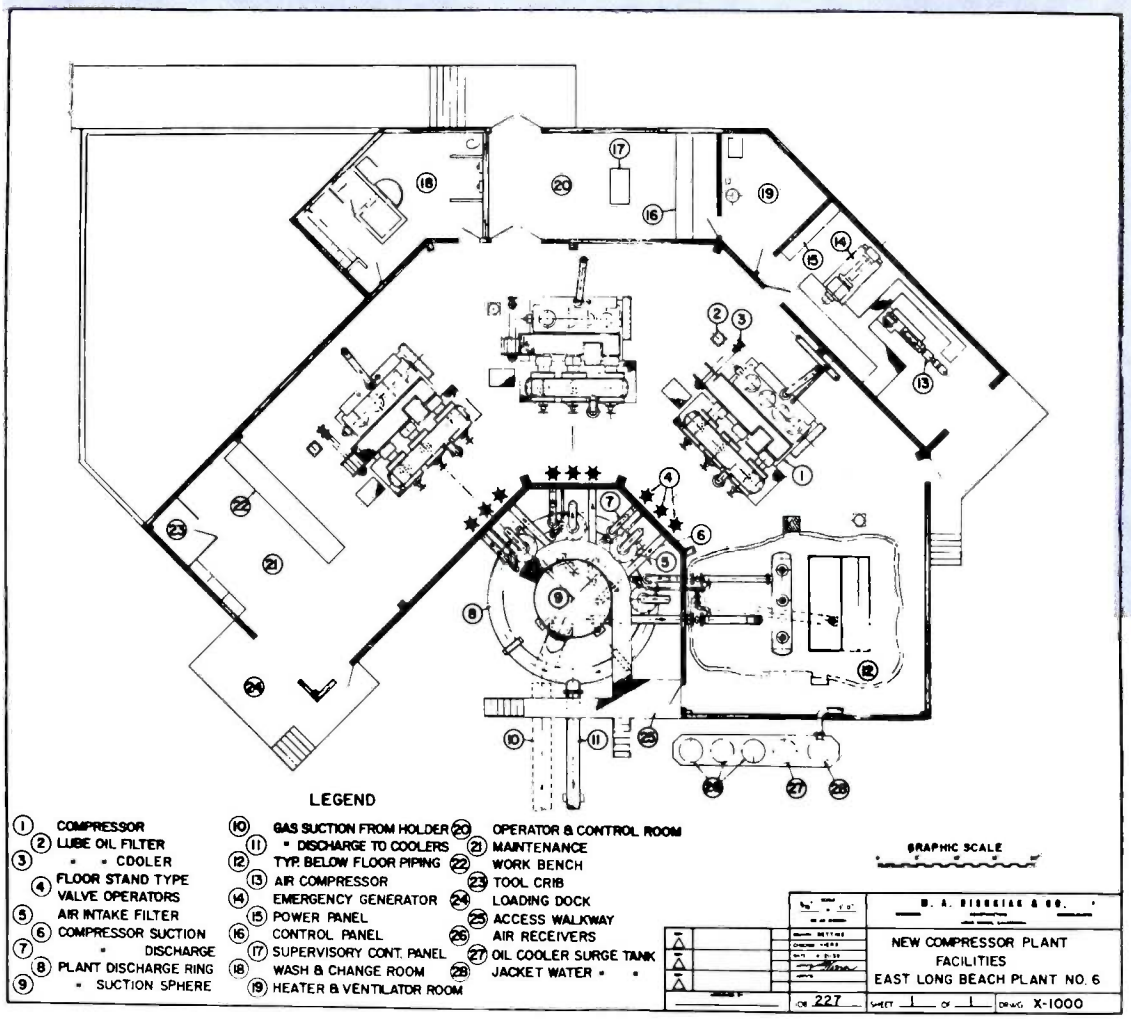
Two leased telephone lines provide the interconnecting link between the central control room and the remote locations.

The gigantic holder is used as a supplement for the normal daily uses in Long Beach which vary from day to day.

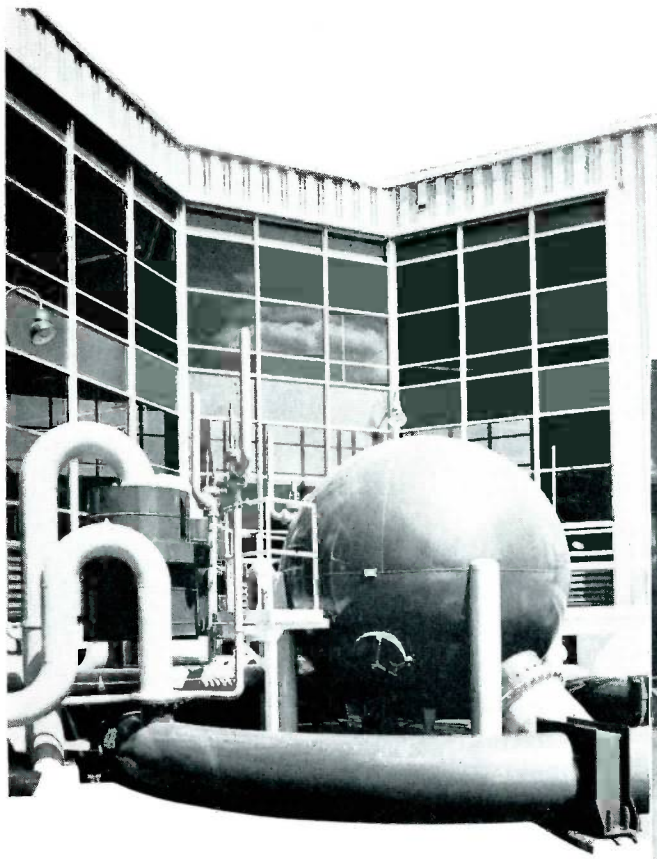
It operates much like the old-fashioned collapsible tin drinking cup held upside down. The bottom of the cup becomes the piston, moving up and down as the volume of gas changes. The seal between these telescoping lifts is formed by huge rubber fabric curtain loops, which are attached to lifts.

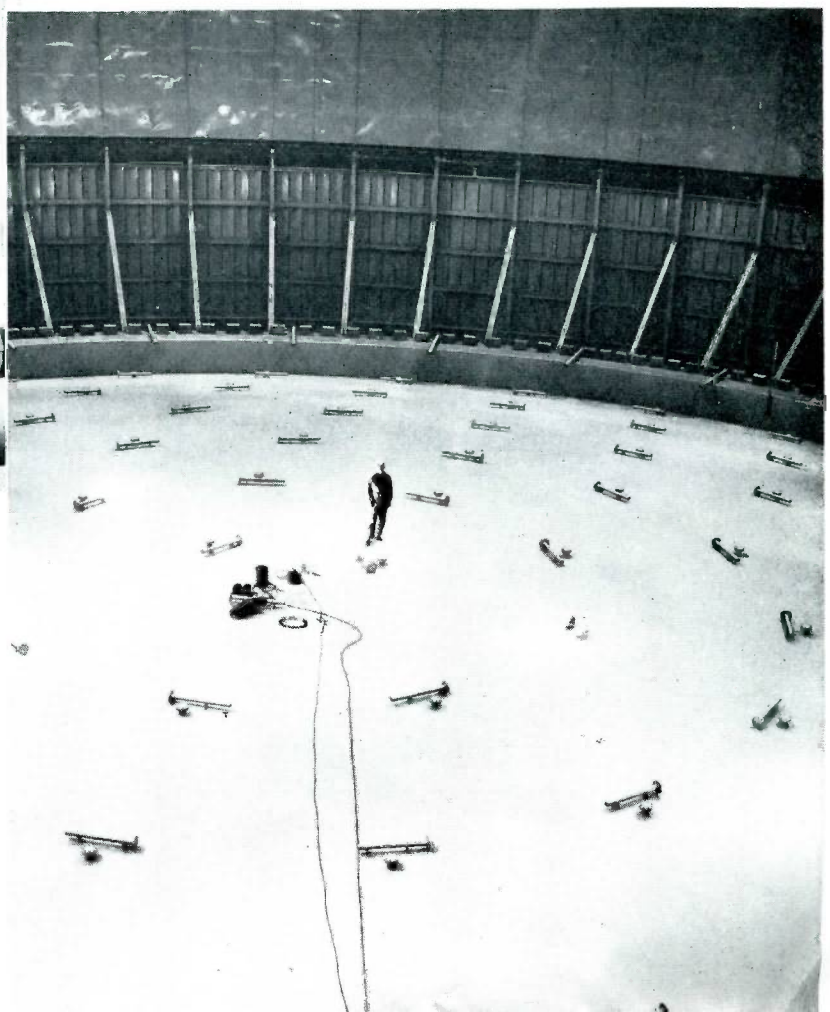
The pressure is maintained by the heavily weighted piston, which the gas has to lift in order to enter the holder.

More than 2,000 tons of steel were required to build the holder and it cost about $100,000 alone to apply its 3,500 gallons of light gray and green paint.

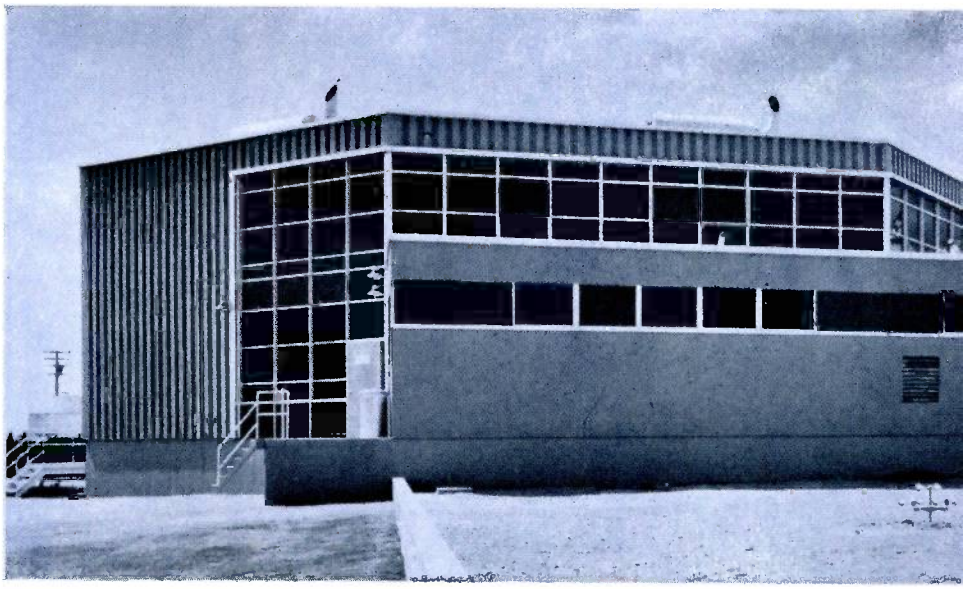


Most of the main features of the new Long Beach compressor plant are shown above. It shows the plant's grouping around the gas suction sphere, the donut shaped ring header and the inlet pipe from the holder. The lower photo shows the gas holder piston dome size in relationship to a workman.

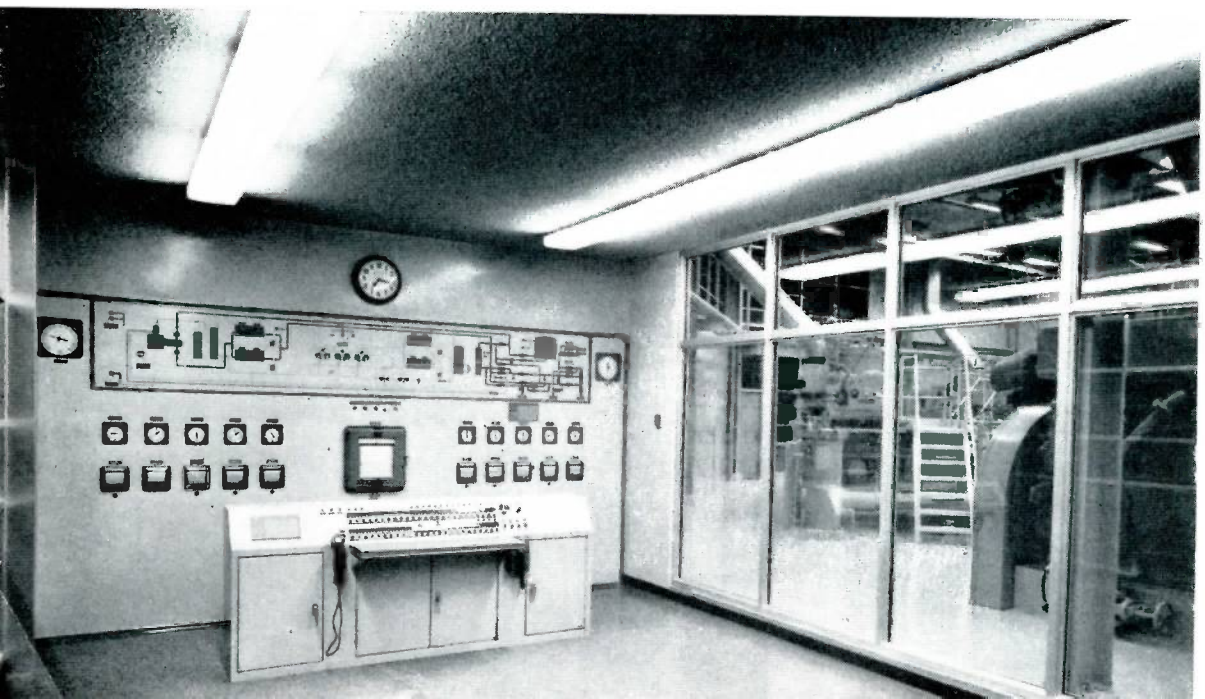




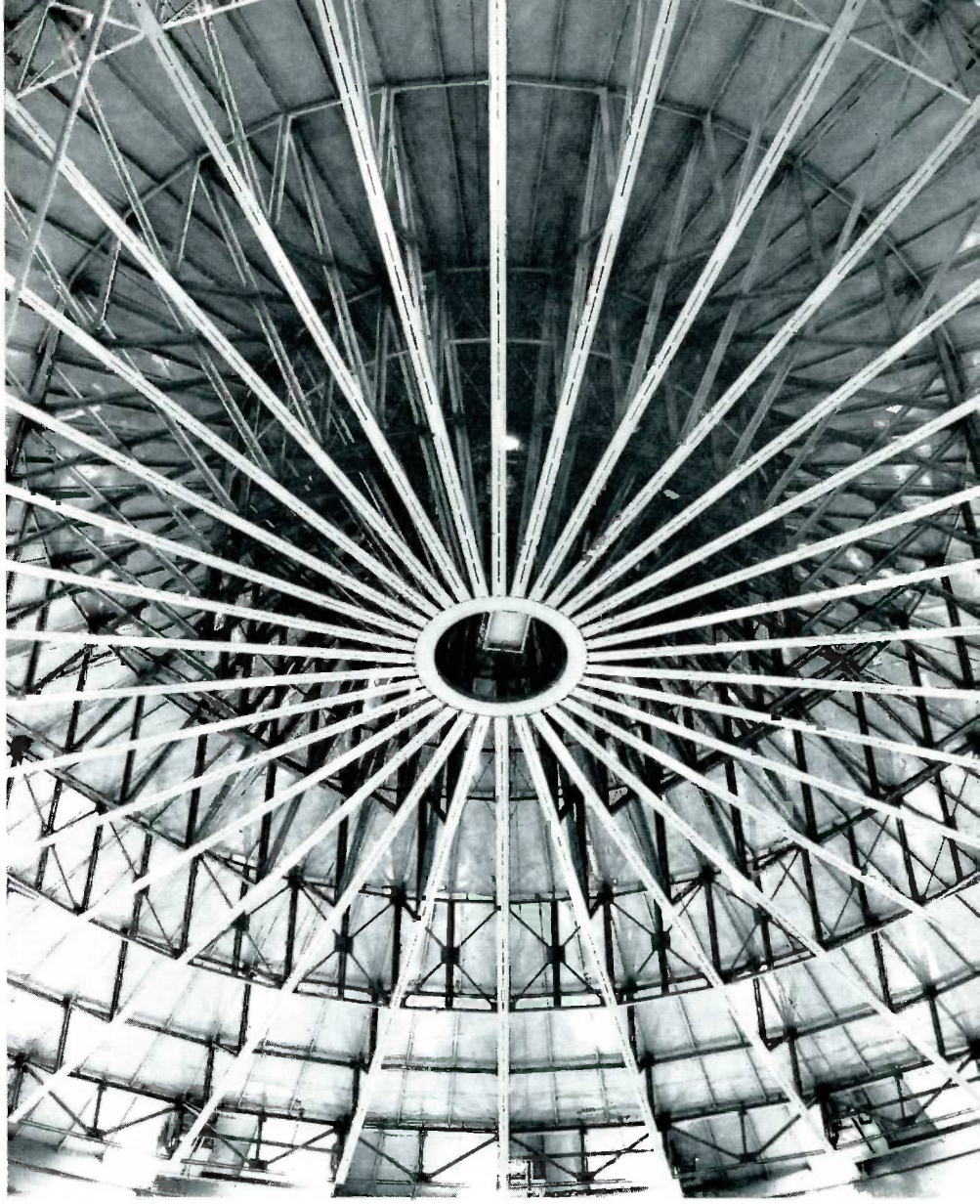
The plant suction sphere and the 24-inch diameter ring header are shown in a closeup view. The building design along with the sphere and ring header make for the most ideal distribution to and from the compressors.



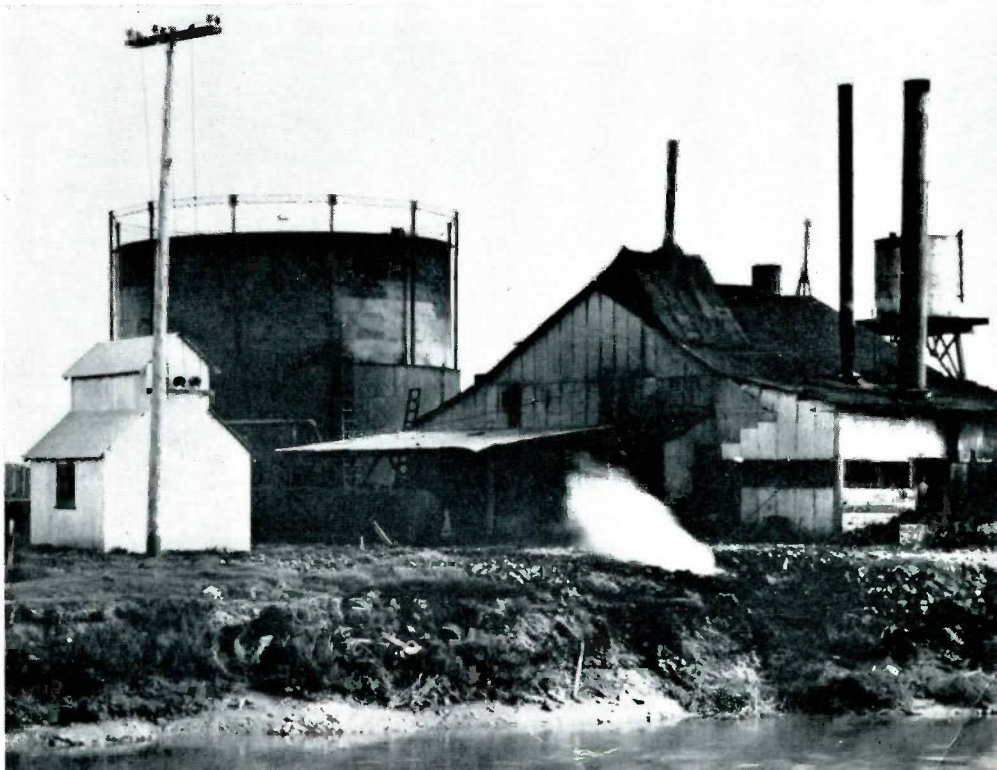
Part of the four, 550 horsepower compressors are shown above while the bottom photograph shows the highly automated control room, consol and graphic panel. At the right is an exterior shot of the new building.

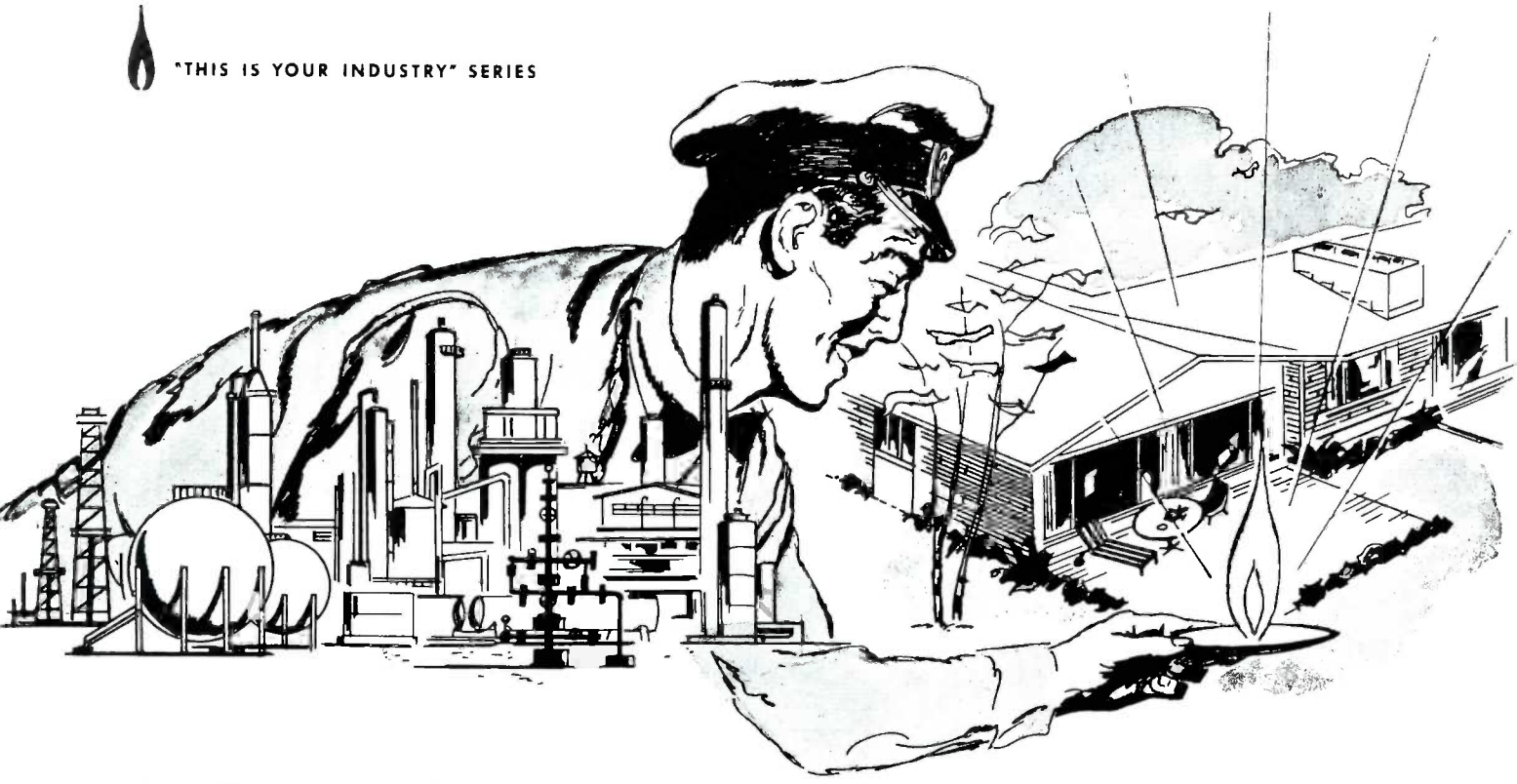


The interior radial truss arrangement of the gas holder roof structure makes an unusual design which is normally seen by few persons.



The imposing, modern design of the new holder and plant are a sharp contrast to the old plant which was outdated, outmoded and worn out.





GROOMING GAS for SUPER-SERVICE

Just suppose you discovered natural gas in your backyard.

Of course you'd be delighted to have such a handy supply of gas for heating and cooling your home, cooking and refrigerating your food, drying your clothes, providing an abundance of hot water, disposing of trash—even for the nostalgic charm of gas lights.

With your own gas well on the premises you could run a length of pipe directly to the house and enjoy all the benefits of nature's wonder fuel.

But, before notifying your local gas company that you would be "on your own" from now on, it would be prudent to consider some of the things you might have to do before getting gas "for free."

First of all, remember that natural gas does not always emerge from the ground as a ready-to-use fuel. If your pipeline was very long you would probably have to remove impurities which could interrupt the flow of gas.

You could do this by forcing or flowing gas through a series of towers, tanks and connecting pipes of various sizes and shapes while subjecting the gas to changes in temperature and pressure—just as the gas industry has done to the fuel you purchase from utilities.

In grooming gas for cross-country travel at processing plants, sand and other solid impurities are first to be dropped by the wayside. To eliminate these trouble-makers, gas is passed through a tall tank larger in diameter than the pipeline. Entering the tank at the middle, gas passes out the top while solid impurities drop to the bottom.

A good scrubbing is now in order for the gas. A second tank, partially filled with oil, serves as a scrubber. This time the gas enters at the bottom of the tank. As it passes up to the top outlet, dust is trapped in the sticky petroleum.

A "drip" takes over the next phase of gas conditioning. A drip, in this case, is a catch basin connected to the bottom of a pipeline. As the gas passes over the basin liquid impurities—water and distillates—are caught in the drip.

Water vapor is a more difficult problem. It can be removed by cooling the gas to condense the vapor into a liquid. An alternative method is to bring such gas into contact with a water-thirsty substance—similar to an ordinary sponge.

Although the gas is now ready to burn, it's possible to strip the gas of heavy hydrocarbons which are marketable. By using another series of receptacles and connecting pipes and by changing temperatures and pressures it's possible to produce, ethane, butane, propane, naphtha, kerosene and diesel fuel. These serve as raw materials for a wide range of chemical products including synthetic fibers, synthetic rubber, alcohol, plastics, insecticides and ammonia fertilizers.

However, few, if any, gas customers would want this Rube Goldberg collection of equipment in their yard. To operate such a complex assembly would require the talents of highly trained technicians, mechanical and chemical engineers and skilled craftsmen.

Fortunately, no one needs to construct such a plant.

At the present time the gas industry has invested $20 billion in facilities to produce, process, transmit and distribute natural gas. More than 200,000 employees operate this enormous "plant." Their combined salaries exceeded $1,184 million last year.

And throughout the nation, homes and industries pay pennies a day for the services of this multi-billion dollar industry.

Thus, a backyard gas well might seem like a wonderful idea, but natural gas supplied by your gas company is an even better idea.

Around the Gas Industry

A convention "as big as the heart of Texas"—that's what is in store for several thousand members of the American Gas Association when they move into Dallas, Texas Oct. 1 for their 43rd annual meeting.

The first A. G. A. convention ever held in Texas is expected to draw 4,000 delegates and guests from major gas utilities, gas pipeline companies, and manufacturers of gas appliances and equipment throughout the United States and Canada.

Built around the overall theme of mobilizing for gas industry development, the national trade association's "Texas-sized" convention will be opened to all branches of the gas business, from natural gas production to utility distribution and appliance manufacturing.

Lester T. Potter, President of A.G.A., is slated to preside over the program's three general sessions. He is the third president of Lone Star Gas Co., Dallas, to serve as head of the industry association. L. A. Bickel, Vice-President of Lone Star Gas, serves as chairman of the convention which climaxes Mr. Potter's one-year term in A.G.A.'s top office.

The four-day annual meeting opens with registration Oct. 1, and the first general session is tentatively booked for the Dallas Municipal Auditorium Oct. 2. The second and third sessions will be held in the Statler Hilton Hotel.

In addition to the full program of general sessions and section meetings planned for delegates, arrangements are being made for a ladies' general session, as well as for luncheons and other social events.

Mr. Bickel reports A.G.A. will continue to use the pre-registration and housing system successfully employed at the past three conventions. Requests for room registrations should be submitted to the A.G.A. Housing Bureau which opened in Dallas in February.

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Dallas has also been selected as the site for the 13th annual Accident Prevention Conference scheduled for Sept. 12 and 13.

The two-day conference at the Statler Hilton Hotel will be co-sponsored by the A.G.A. and the Southern Gas Association. Lone Star Gas Co. and Southern Union Gas Co. will serve as co-hosts.

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Construction has started on the first completely gas air-conditioned elementary school in Southeast Texas.

The $364,000 project, to be completed by September, has attracted wide attention from school officials, architects, and engineers for several unusual mechanical and architectural design features.

Its individually controlled zone system of gas heating and gas air-conditioning is believed to be the first of its kind to be adopted for a major school project in the nation.

Reese J. Brentzel, mechanical and electrical engineer on the project, said, "We estimate that the use of gas for both air conditioning and heating will save more than $110 a month in utilities costs alone for the life of the building, as well as substantially reducing other maintenance and operating costs."

The building's windowless design and the use of a new type of heating-cooling system resulted in a square-foot construction cost of $9.32 which is well below the normal costs.

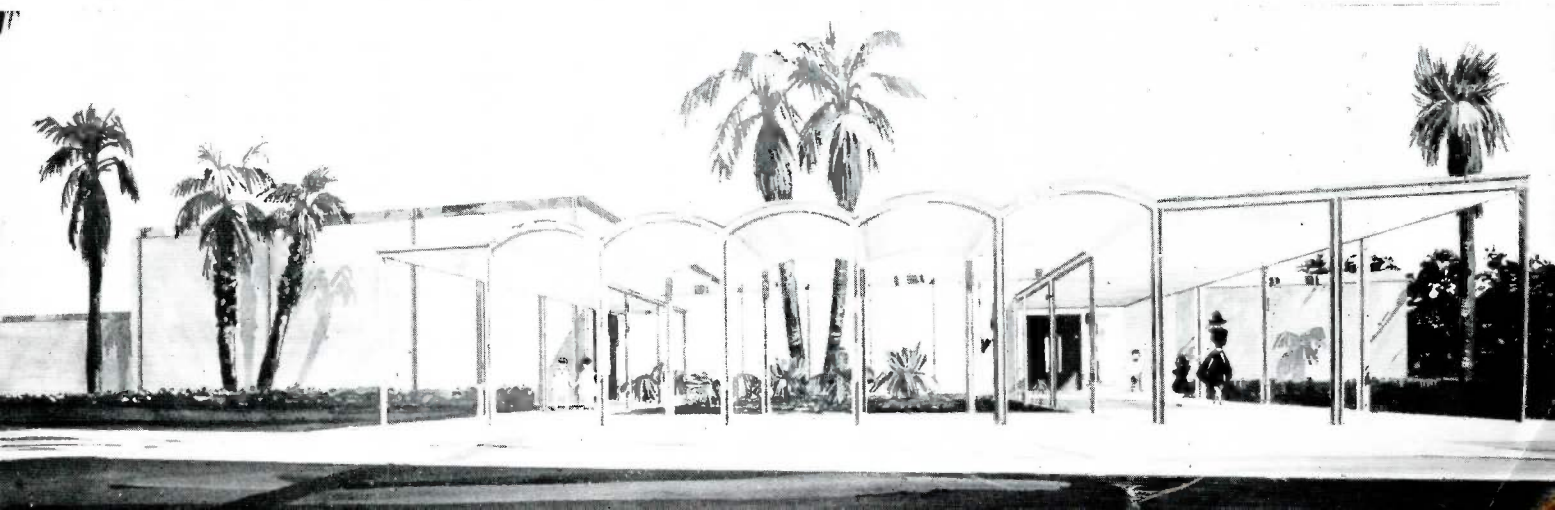
The automatic gas heating and air conditioning system circulates chilled or heated water independently in office, classroom, and cafeteria-auditorium areas. All of these areas have individual control, and simultaneous heating and cooling is available in different areas.

This individual temperature control is obtained by circulating chilled water through a natural gas engine-driven reciprocating compressor. Hot water circulated through the system is obtained from the engine-jacket, as in the heating systems of most water-cooled automobiles.

The gas heating and air-conditioning system is automatically controlled by thermostats in each room. Since the building is windowless, an emergency lighting system is provided for all areas, with an emergency generator for stand-by.

The Union Gas system serves the school project area with natural gas.

The first windowless, gas air conditioned school building in southeast Texas is now being constructed. The new type gas heating and air conditioning system has been credited with reducing the cost of the $364,000 project.



"I want some invisible hair nets for my wife," said a customer.

"Here you are, sir. That will be twenty-five cents."

"Are you sure they're invisible?"

"Invisible!" exclaimed the salesman. "Why, I've been selling them all morning and we've been out of stock for nearly two weeks."

Strictly Off the Record

Just Another Cut-Throat Business To Me!

Friends of a young farmer who was known for his inability to think of anything to say to women were amazed when, the morning after the shy one met a girl at a dance, it was announced that he had become engaged. One asked how it happened.

"Well," said the bashful man, "I danced with her three times and I couldn't think of anything else to say."

A reporter on holidays dropped in to see the editor of the local weekly.

"How on earth do you manage to sell a newspaper in a town where everyone must know what everyone else is doing?"

The editor smiled. "They don't buy my paper to find out who did what. They buy it to find out who's been caught at it."

The butcher was busy waiting on a customer when a woman rushed in and said, "Give me a pound of cat food, quick!"

Turning to the other customer, who had been waiting for some time, she said: "I hope you don't mind my getting waited on before you."

"Not if you're **that** hungry," replied the other woman.

Jimmy: "Aw, you're afraid to fight."

Johnny: "Naw, I'm not, but if I fight my mom'll find out and spank me.

Jimmy: "How'll she find out?"

Johnny: "She'll see the doctor going into your place."

Neighbor: "They tell me your son is on the college football team. Do you know what position he plays?"

Proud Mother: "I'm not sure, but I think he is one of the drawbacks."

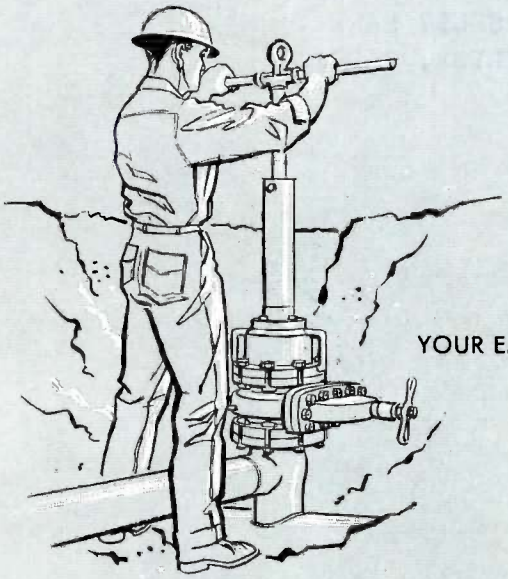
The stingy salesman, while on an out-of-town sales trip, sent his wife a check for a million kisses as an anniversary present.

The wife was quite annoyed and sent back a postcard: "Dear Chuck, Thanks for the anniversary check. The milkman cashed it for me just this morning."

A husband decided that on his wife's birthday he'd surprise her with a new Cadillac convertible. He drove the car home and parked it in front of the house. He then went in and asked the little woman to come to the front door.

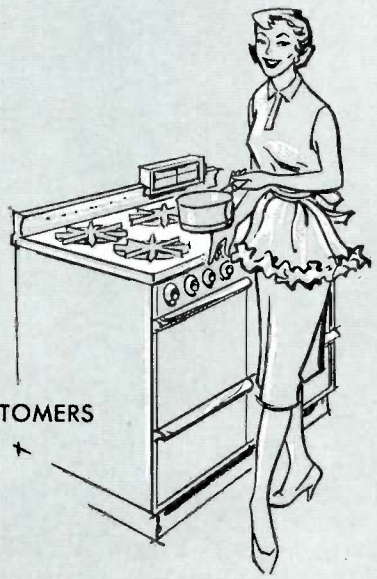
When she appeared the husband pointed proudly to the parked Cadillac and asked, "How do you like it, honey?"

Whereupon the wife turned to him and said, "What's the matter, stupid, couldn't you answer the $64,000 question?"



YOUR EMPLOYEES

SAFETY



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