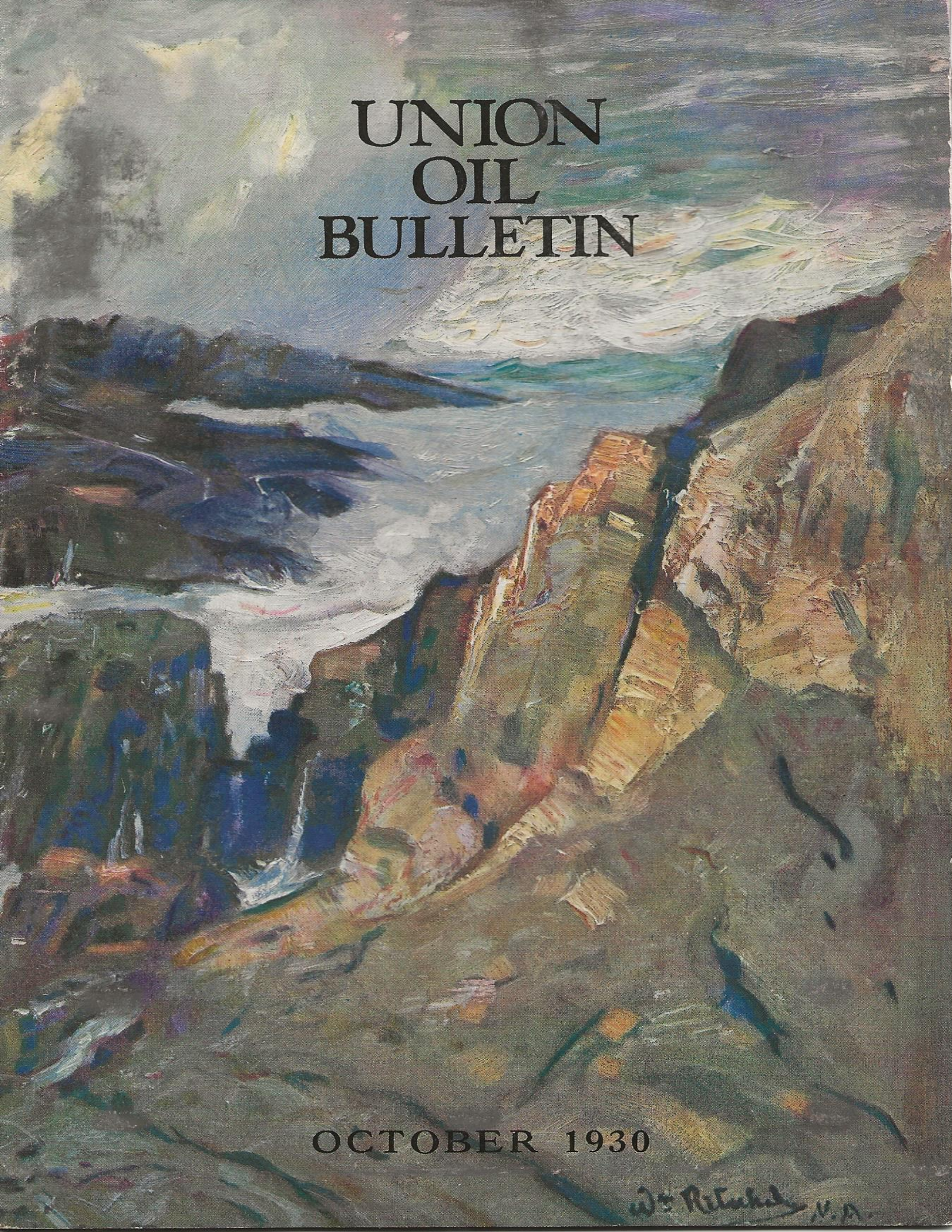
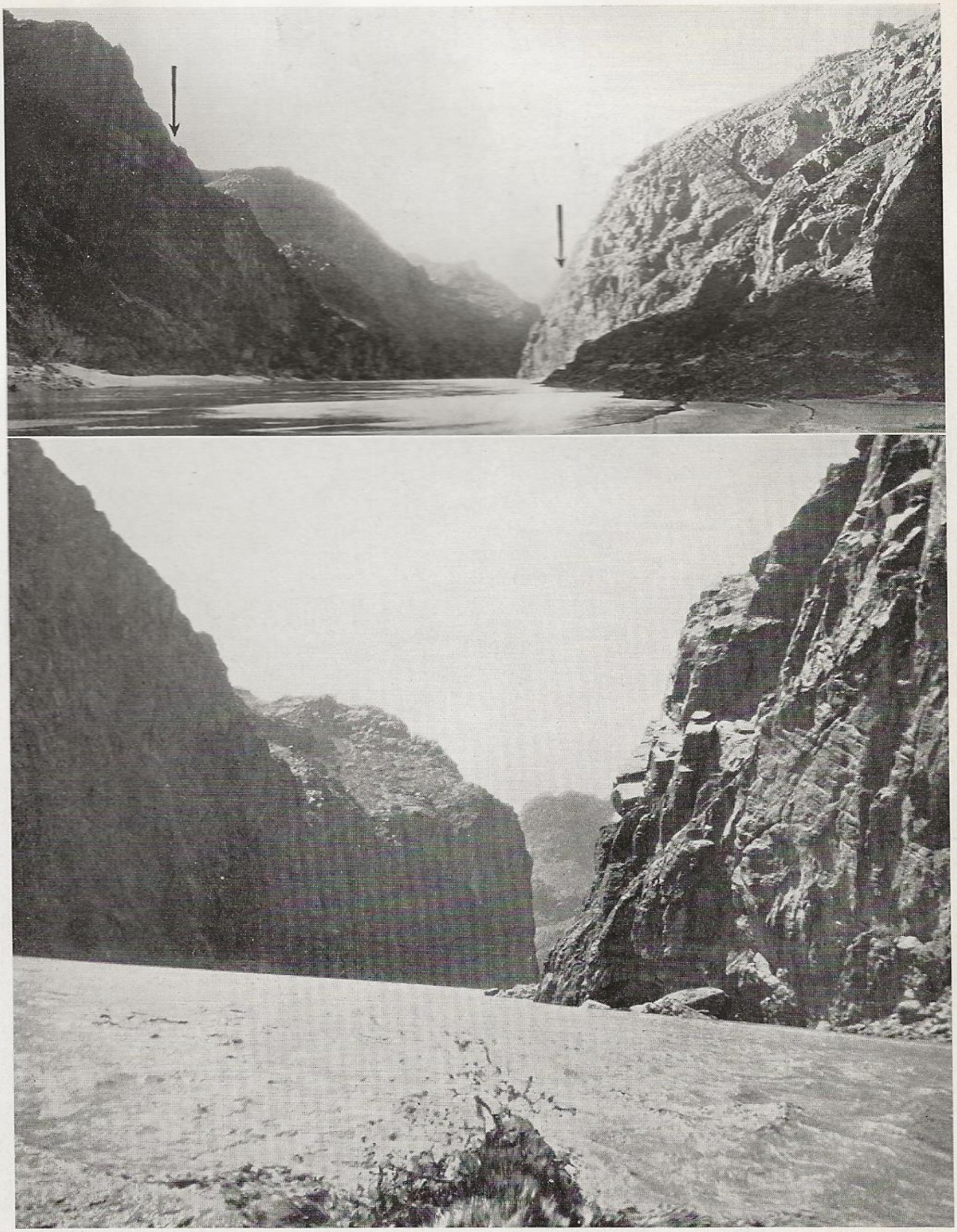
UNION OIL BULLETIN



OCTOBER 1930



Site of Boulder Canyon Dam

A distant and close up view of the Boulder Canyon Dam site are shown in the two photographs reproduced above. The arrows in the upper picture mark the point at which the dam will be built.

UNION OIL BULLETIN

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Fortieth Anniversary

OCTOBER 17, 1930, will mark the fortieth anniversary of the incorporation of Union Oil Company of California, brought about in 1890 by the consolidation of the Hardison & Stewart Oil Company, the Torrey Canyon Oil Company and the Sespe Oil Company, in which Lyman Stewart and W. L. Hardison were principal stockholders. It is a significant milestone in the history of the company, which today holds the distinction of being the oldest of existing oil companies on the Pacific Coast; significant, not merely because of the attainment of age, but because it is evidence of the wisdom of the policies established by the founders of the company and followed by those who have guided its destiny during the forty years of its incorporation.

From the beginning the company has pioneered the way in the industry on the Pacific Coast. In the production of oil it has developed methods that have been adopted to a large extent by the industry and has discovered four of California's major oil fields within the past ten years. In the manufacturing of petroleum products its pioneering has also been in evidence. It was one of the first to develop tubular stills, now in general use in all modern plants. These stills make possible the most efficient distillation of all grades of crude oil yet developed, and at the same time have increased output and improved the quality of the products, as well as lessened the investment in still equipment. It has developed the direct fractionation of gasoline — a process by means of which gasoline is taken direct from the crude oil in one operation. Among its other achievements along refining lines has been the development of aerial fractional condensation, a process which makes possible the condensation of lubricating distillates free from water and light products. The company was also one of the first to use high pressure cracking on a com-

Lyman Stewart *W. L. Stewart* *L. P. St. Clair*

Since its incorporation Union Oil Company of California has had but four presidents. Its first, Thomas R. Bard, held office from 1890 *to* 1894. *Its second president, Lyman Stewart, dean of California's oil pioneers, served from* 1894 *to* 1914, *when he took the office of Chairman of the Board of Directors and passed the burden of the presidency on to his son, W. L. Stewart, who remained in office until his death in June of this year. L. P. St. Clair, who succeeded Mr. Stewart, was elected to office July, last.*

mercial scale. By this process it has obtained a large quantity of gasoline from heavy oils. Major improvements in design for absorption towers and stills for recovering gasoline from natural gas are also credited to the company. The Santa Paula refinery was one of the first built in California; today the company owns seven.

The company was first in California to build a pipe line for the transportation of oil and the first to move oil in bulk by tanker. Its fleet of tankers at present numbers eleven, in addition to two motor ships and fifteen barges.

In furthering the use of petroleum products the company conducted the first successful test in burning fuel oil in a railroad engine and pioneered in this work until the use of fuel oil became general.

It is difficult today with the highways and city streets swarming with automotive equipment to realize that the company was founded in a horse and buggy age, and that for fifteen years gasoline was virtually a waste product. The distribution of the company's products was handled for nine years direct from Santa Paula. The first branch marketing station was established at East San Pedro, now Wilmington, in 1889. Two years later a marketing station was opened in Los Angeles, followed by the opening of a marketing station in Honolulu in 1903. The next year the company entered San Francisco and Portland. From then on the expansion into new marketing centers was more rapid, but it was 1924 before the company established the last of its major Pacific Coast districts at Spokane. Today its marketing stations number in excess of 450. In 1928 the company entered the Australian and New Zealand market as joint owner of the Atlantic Union Oil Company.

Though the company sold gasoline and lubricating oils through garages for several years, it was not until it purchased the service stations of the Pinal-Dome Oil Company in Los Angeles, Oakland, Santa Ana and Anaheim in June, 1917, that it launched into the service station business. Today it owns and controls 722 stations and markets its products through approximately 6000 additional resellers on the coast.

Hydrogenation Journey

By A. G. PAGE

AN OIL refiner is always interested in seeing a new and successful refining process, more interested if it differs in detail from his own and if very much of it is radical in procedure. If his training and experience have a chemical foundation and the new refining procedure introduces deep chemical transformations, then it becomes keenly interesting. Petroleum has always been expected by petroleum chemists to become the most prolific raw material for making organic chemicals, both new and old, that nature has abundantly provided. That very abundance, however, and the low cost, have thus far confined the use of petroleum mainly to the field of convenient fuels in various forms.

A. G. PAGE

Obviously, the main chemical quality needed for fuel products is mere combustibility, which the hydrocarbons of petroleum possess to a marked degree. Combustion is a procedure interesting to the power engineer but is not a refiner's problem.

When a refining procedure is one of complete chemical transformation of the composition and nature of the compounds that compose petroleum into other compounds that did not previously occur in the petroleum, the procedure is absorbingly interesting from all points of view.

Of all genuine chemical transformations, hydrogenation of petroleum has been the most enticing to the chemist who had previously succeeded in applying hydrogenation to fatty oils for the production of such edible fats as Crisco, and who is now succeeding with certain other fatty oils not heretofore placed in American kitchens in the new solid form.

Until, however, Interessen Gemeinshaft Farbenindustrie Aktiengesellschaft, the industrially famous "I. G.," applied their hydrogenation procedure to coal tars and other heavy oils on a large scale, hydrogenation had been mainly of academic interest to the petroleum refiner.

When Mr. Howard, President of the Standard Development Co., arranged with the German I. G. to display the hydrogenation process to the Hydro-Patents subscribers, and when the opportunity came to me to see the vast industrial combination, which is the amalgamation of so many German scientific and technical manufacturing organizations, I accepted this opportunity gladly.

Arrangements had been made for the U. S. representatives of the Hydro-Patents subscribers to leave July 16 on the Bremen. Some of the subscribers had appointed agents who were already in Europe to meet our party there.

Our party on the Bremen had gathered from all points in the United States, and despite the competing commercial interests of the various companies, and the separation of their ac-

tivities in location and character, the members were pleasurably united in anticipation of the European trip, and in expectation of seeing a technical triumph in the final application of hydrogenation to refractory oils on a commercial scale.

To meet the desires of the I. G. for a program that would include an unbroken week, the plan was adopted of going first to Paris for the few days until the beginning of that week, thence proceeding to Germany. After four days of rest and relaxation on the boat, and in spite of the enjoyable trip, the landing at Cherbourg, en route to Paris, aroused the first real thrill of the journey.

The "American Invasion" had, however, been preceded by a typical American effort of one of the companies represented in our party, whose immense sign of "Huile d' Or" painted on a conspicuous building stood out rather misleadingly among lesser and older signs advertising liquid refreshments. To homesick Americans it might have been heartening to see this sign, but we were not homesick. No one could be homesick on landing at Cherbourg, or on the journey southward past rich fields, green and luxuriant, particularly pleasing to the Californians at this time of year, and through landscapes beautiful with poplar-lined roads, small streams, orchards and little trim woods.

Our first destination after leaving Paris was Heidelberg, which is the nearest large city to the Oppau Plant of the I. G. From Heidelberg we were driven Monday morning at 9 o'clock to the plant, where we were met by the officers of the I. G. These turned us over to the technical force, who gave a history of the development of the processes and conducted us through the plant.

The history traced the origin of hydrogenation from its beginning in the Haber-Bosch process, which produced ammonia from the gases hydrogen and nitrogen by causing them to react at a temperature of 1700-2000° F. and at a pressure of 3000 pounds per square inch in the presence of a catalyzer, or contact material, that accelerates the reaction. In the beginning, when ozmium was used for the catalyzer, a predecessor of the I. G. bought up all of this substance in the world, which did not amount to much more than a pint bottleful.

From this original process the history of hydrogenating was traced through several developments that were each based on successive discoveries of catalyzers, or contact materials, which developed from a systematic search for them by Doctors Bosch, Mittasch, and others. The work resulted in such operations as the hydrogenation of carbon monoxide to a mixture of various hydrocarbons; in the improvement of this process to the point of manufacture of methanol (methyl alcohol) alone; and, concurrently, in the development of the catalytic oxidation of sulfur dioxide to sulfuric acid and of phthallic anhydride to phthallic acid.

In 1924 processes were developed for the hydrogenation of hydroxide and sulphur compounds present in hydrocarbons, which resulted in the elimination of oxygen and sulphur and thereby in the purification of the hydrocarbons. Finally, by 1927, the production of hydrogen from methane was developed.

All these processes are intensely interesting but no one can fully appreciate them without chemical and technical knowledge.

Perhaps more popularly interesting than the processes are the minor or collateral products that have diverged from the original process of hydrogenation as:

(1) pure iron, remarkable from the fact that under high pressure and at high temperatures, but nevertheless below its melting point, it can be converted from a powder into the ordinary massive form with all the properties of pure iron.

(2) waxes of high melting points and smooth glassy surface made from methanol.

(3) glass, resin and varnishes made from artificial urea.

(4) bricks of the usual size but of one-quarter the usual weight, made from acid sludge, that have the full tensile strength of brick of ordinary composition.

(5) fuel for cigarette lighters, consisting of a solidified liquid in a collapsible tube which on a slight pressure ejects the contents as a clear liquid.

It is little wonder, when these accomplishments are considered, that, in the research laboratory at Oppau, there are 176 chemists holding Ph.D. degrees engaged in academic work, and 806 non-academic chemists and laboratory men engaged in operations. In the laboratories no expense is spared to secure the instruments and equipment necessary to test out the newest results of science and to convert these results into practical operations.

Our course through the plants led us into a number of by-paths off the road of hydrogenation, but they were significant, indicating to us the diversity of interests that stimulate the I. G. laboratories.

For examples, the botanical station is rich in material for investigation. The mimosa, or the sensitive plant, which folds up its leaves at a touch on the stem, is forced to reveal its secret of the transmission of the stimulation.

Also the I. G. are going deeply into the composition of those fruits that contain alkaloids, or ferments. In their own tropical green houses, they are growing the papaya, the fruit of which contains a ferment that has been described as similar to a combination of pepsin and trypsin, which it is hoped will prove to be of pharmaceutical value.

The I. G. X-rays peer into the interstices of the atoms of crystals and lay out on a photographic plate a pattern of the arrangement of the atoms in the crystals. The work is not that of curiosity alone. It has a useful application in finding out what has taken place on the surfaces of powders that have been exposed to chemical reactions.

Interesting as were these laboratory and experimental activities of the I. G., our mission was to see their hydrogenation process. This process brought us first to the big operating units for the production of ammonia by the hydrogenation of nitrogen of the air. Here the operations are in a field, new to the petroleum refiner, of high pressures and of high temperatures that, combined with the pressure, introduce mechanical difficulties not encountered in the petroleum processes to which he is accustomed. A similar new field of difficulties is opened up by the use of catalyzers.

The I. G. carries on its hydrogenation of nitrogen at both its Oppau and Leuna plants, but the hydrogenation of coal tar on a commercial scale at Leuna only. The Oppau plant was the one first visited as the nearest to Heidelberg.

In the ammonia process in use, hydrogen is obtained from water gas, and nitrogen from producer gas, and both are produced in tall generators consisting of iron shells with fireproof lining, which are under the cover of tall open sided buildings. In the water gas process hydrogen is produced by blowing steam up through a bed of red hot coke according to the reaction:

$$H_2O + C = H_2 + CO.$$

Nitrogen is separated from the producer gas which is made by blowing air up the coke bed, and is the residual nitrogen of the air after the oxygen combines with the carbon of the coke. From this point, the gases pass to great storage gasometers,—one at Oppau having a capacity of one and three-quarter million feet, a supply that lasts the plant less than an hour.

Further processes consist of the isolation and purification of the hydrogen and nitrogen, and the catalytic hydrogenation of the nitrogen.

These operations are conducted in buildings remarkable for quietness, cleanliness, and for the small number of workmen and attendants. These buildings consist of compressor houses for purifying operations and others for gas compression and of high buildings which cover catalytic operations, the

equipment for which consists of tall "contact ovens" of steel with great strength that are themselves enclosed in reinforced masonry chambers.

The controls by means of instruments and valves are all in sight and there are few operators. The processes are "rationalized" to the point of being scientific and technical triumphs.

From the water gas reaction the products are hydrogen and carbon monoxide. These are separated by a catalytic reaction in which steam is used to decompose the carbon monoxide according to the equation:

$$H_2O + CO = CO_2 + H_2$$

The carbon dioxide is readily washed out from the gas mixture with water under pressure. The hydrogen is further purified by washing under pressure with solutions of chemicals. Thus, when the carbon monoxide is converted into carbon dioxide an additional quantity of hydrogen is produced, and one hand washes the other.

Obviously very large and heavy multistage compressors are needed to supply the hydrogenation "ovens" with the gases under the required pressure of 200 atmospheres. These are housed in buildings made for the purpose, where they operate quietly and with a minimum of attendance.

In order to supply oxygen and to increase the nitrogen supply to adjust the quantities of hydrogen and nitrogen to the ratio required in ammonia, a Linde plant separates by fractional condensation oxygen and nitrogen from the air, and thereby permits the adjustment of ratios of the reaction gases without waste of production.

These processes were all most patiently explained to us. In fact, in all our meetings with the staff of the I. G. they were uniformly courteous, thoughtful of our comfort, generous and helpful with information. While it would not be practicable to acknowledge here all the pleasant courtesies shown us, our reception by Dr. Bosch must be mentioned. After two hours of listening to explanations of the hydrogenation processes and their history, and of observation of testing and experimental work in the laboratories and the development department, we went to the staff headquarters and were received by Dr. Bosch, the dignified and affable head of the I. G., and were entertained at a marvelous luncheon in the large staff dining room. There we had opportunity to make personal and enjoyable contacts with the members of the staff who had been our guides and mentors. Nor are we likely to forget the blue trout and the venison from the Black Forest, the wines and appetizers, the sauces, and the dessert which was the chef's masterpiece.

Leaving beautiful Heidelberg, its university, the great castle, the Neckar River and Valley, and the Black Forest with regret mingled with anticipation, we proceeded to the great city of Leipzig, in which commerce flourishes and culture thrives.

At the Leuna plant, to which we drove from Leipzig, the commercial production of coal tar and heavy oils is accomplished by the liquefaction and distillation of brown coal, or lignite, and the final production of gasoline is accomplished by the hydrogenation of these heavy oils.

The brown coal mines belonging to the I. G. are only a short distance away, the raw material for the process being thus fully under the I.G. control.

Although our present ample crude oil supply in America precludes any immediate use here for the hydrogenation of coal, we were interested to see solutions of difficult problems in the coal handling process, such as (1) partial removal by filtration of the oil that had been retained in the sludgelike residues of the distillation of coal, (2) the washing of the filtered residue with other oils, (3) the further separation of the oil by filtration of the washed residue. In both filtrations certain well known American types of filters were used.

The filtered carbonaceous and ashy residue is discarded or used for fuel, the heavy oils enter the hydrogenation "contact oven."

In these "ovens" problems are met similar to those encountered in I.G.'s experimental and developmental ex-

perience with petroleum. Perhaps a mere statement of the reactions that occur in hydrogenation will indicate that certain variations in the processes are necessary to accomplish the successful hydrogenation of coal-tar and petroleum.

1. Hydrogen unites with the compounds to form new ones.

2. Hydrogen unites with atoms on either side of a link in a compound and splits the compound into two smaller compounds. In both cases the new compounds have lower boiling points and lower specific gravities than the old and exhibit the characteristics of gasoline.

3. Hydrogen unites with oxygen and sulfur atoms in petroleum. Water and hydrogen sulfide are split off, and the petroleum is thereby purified from sulfur.

4. Hydrogen under certain modifications of the process is removed from the compounds. The paraffines change to benzenoids, which knock less in an engine.

Conforming to our expectations we saw that the conditions for the hydrogenation of oil differed from those for the hydrogenation of nitrogen, that in hydrogenating heavy oils the conditions must be altered from those for hydrogenating volatile oils; that in the production of gasoline alone from heavy oils, alterations of conditions would be made in series for the heavy oils, the lighter oils and for the final production of anti-knock properties of gasoline.

For these procedures, the "contact ovens" resemble outwardly the "contact ovens" of the ammonia process. Obviously, however, the conditions just mentioned require considerable modification of temperatures; much auxiliary operation and equipment; appropriate choice and arrangement of the catalyzers inside the ovens, and a proper method of contact between the catalyzer and the oil or oil vapor.

Corresponding to the demand for special conditions that oil hydrogenation has made, many changes have been made in the construction of the ovens from the ammonia type. In these changes and in the process modifications, the I.G. technical staff has again displayed its skill and resources.

The operations of hydrogenation and of the many purifications and recirculations of the oils and gases go on very quietly and unobtrusively, with no moving sign of the operations except the slow reciprocations of the heavy pumps.

Only to those with training and experience can the operations be significant under the jackets of the great vessels and under the steel pipes for liquids and gases. Our imaginations were stirred by the thought of the immense forces so perfectly guided and controlled and accomplishing so much with so little evidence of human effort or even attention.

Our last afternoon was given over to a visit to the brown coal mine near the Leuna works, where a great level deposit of brown coal lies under an overburden of surface soil of perhaps twenty feet. The mining is all from an open cut. At the mine we saw that a mile square in area had been opened up to a depth of perhaps 100 feet at least in parts. Even at this depth not all the brown coal deposit had been taken out.

This brown coal is mined by dredges working on the walls of the open pits and depositing the scoop contents in temporary bins at the top of the wall to fill the cars which are run by a continuous chain on industrial track rails at the top of the wall. The cars dump into great storage bins at the surface from which the railroad gondolas are filled. The coal supplies the fuel for the Leuna plant as well as the raw material for the production of coal tar.

When we bade goodbye to our German hosts, we carried away with us gratifying memories of the arrangements made for comfortable transportation to the plants, of the hospitable luncheons provided, of the personal contacts there with the staff, of the informing lectures on the processes and of the courteous guidance through the buildings.

We left Leipzig for whatever points our errands or personal tastes dictated,

many of us going to Berlin, others to make a prolonged trip in Europe, others to Paris for a few days, and thence homeward.

All members of the party, no matter how scattered on their homeward way, were unanimous in their appreciation of all that had been done for their convenience and comfort on the way over to Europe. Mr. Howard, President of the Standard Development Company, relieved his party of "Hydro-Patters" of all responsibility for the trip over, for the railroad arrangements, and he entertained it in Paris. No one could be more patient with our idiosyncrasies, more courteous and more efficient. We are grateful.

In our country, one hydrogenation unit built on the basis of the German developments of the process for coal tar has been completed by the Standard Development Company in the plant at Bayway, N. J., for the hydrogenation of petroleum on a commercial scale. Two others are under construction, one at the Humble Oil Company's plant at Baytown, Texas, the other at the plant of the Standard Oil Company of Louisiana at Baton Rouge.

The oil industry is awaiting the operation of these hydrogenation plants with much interest, for in them will be incorporated the American experience and inventions with reference to the hydrogenation of petroleum oil.

Boulder Dam

THE building of Boulder Dam—the dream of men of the Pacific Southwest for the past ten years, and the greatest single engineering project since the construction of the Panama Canal, is under way. Actual work was started last month with the awarding of a contract for the construction of the first twenty-two miles of railroad from Las Vegas to the dam site by the Union Pacific Railroad Company to Merritt-Chapman and Scott Corporation of San Pedro, one of the largest contracting firms in the United States. Over this special line will pass virtually all supplies and materials for the construction of the dam.

Many of the individual engineering problems which face the builders of the dam, and those charged with the completion of allied projects, dwarf the seemingly insurmountable obstacles which confronted the builders of the canal, and not the least of them will be encountered in building the railroad.

It seems more than a coincidence that Union Oil Company products should have played a part in the construction of the Panama Canal and should have been selected by the Merritt-Chapman and Scott Corporation for the Boulder Dam project. It would appear to indicate that men who are trained to recognize merit have confidence in their quality.

The 22-mile rail line now under construction will be standard gauge and will extend from Las Vegas to Boulder City, the model city to be built by the government to house employees. From that point the railroad will be extended another eight miles to a precipitous point nearest the actual location of the dam. The building of this latter stretch will represent an exceedingly difficult railroad engineering problem, for the route lies through a rugged country, primarily made up of volcanic rock. For the last half mile the road will be virtually suspended from cliffs which tower above the river. From that point actual communication with the base structure of the dam will be accomplished by an incline to be operated by counter balances from the face of the cliff to the bottom of the river. Specifications require that the cables to be used shall be strong enough to raise and lower a standard sized locomotive.

Most of the actual construction work will be mechanical, both because of the magnitude of the undertaking and be-

Note: An error was made in writing the description under photographs on the inside front cover page in referring to the Boulder Dam as the "Boulder Canyon Dam." The dam is being built in Black Canyon but is generally known as "Boulder Dam."

Tanks to be used to store gasoline for Merritt-Chapman and Scott at Las Vegas photographed at the Los Angeles refinery just before being shipped to the Nevada city. At the right J. E. Gooderidge, Union Oil Company representative, is showing G. L. Skolfield, vice president of Merritt-Chapman and Scott Corp., (center), and H. F. Armour, company agent, sample of lubricating oil to be supplied the contractors for use in their road building equipment.

cause of the prevailing climatic conditions which make it practically impossible for men to do a great deal of work calling for extreme physical exertion. The prevailing temperature during the summer months ranges between 110 and 120 degrees. Skilled labor will be employed to operate steam shovels, tractors, boring equipment and other machinery. Common labor will be reduced to an absolute minimum, the greatest use for it being in the laying of the concrete, which will be done by hand. The principal demand, it appears, will be for carpenters, machine runners and drill operators.

The height of the completed dam will be 727 feet. The most difficult engineering feat will be the construction of the foundation which must be accomplished between flood seasons, usually occurring between March and July. Four tunnels, each approximately one mile long and of sufficient bore to accommodate a steam shovel, will be driven through solid rock to divert the water from the river bed where the foundations will be laid. It has been estimated that the volume of water pouring through these tunnels may be visualized by comparing it with the Mississippi river at St. Louis, Mo. It is interesting to note that the present consistency of the river water is considerably heavier than the Missouri river, which has heretofore been known as the "Great Muddy." In recent years the Colorado river has frequently been referred to as "a stream too thick to drink and too thin to plow." This illustration gives a slight idea of the amount of silt, now carried by the river, which will settle to

the bottom, thereby affording a saving in the Imperial Valley district alone of approximately $1,000,000 annually, this being the sum now expended to remove silt from their local irrigation canals.

The benefits of the completed project are innumerable and exceedingly difficult to classify. Primarily, however, a gigantic power plant developing 1,000,000 h.p. will be installed below the dam which will yield an approximate income of $7,000,000 annually, the revenue from which is expected to reimburse the government for money expended in its construction. After the dam is completed it is estimated that approximately two years will be required to fill the delta reservoir thus formed, which will be about 120 miles long, 30 miles wide and 500 feet deep at the dam site. This enormous lake will impound 29,500,000 acre feet of water and will not only permit the reclamation of thousands of acres of arid land by irrigation but will prevent the devastating Imperial Valley floods by affording a definite control, made necessary by the fact that at some points the Colorado river is 250 feet higher than the Imperial Valley.

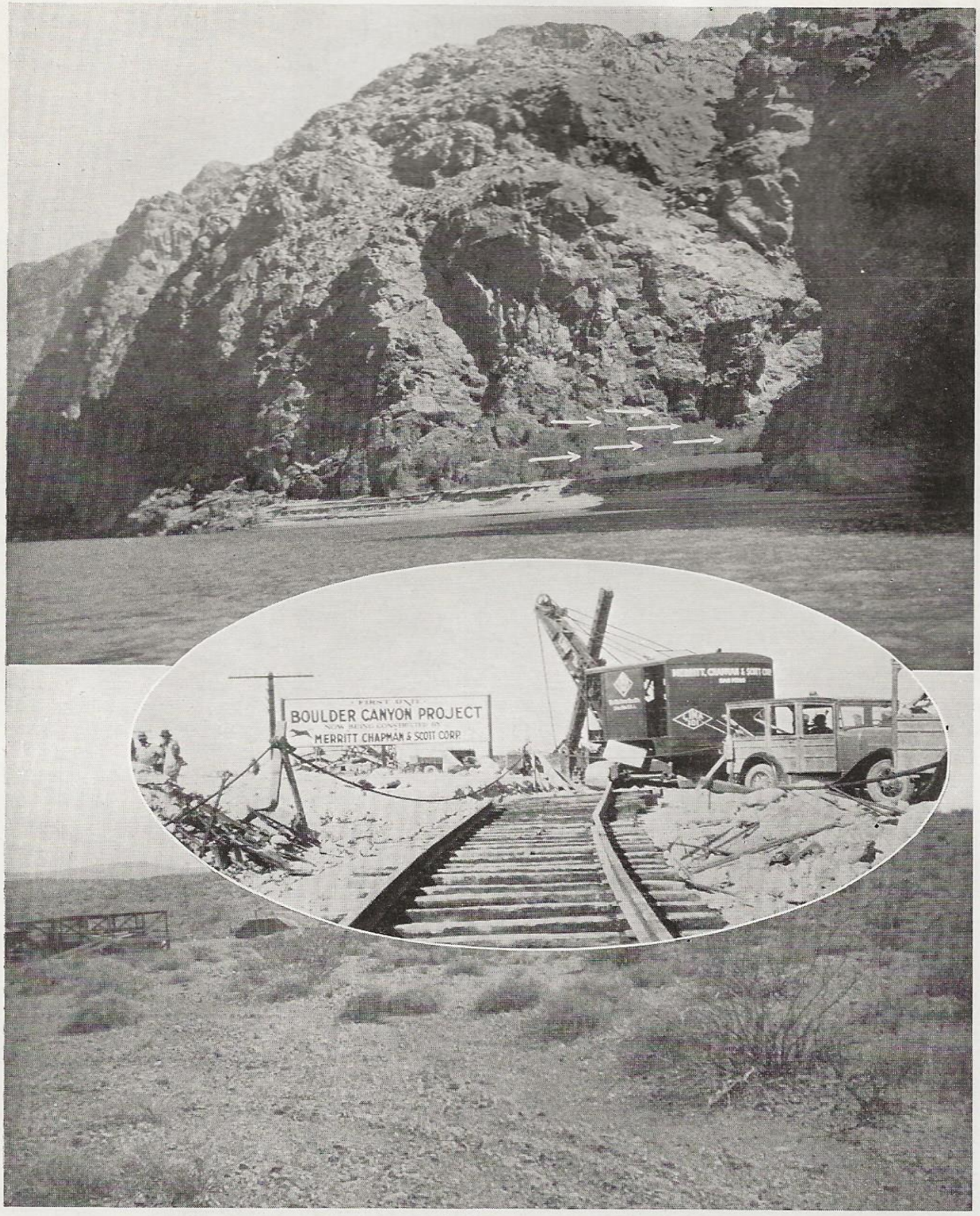
It was originally feared that the backing up of this tremendous head of water would, to a certain extent, impair the natural grandeur of the world famous Grand Canyon of the Colorado River, but subsequent careful analysis and observation has determined that such a catastrophe will not occur.

The town of Las Vegas has become the headquarters for engineering supervision and material distribution and has been consequently subjected to a boom which has been characterized as typical of the gold rush periods. The spur railroad track from the Union Pacific main line is located approximately seven miles south of Las Vegas —or an actual distance of 327 miles from Los Angeles—from where it proceeds in a southeasterly direction over comparatively level desert country to Railroad Pass, an inclusive distance of twenty-two miles, which, in places, parallels the rough highway connecting Las Vegas with the approximate site of the new Boulder City. From here the highway proceeds to the bank of the Colorado river at a point where the river bed becomes narrowed and passes into the mountainous defile where the dam will be constructed.

Small power boats are now being operated for sightseeing purposes from the latter point through the river gorge. Much could be said of the efficiency and seamanship of the pilots who, in navigating this turbulent stream, wend devious ways through innumerable hazards caused by the rushing torrent, which varies in depth from 9 inches to 40 feet. The entire trip from the river bank terminus of the highway to the site of the dam construction and the government silt testing station takes approximately fifty minutes, about thirty-five minutes of which is consumed in the return trip against the surging current.

At present the surrounding country presents a forlorn and desolate appearance, the rugged, volcanic peaks, pock-marked with mining claims, contrasting strongly with the lower, undulating sun-scorched desert tableland. This condition is rapidly becoming relieved, however, by the introduction of massive mechanical equipment, increased vehicular traffic, government and construction camps, and last, but not least, the temporary quarters of optimistic real estate developers.

In view of the great influx of sightseers, tourists and those interested in observing the locale and progress made in the dam construction, it is well to heed the warning originating from the government land office to the effect that there are no lands in the vicinity, or for many miles distant from Boulder Dam, that have any agricultural value. The adjacent Nevada territory is too high to receive any irrigation from the reservoir and no impounded waters will carry to a greater height than approximately 250 feet above sea level in either California or Arizona.



Scenes of Boulder Dam operations. In the upper photograph is shown the location for one of the four diversion tunnels which will carry off the flow of the river while the dam is being built. Center—Start of the road building project from Las Vegas to the dam site. Bottom—A section of the desert country to be traversed by the railroad.

Portable Drilling Outfit for Wildcats

by E. P. Tallant

NEED for a drilling outfit capable of going down from 4000 to 5000 feet in reasonably fast time — one which could be readily moved about and quickly rigged up—has been felt in the oil industry for a number of years. It has been realized that such equipment could be utilized to great advantage, both in testing wildcat territory and in the drilling of a series of shallow wells located relatively close together. The equipment in general use for this type of work has been so heavy and cumbersome that it could not be moved intact. In addition, it required too much time to set up in the derrick.

With a view of constructing a unit that would meet these requirements, the field department of the Union Oil Company several months ago began the designing and building of the portable rotary drilling equipment which is now being successfully operated at the company's La Merced lease in the Montebello field. There are many salient features about the new unit which are of considerable interest to the field man.

In the first place, there is not another similar outfit in the world. It is the first application of gasoline-engine power to drilling equipment and it is proving superior to steam in flexibility and pulling power. This power is obtained by the use of direct current generators and motors between the gasoline engines and the drilling unit, and the Ward Leonard direct current control system.

It is impossible to "stall" the gasoline engines, as the governors hold the engine speed at 1000 revolutions per minute. The only variations being to 950 revolutions per minute on sudden applications of full load, and 1050 revolutions per minute when load is suddenly thrown off. This is possible because of generator characteristics. As overload builds up, generator voltage drops off, and this in turn automatically reduces motor speed. The overloading of the motor can be carried to the stalling point, but does not affect the engine speed.

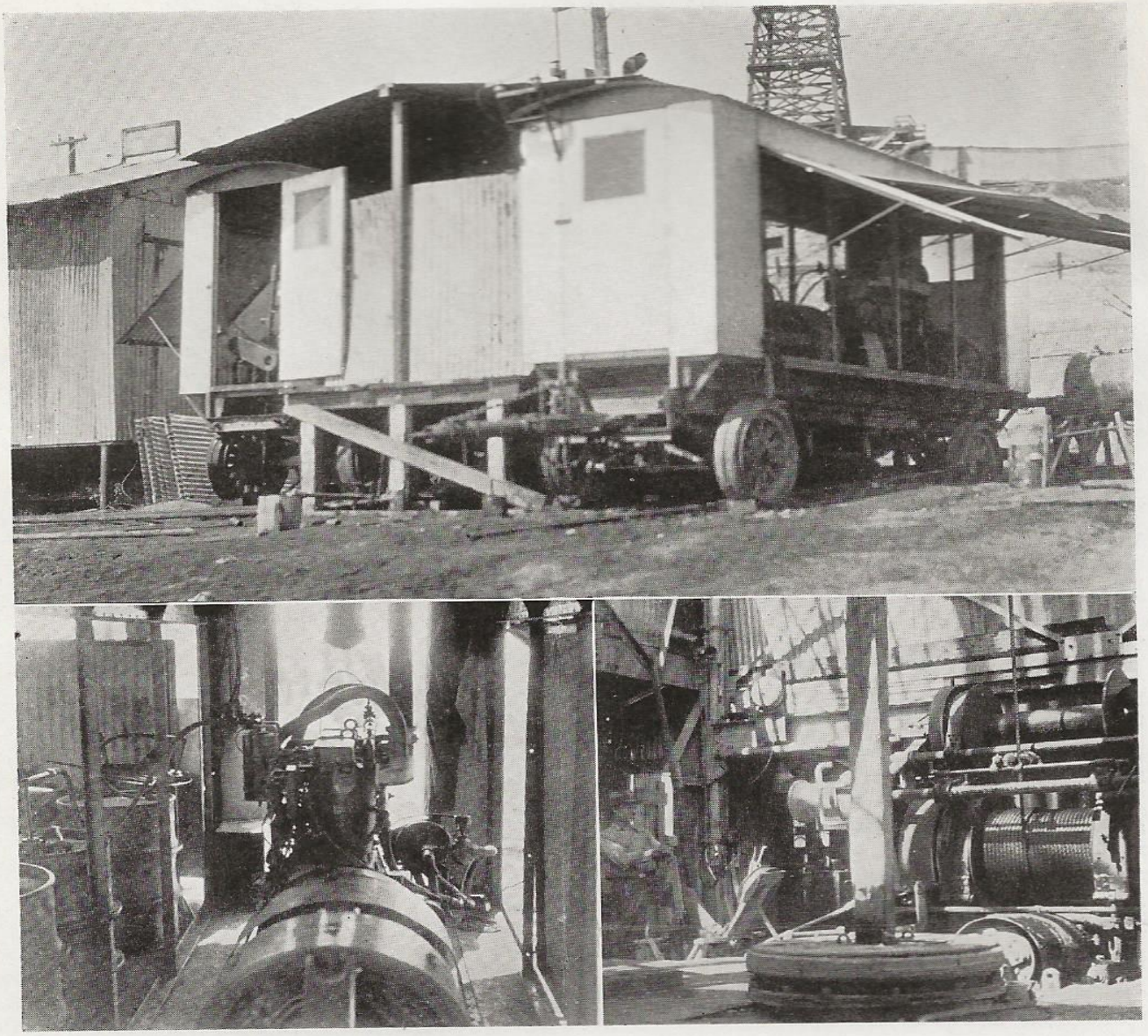
The drilling motor, drawworks, and rotary table are mounted on a common base, and are moved as a unit. This eliminates disassembling for transportation and subsequent reassembling in the derrick. The weight of this unit is approximately 12 tons, and it can accordingly be carried on a 12-ton trailer. The length is slightly less than 20 feet and the width is approximately eight feet.

The drawworks is equipped with a three-speed transmission and secondary speed reducer which makes a total of six hoisting speeds and three table speeds. These gear changes combined with the flexibility of the motor, will, according to the drillers, allow the unit to do everything but sing grand opera.

The mud pump unit is the same old design except that the "business" end is cast steel, good for 1500 pounds pressure, and is 1000 pounds lighter than cast iron. The direct current motor has the same speed control as the drilling motor and this means flexibility equal to a steam pump, but impossible with an alternating current motor.

When "coming out of the hole" (with the pump shut down) the output of both generators is thrown on the drilling motor. Thus double power is available for heavy hoisting, or high speed for light hoisting.

The generating units (gasoline engines—direct current generators and exciters) are permanently mounted on



Gasoline engines which generate power for the electrically driven rotary, drawworks, drilling motor, and mud pumps, of the new portable drilling outfit are mounted on truck trailers shown as part of the above rig. Below—left—one of the generating units, and right, the rotary table and drawworks, behind which are located the direct current motors.

trailers and are located a safe distance from the well.

The engines are rated 150 h.p. at 1000 revolutions per minute and are jointly consuming five to six barrels of Union distillate every 24 hours. Motorite extra heavy is providing efficient lubrication for the engines. Approximately five gallons are used every 36 hours.

The entire equipment can be transported on four trailers and the various and sundry accessories and drilling tools are all handled on the four pulling trucks. So if you ever meet this caravan on the road, it is hoped that you will recognize it, and say to yourself, "There goes Cy Rubel's wildcat tamer, may it never become a white elephant."

Service Emblem Awards

A QUARTER of a century of service with the Union Oil Company was rounded out in July by William F. Coggins, employed at the Oleum refinery, and by Alfred C. Powell, Southern Division field, and as a result both are today wearing service emblems studded with three rubies.

During July, August and September twelve other Union Oil employees completed twenty years of service with the company, and were awarded a second ruby for their service emblems.

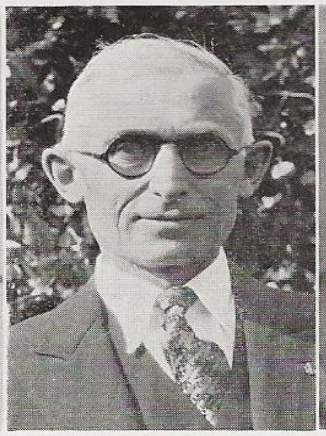
Mr. Coggins has spent the entire twenty-five years of his employment with the company at the Oleum refinery, his first job in July, 1905, being that of pipe fitter. He has filled many positions since then and now holds the position of power plant engineer.

"Fred" Powell is a native Californian, and grew up in the oil business. When but eleven years of age he started working during summer vacations for the old Pacific Coast Oil Company. He first obtained employment with the Union Oil Company at Santa Maria as roustabout on the Fox lease, which then boasted of a fine baseball team, on which Powell alternated between short-stop and pitcher. Vivid in Powell's memory is the capping job on Newlove No. 2, when he went up the derrick to hook on the elevators, which had become unhooked. The well was blowing 3000 barrels of oil and the driller, unable to see the hook going up, caught the tubing board and sent 3000 feet of tubing crashing through the side of the rig. Powell was on the opposite side and fortunately was unhurt. After serving a year in Santa Maria, he was transferred to Port San Luis, remaining there for three years, during which time he witnessed the building of the Avila refinery. In 1909 he was moved to the Stearns lease at Brea. He obtained his first run in 1913 and is at present drilling on Sansinena No. 11.

The twenty-year men of the past quarter are William E. Brown, George F. Reiley, Sank V. Sharp, Clyde G. Bussey, Patrick Frize, John H. Hartman, Milton G. Kerr, Marion F. Robertson, Charles W. Botkin, Hubert O. Butler, Antonia Cunha, and John E. Schmidt.

Brown, after twenty years of serv-

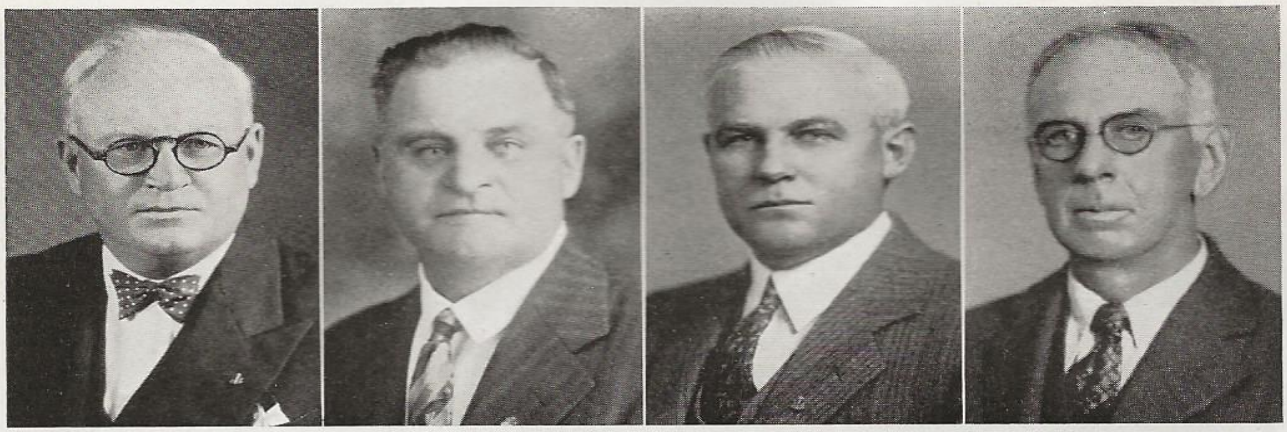
A. C. Powell



W. F. Coggins

J. E. Schmidt

M. F. Robertson



G. F. Reiley C. W. Botkin M. G. Kerr C. G. Bussey

ice in the northern division field, retired last month at the age of 64 years. Coming to the company in July, 1910, he served virtually all of his twenty years in the Santa Maria fields. He was placed on the pension list in September.

George F. Reiley first saw service with the company at Adams Canyon, on the Ex. Mission lease, Santa Paula. After working as roustabout for five months, Reiley was made foreman and transferred to Tar Creek and Sespe district where he had charge of Cesapi production and assessment work on the Little Sespe Petroleum Mining District claims. May, 1914, Reiley went as foreman, to Torrey lease, where he is now located.

The cooperage at Oleum has been the locale of activity for both S. V. Sharp and Antonia Cunha. Sharp went to work in the cooperage July 1, 1910, and two months later was joined by Cunha, a native of Portugal, who came to the United States in 1906. In 1915 Sharp became foreman of the shop and has held that position since then. Cunha is now rated as a first class slack barrel cooper. He has been a model employee and has an unblemished record with regard to tardiness, layoffs and absences.

When the Los Angeles garage was built in 1910, C. G. Bussey was employed to take charge. At that time the company's entire fleet of thirteen pieces of equipment was in the south. Included in the fleet was a one-cylinder Cadillac roadster and two Packard trucks. These trucks, incidentally, were the first automotive oil delivery vehicles in Los Angeles. Bussey held the position of superintendent of the Los Angeles Garage until 1928, at which time, under the company's new automotive policy, he was made automobile superintendent of the southern division, the position he now holds.

While his first employment dates from 1909, Patrick Frize took time out late in that year to return to Ireland to claim his colleen. He immediately returned to California and his record of continuous employment dates from Aug. 22, 1910, when he was engaged in the Orcutt field as a wellpuller. He recalls "the good old days" when Mr. Lyman Stewart made periodical trips to the Purissima field and met with the employees in one of the old schoolhouses, where he showed lantern slides on early drilling methods in Pennsylvania. In 1923 Frize was transferred to Santa Fe Springs as a wellpuller, which position he still holds.

A native son of Tulare county, John H. Hartman came to the oil fields at Coalinga in 1906 as a teamster. He was a wellpuller and pumper until 1910, when he joined forces with the Union Oil Company. In 1912 he moved to the electric department and has been foreman since July, 1919. His twenty years' service has been spent entirely in the Santa Maria fields.

M. G. Kerr, auditor of refining and marketing accounts, entered the oil

Antonia Cunha | Patrick Frize | S. V. Sharp | J. H. Hartman

business in Texas before coming to the Union Oil Company 20 years ago. His first job with the company was as clerk in the crude oil division. He later was transferred to the Los Angeles district sales office, and in 1913 was promoted to the post of assistant chief clerk, Los Angeles sales. The following year he was made cashier of the sales department with headquarters in Santa Paula, later advancing to assistant chief clerk, crude oil division of the comptroller's office, and in 1917 to the position of chief clerk crude oil division. He was next selected to serve as a traveling auditor, remaining on the road, as it were, until 1924, when he became auditor of production and transportation accounts. His promotion to auditor of refining and marketing accounts came this year.

Special agent for the field department in Maricopa, at the time when Lakeview No. 1 was causing no small amount of comment among valley producers, was the first job M. F. Robertson filled for the company. In 1914 he was transferred to Orcutt in the same capacity, remaining there until 1922 when he came to the Southern Division as supervisor of field offices and warehouses under F. F. Hill. Late the same year he was appointed supervisor of all field offices and warehouses in the entire state, with headquarters at the head office. In November, 1924, all warehouses were consolidated as the stores division of the purchasing department, and Robertson was placed in charge and holds the position of supervisor at the present.

The first job C. W. Botkin had with the company was that of drum and barrel washer at Oleum. He was soon advanced to the position of foreman of the acid recovery plant, remaining there until the unit was discontinued. The operation of crude, rerun, asphalt, etc., stills, then occupied his time until he was transferred to the Los Angeles refinery as rerun stillman in 1919. A year after he was promoted to refinery shift foreman and holds this position at the present time.

H. O. Butler has spent the twenty years of employment with the company in Southern California fields. Employed as a pumper at Powers No. 1 in the Orange division in Sept., 1910, he remained there until 1921 when he became warehouseman at Montebello. Three years later he was again assigned to the position of pumper in the Montebello field, and is working there at present.

From driver of a four-mule team, delivering fuel oil, to driver of a four-horse team delivering refined oil, was the first advancement made by J. E. Schmidt after his employment in Sept., 1910, in the Oakland district. In 1914 with the advent of the Alco refined oil trucks, Schmidt forsook his horse-drawn vehicle and drove one of the six-ton "brutes" until 1918, when he was promoted to the sales force, where he devoted two years to refined oil trade. In 1920 he became industrial

salesman and took charge of the entire industrial, jobbing, and asphalt business. In July, 1928, he was promoted to assistant manager in charge of sales in the Oakland district, which position he now holds.

FIFTEEN YEARS

Baily, F. H. .....San Diego Sales
Boggeman, C. M. .....General Accounts
Carroll, Helen .....Crude Oil Dept.
Clevenger, P. S. .....Prod. Pipe Line
Dickinson, A. S. .....Oleum Refinery
Fuller, Joshua .....Northern Div. Gas
Fulton, Clarence .....Marine Dept.
Gier, M. A. .....Southern Div. Field
Gregory, E. D. .....Los Angeles Refinery
Hensler, R. R. .....H. O. Comptroller's
Huffman, W. M. .....Prod. Pipe Line
Johnson, H. D. .....Prod. Pipe Line
Luxembourger, Andrew .Los Angeles Sales
McKenzie, Alexander .....Vancouver Sales
Moynier, D. L. .....Northern Div. Field
Santos, Joseph .....San Francisco Sales
Schock, Frank .....Southern Div. Field
Shea, James J. .....Oleum Refinery
Steele, J. D. .....Southern Div. Field
Stewart, W. O. .....Oleum Refinery
Tune, L. A. .....Oakland Sales
White, T. R. .....Southern Div. Field
Whitworth, W. O. .....Maltha Refinery

TEN YEARS

Baker, Peter J. .....Crude Oil Division
Barnett, Frank F. .....Southern Div. Field
Bartscherer, Hazel S. .....Tel. Head Office
Bissett, Geo. C. .....Southern Div. Field
Blair, Lester H. .....Southern Div. Field
Bly, Alvin Paul..Research Dept. L. A. Refy.
Belcher, Robert R...L. A. Lubricating Div.
Burcham, William.....Southern Div. Field
Chansler, Perry .....Southern Div. Field
Clegg, Andrew J. .....San Francisco Sales
Corcoran, Robt. E., Jr...Southern Div. Field
Crique, Arthur L. .....Sacramento Sales
Davies, John W. .....Southern Div. Field
Davis, Ray S. .....Southern Div. Field
DeGroot, John V. .....San Diego Sales
Dellett, Henry J. .....Oleum Refinery
Dorsch, Emil F...Marine Dept. "Utacarbon"
Dysinger, Ray V. .....Southern Div. Field
Enfield, Joseph L. .....Southern Div. Field
Engelke, Walter A. ....Northern Div. Field
Erb, Clinton R. ..General Accounts, H. O.
Farnsworth, Fred M....Southern Div. Field
Hallam, Jim .....Southern Div. Field
Hanmore, Guilford S. ..Southern Div. Field
Harris, John L. .....Southern Div. Field
Havely, Coy G. .....Oleum Refinery
Henderson, Leo W.....Prod. Pipe Line
Hesser, Arah W. .....Legal Dept.
Hough, Theron B. .....Sacramento Sales
Huckaby, James Lee...Southern Div. Field
Keithley, Stephen .....Southern Div. Field
Kinkela, Rudolph J. .....Portland Sales
Kinsey, Chester C. .....Seattle Sales
Lane, Rex Gilman .....Southern Div. Field
Lewis, Riley S. .....Santa Fe-Ventura Field
Layton, C. L. .....Sacramento Sales
Lucas, John F. .....Southern Div. Field
Lytle, Wm. Lewis .....Southern Div. Field
Maddox, John W. ....Southern Div. Field
Martin, Lawrence J.....Prod. Pipe Line
Mauerhan, Ralph W....Southern Div. Field
Melton, Walter E. .....Southern Div. Field
Mentzer, Jesse E. .....Southern Div. Field
Messenger, Jesse E.....Southern Div. Field
Moore, Harry B. .....Oleum Refinery
McCall, Percy F. .....Southern Div. Field
McDonald, Fred .....Oleum Refinery
Mullen, Geo. H. .....Southern Div. Field
Mulligan, Frank X. .....Sacramento Sales
Newhoff, William A. .....Oakland Sales
Neylon, Irene .....Oleum Refinery
Nordquist, Victor O. .....Station Accounts
Olmsted, Paul M.....Southern Div. Field
Ono, Tokumatsu .....Honolulu Sales
Oster, Frank J. .....Prod. Pipe Line
Paes, Jose A. .....Oleum Refinery
Rabello, Antonie .....Oleum Refinery
Rebella, William V. ....San Francisco Sales
Riordan, Andrew E. .....Prod. Pipe Line
Rostain, Enil F. .....Fresno Sales
Sala, Walter H. .....Southern Div. Field
Samuelson, Carl S.....North. Sales Constr.
Salcido, Adolph .....Prod. Pipe Line
Schmidt, Arthur .....Prod. Pipe Line
Spaulding, George E.....Oleum Refinery
Spensley, Richard M....Southern Div. Field
Stoffel, Edw. H. .....Southern Div. Field
Stone, Ernest E. .....Southern Div. Field
Sumter, George L. .....Northern Div. Gas
Stafford, Robert J. .....Oleum Refinery
Staub, Edwin .....Oleum Refinery
Summers, William A...Southern Div. Field
Taylor, Reid .....Oleum Refinery
Trimble, George A.....Central Div. Garage
Walker, Friend E. .....Southern Div. Field
Wilcox, Gilbert C. .....Portland Sales
Wilson, Laidlaw H. .....Phoenix Sales

Promotion Made in Sales Ranks

ADVANCEMENT of E. W. Hutton, for the past year assistant manager of lubricating oil sales, to the position of manager, was announced October 1 by V. H. Kelly, manager domestic distribution. He succeeds W. L. Standard, who takes up the position of manager general sales.

Other changes made within the company's sales organization included the transfer of G. W. Schattner, popular Fresno district manager, to Portland as head of that district, C. L. Tostevin, manager at Portland for the past several years, going to Seattle as assistant district manager operations, and the

E. W. Hutton
Mgr. Lub. Oil Sales

W. L. Standard
Mgr. General Sales

G. W. Schattner
Portland District

C. S. Myer
Fresno District

transfer of C. S. Myer, for the past six months assistant district manager operations at Seattle, to Fresno to succeed Mr. Schattner.

Mr. Hutton, who will direct lubricating oil sales, started with the company as a tank truck salesman in July, 1916, in Portland, but the following year decided to go into business for himself. He returned to the company, however, in 1922 as a tank truck salesman at Tillamook. Being conversant with the lubricating problems confronted in operating steam and gasoline construction equipment, he decided to perfect himself as a lubricating engineer. As a result of his close application to the job he was transferred to Portland in June, 1926, as a lubricating engineer. He made such an excellent reputation in Portland that he was called to Los Angeles in December, 1927, as a lubricating engineer for the Los Angeles district. A year later he was assigned to Fresno as assistant district manager under Mr. Schattner.

In July, 1929, he was selected to go to Australia to assist in the organization of the lubricating oil sales department of the newly formed Atlantic Union Oil Company, Ltd. At the close of the year he was called back to the head office and made assistant manager of lubricating oil sales.

Mr. Standard, who assumes new duties as manager general sales, has been with the company since September, 1911. He was the company's first salesman of petroleum products within the city of Los Angeles. Within a period of two years he was made superintendent of the lubricating oil division and since that time he has directed the sale of oils and greases for the company.

Mr. Schattner started his employment with the company in the San Francisco district in 1914. In February, 1917, he was advanced to collector of the district, holding that position until he entered the army in March, 1918. After serving for sixteen months he returned to San Francisco as special salesman and the following year was appointed agent. September, 1927, he was appointed sales supervisor, and in July, 1928, was assigned to Fresno as assistant district manager. Four months later he was made manager and remained in that capacity until his transfer to the Portland district.

Mr. Myer, the new district manager at Fresno, spent eleven years in the banking business in Los Angeles, and considerable time in Central America and portions of South America, prior to determining upon a career with the Union Oil Company in March, 1923. His first assignment was to Reno, Nevada, serving under S. D. Herkner, then manager of the Sacramento district. In September, 1924, he was transferred to Sacramento as assistant cashier. Promotions to positions of district accountant, office manager and assistant manager operations followed.

Deep Production at Belridge

CONFIRMING the long standing belief of the company's field and geological departments in the deep zone production possibilities of the Belridge oil field, the Belridge Oil Company, October 7, put its Belridge No. 15 on production from a depth of 5475 feet with an initial oil flow of 2700 barrels and a gas flow estimated between twenty-five and forty million cubic feet. The gravity of the oil is between 45 and 50.

Union has had fee and leased land in the Belridge area for the past twenty years and in recent months has increased its holdings in the immediate vicinity of Belridge No. 15 to 1272 acres, and in addition owns in fee and has under lease approximately 1400 acres in the south Belridge area, which now takes on a new aspect as the result of the completion of the deep producer.

The company has been producing oil of low gravity on its Belridge holdings from shallow wells since 1916. These wells have ranged in depth from 750 to 1100 feet. A test of lower sands was made in 1917 with Belridge No. 1, which was drilled to a depth of 4260 feet, where it was put on production with a flush flow of 500 barrels. Water broke in after a few months of dwindling production, however, and the well was plugged back to the top sand and has produced from that zone since 1917. The production from the lower zone in this well and other geological data, however, convinced the company's field and geological department that the possibilities for deep production were excellent.

As a result of the definite discovery of deep-zone, high-gravity production the company's holdings in the Belridge area become extremely valuable.

Company Marketing Balanced Winter Gasoline

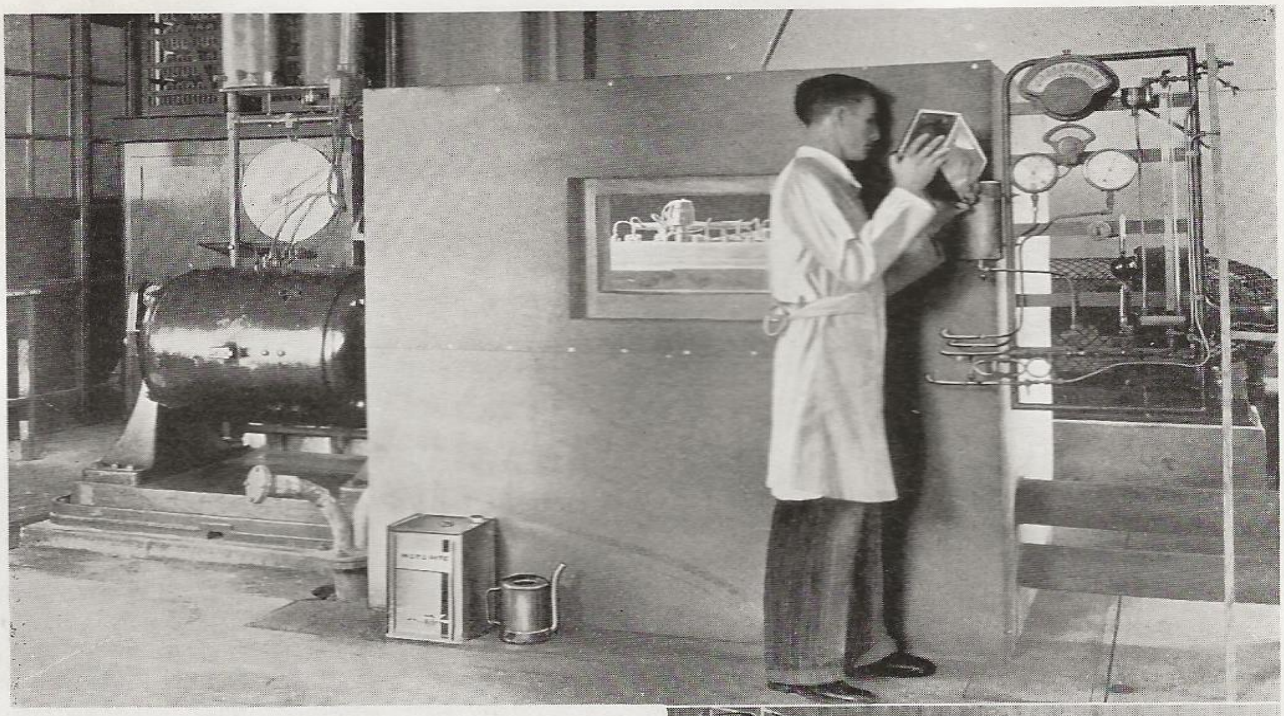
A winter gasoline, adjusted to the requirements of each of its districts, was placed on sale by the company throughout its marketing territory on the coast. It is the first winter fuel to be made available to western motorists so far this year, and is outstanding in that it has been balanced to the prevailing temperatures of the various districts in which it is to be used.

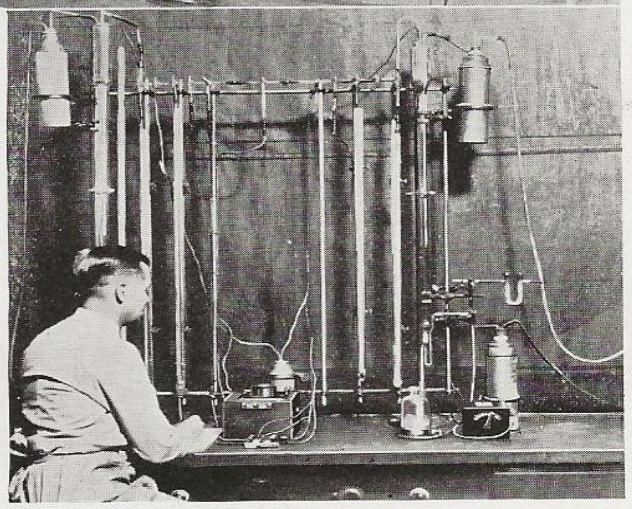
The company's summer grade of gasoline has long been considered one of the best balanced motor fuels, and now that that balance is being carried into the winter grade its popularity can be expected to increase. This balance, due to the discoveries of the company's research chemists, can be and is very definitely controlled.

Gasoline is composed primarily of light and heavy hydrocarbons. The light hydrocarbons give it its volatility, essential to quick starting and acceleration. The heavy hydrocarbons contain a greater amount of the heat units, the power-giving, mileage-producing elements. In the gasoline designed to give the maximum motor efficiency a perfect balance is maintained between the two, for when the lighter hydrocarbons are increased at the expense of the heavier ones, though the volatility is increased, mileage is sacrificed. Where the heavy portions are increased at the expense of the lighter ones, a sluggish motor fuel is produced.

As heat increases the volatility of gasoline and cold decreases it, it is obvious that a compensating adjustment must be made on the basis of climatic conditions under which it is to be used. And as volatility can be controlled by varying the lighter hydrocarbons, the problem becomes one of increasing the lighter hydrocarbons in the winter gasoline and decreasing them in the summer grade.

The determination at just what point the adjustment between the light and heavy hydrocarbons should be made for various weather conditions has been the subject of years of research work and experimentation on the part of the Union Oil Company's research engineers. They point out, for instance, that there is always a danger of getting a gasoline too volatile, either for summer or winter use. The atmospheric temperatures during the summer months will cause a gasoline too high in the lighter hydrocarbons to vaporize in the feed lines, thus preventing liquid gasoline from entering the carburetor. This results in the killing of the motor through fuel starvation, popularly described as gas or vapor lock, which is





Determining specifications to which the new winter gasoline must conform. Above is the quick starting test. This test utilizes an automobile engine, housed in an especially constructed chamber through which a brine solution is circulated to produce freezing and sub-zero temperatures. The dynamometer shown at the left serves as a starting motor and also measures the number of revolutions required to start the engine—an accurate check on quick starting performance. At the right is a distillation test unit by means of which each individual compound contained in the gasoline can be separated and analyzed.

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often preceded by "bucking". The same thing will happen in cold weather with a too highly volatile gasoline after the motor warms up.

Daylight Saving

Daylight Saving for California, which appears as initiative proposition No. 7 on the November 4 ballot, has been heartily endorsed by the Union Oil Company, as well as all others engaged in the production, refining, and marketing of petroleum products, in addition to a substantial number of commercial and industrial concerns.

The proposed law provides that, effective in 1931, all clocks in the state will be set one hour ahead on the last Sunday of April of each year and will be turned back one hour on the last Sunday of September. Under analysis, the measure means simply that the usual activity of the people will begin an hour earlier in summer, when the sun rises earlier, and will start an hour later during the winter. In both instances, the hour of daylight thus saved would be utilized in the evening. The same program of daylight saving has been in effect for the past few years in principal cities in the East and Middle West and has found high favor in these sections.

In providing an extra hour of daylight after the close of the average business day, the proposed amendment would permit the enjoyment, during the summer months, of nearly three hours of California sunshine before dusk settles. This time, if the measure is voted by the people of the state, can be used to advantage in many forms of outdoor recreation.

NEWS OF THE MONTH

LEASE LAND NEAR TRACY

Leases in an area three miles southeast of Tracy and near the San Joaquin river, totaling 7688 acres, were acquired by the company last month. The property is held by eight or nine owners. A test well is to be drilled in the near future. No previous drilling has been done in the immediate area in which the leases are located.

UNION BOATS WIN

In competition with the best the Pacific Coast had to offer in outboard motorboat racers, Johnny Seaborn and Denny Gagetta established themselves as potential national champions by scoring wins, respectively, in Class B and Class C events at the regional championship regatta held on Lake Merritt, Oakland, Calif., on Sept. 8 and 9.

Seaborn, whose Seaborn Baby has been a consistent place winner in Northern California races throughout the season, averaged 36.5 miles per hour to win all three heats in Class B. Gagetta, driving Snake Eyes 2nd, cleaned up in the Class C event, winning two heats and taking a second in a third.

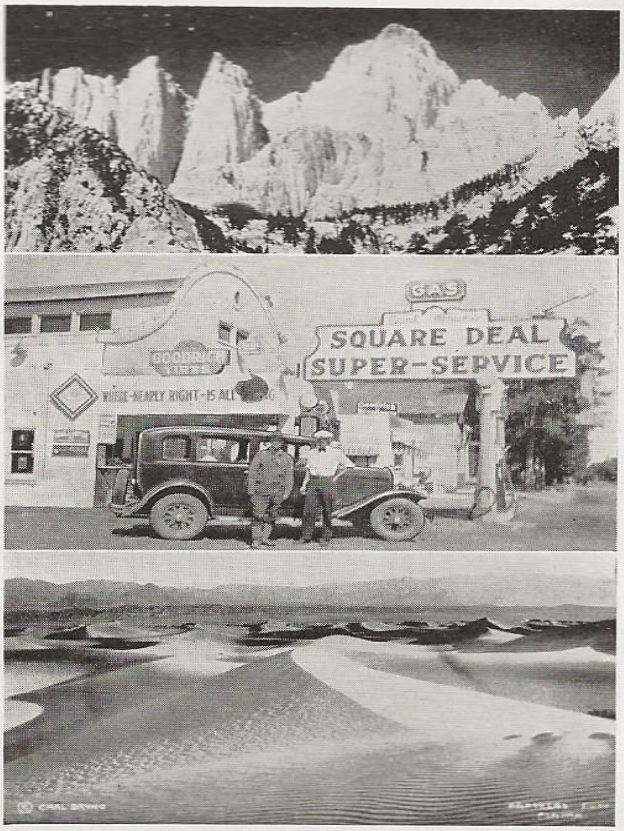
In winning the Pacific Coast championships, both Seaborn and Gagetta used Union Ethyl gasoline in the motors of their speedy craft.

FROM TOP TO BOTTOM OF U. S.

From the snow-clad summit of Mt. Whitney, Calif., the highest point in continental United States, 14,496 feet above sea level, to the sun-bleached sands of Death Valley, 260 feet below the level of the Pacific Ocean, a total change in altitude of 14,756 feet; from an atmosphere where the thermometer registers below freezing to where it stands at 115 degrees, in the shade—enough of a temperature change to give the ordinary city dweller a violent cold, in seven hours is the mark set by Norman Clyde, mountain climber and writer, assisted by Carl Bruno of Lone Pine.

Clyde left the summit of Mt. Whitney afoot at dawn, with the temperature below freezing. Following the newly opened horseback trail he negotiated the 18 miles down the mountain in approximately four hours. At the end of the trail he was met by Carl Bruno, proprietor of the Square Deal garage in Lone Pine, with a Chrysler automobile, and rushed 120 miles to the heart of Death Valley, where the mercury stood at 115 degrees.

Union Ethyl gasoline and Motorite were used in the car on the run and performed perfectly in face of the extreme temperature and altitude changes, Bruno, who handled Union Oil Company products at his Lone Pine establishment, stated after the record-breaking trip.



Above is shown the summit of Mt. Whitney and below is a view of Death Valley, the highest and lowest points in the United States, which were brought within seven hours of each other by Norman Clyde and Carl Bruno, shown in center photograph at Bruno's Square Deal Service Station at Lone Pine during a halt for gasoline.

TACOMA AGENTS PICNIC

Held Sept. 7 at Bonnie Brae Inn on beautiful Lake Steilacoom, the fall picnic of Union Oil Tacomaites brought a representative gathering from the Tacoma main station and all surrounding agencies, and proved to be one of the best ever conducted in the Northwest.

An exciting nine-inning baseball game, in which the Tacoma station team beat out an aggregation composed of employees from the other stations, featured the day's activities.

RITSCHEL PAINTS COVER

This month's Bulletin cover is the work of William Ritschel, national academician, recognized as America's greatest marine painter. Arthur Millier, art critic of the Los Angeles Times, writes of him:

"Mr. Ritschel is known throughout America for the long series of canvases painted from his rock-bound studio at Carmel. As Winslow Homer immured himself at Prout's Neck, so Ritschel built a castle on these western cliffs and by day and night watched the combers break, the surf tumble into jeweled lights, until he made himself master of a marine color-magic that sets him apart as one of the greatest marine painters of today.

William Ritschel

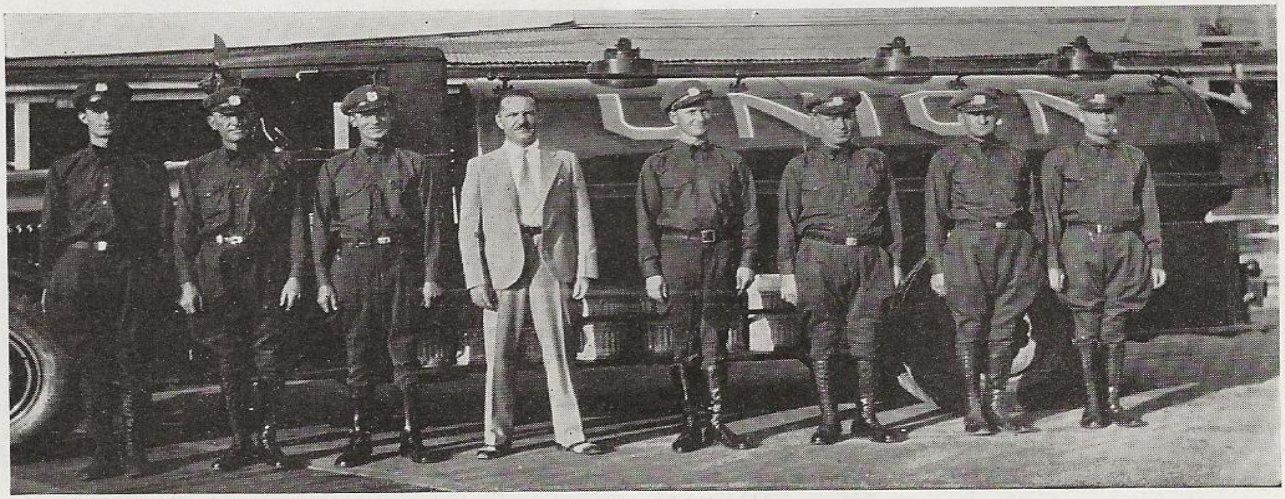
"As for Ritschel himself, the atmosphere of lonely adventure clings to him. But his adventuring was not merely with paint. That air of the sea dog is genuine. Like Conrad he served his many years among icy shrouds and on lonely, deck-pacing watches. He is an old salt. The man, true sailor that he is, seems part of the sea itself, his gestures and attitudes seem born of the sea, and his sea-going adventures would make a fascinating addition to maritime romance."

Announcement has just come that for the third time, Ritschel has won the much coveted Isidor prize at the annual Salmagundi Club exhibition in New York. At various times he has won the Carnegie Prize, National Academy of Design; gold medal and thousand dollars, National Arts Club; gold medal, Panama-Pacific Exposition, San Francisco; and many others. In California, where he lives, Ritschel was awarded the gold medal at the state fair so regularly that he was finally declared "Hors Concours" so that other artists might have an opportunity to win. Many of Ritschel's prize paintings are included in his present showing at the Stendahl Art Galleries, Ambassador Hotel, Los Angeles, through whose courtesy the reproduction of this month's cover was made possible. Copies of the cover are available without the overprint.

50-MILE SPEED BOAT RACE

Staged on the lagoon in Recreation Park, Long Beach, last month, the fifty-mile outboard motorboat race, the first three places in which were won by boats fueled with Union Ethyl gasoline, proved to be the most thrilling yet scheduled by the Southern California Outboard Association and drew the largest crowd, estimated at 15,000, ever to witness such an event in the Southland.

"Fresno, the Better (dressed) District"



From Fresno comes a challenge to other Union Oil Company districts to produce a crew of better dressed tank truck salesmen than that shown above with George M. Griffeth, agent for the city of Fresno. The salesmen are togged out in new uniforms of forest green snapped up with high-topped boots. From left to right they are: H. Blaine, O. F. Berlin, F. E. Burleigh, Mr. Griffeth, S. C. Richmond, R. Bittner, R. L. Jones and F. E. Rinehart.

New Airport Contract Goes to Union

Consolidation of the adjoining American and Rogers Airports, and the airport of Continental Air Express, of Los Angeles, Calif., as one operating unit under the name of the American Aircraft Company, Ltd., was culminated last month and a program of expansion and improvement immediately launched.

Buildings of the American Aircraft and the Continental Air Express operators have been moved to the Rogers end of the field, giving the new organization fourteen hangars with a storage capacity of 48 planes, and a number of other units housing shops, wing plants, parts departments, garages, ground school class rooms, club rooms and offices. The field has a frontage of approximately 4000 feet on Crenshaw boulevard in southwest Los Angeles, and a depth of more than 3000 feet. Two major take-off runways have been oil treated for a distance of 1000 feet, and taxi lanes, 3000 feet long, have also been conditioned.

A number of new operators have moved to the American Airport because of its proximity to metropolitan Los Angeles, and several others have opened negotiations for space. The American Air School has 83 active students and during the past five years has graduated more than 500. Officers of the company are: A. B. Mackenzie, president; T. S. Trebell, vice president and general manager; Paul J. Lansing, vice president and superintendent of operations; W. E. Rice, secretary and treasurer, and D. M. Teel, director of education and chief pilot.

In the top photograph you see representatives of the American Aircraft Company, Ltd., and the Union Oil Company inspecting one of the airport's 3000-foot taxi lanes, which a few minutes later was sprayed with Union road oil, as is shown below.

SAFETY *IN THE* UNION

THE LOST TIME ACCIDENT

Oil field workers have learned through much safety propaganda that the term "lost-time accident" means an industrial injury which prevents the injured from returning to his regular duties on the day following. What these injuries amount to on the average may also be of interest. Taking nearly 150 lost-time injuries in the drilling and producing department, we found that the average case caused a lay-off for 23 calendar days. A medical and hospital bill of $127 was paid by the company. For the first 7 days the injured man received neither pay nor accident compensation. Starting on the eighth day he began to receive about $3 per day which continued for 16 days, after which he returned to work. But Mr. Average Man did not return as good a man as he was before being injured. Partial or permanent disability in some member—a lost finger, stiff joint, or the like—had maimed him for life and in consequence Mr. Average Man received, in addition to his $3 per day for 16 days, an additional award of $110.

No one has ever bought back his original health and happiness with his compensation "award." Not even in California, which has one of the most liberal Compensation Laws and a humane commission, has an accident "paid."

In order to standardize the use of the term "lost-time accident" and to preclude any suggestion that during contests for safety records men are put on light duty jobs in order to avoid being classified as casualties, the Safety Board has adopted the following definition:

> "A lost-time accident is one in which the injured employee could not perform his regular duties on the day or shift following the one on which he was injured."

The definition has been approved by the safety engineers of the companies on the Pacific Coast and will be presented to the National Safety Congress at its meeting in October for adoption by the entire petroleum industry. Whether or not it is so adopted, the definition will hold hereafter for statistics on which the Company's records are based and on which the safety contests within departments are judged.

NOT ALWAYS THE SAME

The truth and the whole truth are often pretty far apart. Our accident reports often sound as though the writer were trying to "get by" with the minimum effort. The result is frequently a statement of fact that is actually far from the truth. I am reminded of a luncheon at which a guest appeared with his arm in a sling. There were immediate inquiries of "how come" and the usual line of banter. "My horse fell with me and I broke my arm," he finally said. But the gang was too much for him; they wanted details. "I was riding along when the horse stumbled and fell to his knees. He didn't throw me. In fact, when he stopped I had both feet on the ground and was still in the saddle. So I kicked off the stirrups and jumped off. As I did so I turned my ankle and in trying to save myself I fell on my outstretched arm and dislocated my elbow." "But you said you broke it?" someone asked. "So I did," he answered, "I broke the bone trying to reduce the dislocation."

YOU ARE THE COMPANY

Did you ever stop to think that YOU are the UNION OIL COMPANY to those with whom you come in contact? Did you ever consider what you do and say, how you treat others, creates a picture of the Union Oil Company in the minds of those you serve?

The public's opinion of any company is formed chiefly from its contact with that company's employees. By their words and deeds, their service or lack of it, they can make or break their employer.

Inefficient, surly employees paint a picture of an inefficient, carelessly operated business. Efficient, happy employees create an impression of an efficient, trustworthy, successful company.

Did it ever occur to you that it might have been the agent who lost his temper; the salesman who misrepresented his product or service; the clerk who was too busy to be courteous; the truck driver who appropriated the right of way or failed to close the customer's gate; or the employee who failed to keep the premises neat and orderly; that gave your competitors such advantages as they now enjoy?

REFINED AND CRUDE

By R. SNEDDON

Scientists claim that no human being can go up in the air more than eight and a half miles. They obviously have never studied the actions of a golfer in a sand trap.

* * *

Good looks are not essential to success, but in the case of a lost ball, they come in very handy on the golf course.

* * *

It is said that the female crab has one million young at a birth. No wonder the father crab's eyes stick out so far.—Punch.

* * *

An apple a day keeps the doctor away—if you don't get the seeds in your appendix.

* * *

So far we have been unable to verify the rumor that a well-known broker has traded his seat on the Los Angeles Stock Exchange for a seat at the U. S. C.-Stanford game.

* * *

Note, the mosquito presents his bill before he works on you. That is undoubtedly where our hospitals got their idea.

* * *

We see no reason why the movie fraternity should be opposed to daylight saving. They have always been noted for their efforts to turn night into day.

* * *

And incidentally, think of the glorious theme it presents for a Scotch scenario.

* * *

"How long will it be before your sister makes her appearance?"
"She is upstairs making it now."—Orcadian.

* * *

If all the boarders in the United States were placed end to end they would reach——

* * *

Which recalls the fate of the monastery egg: Out of the frying pan into the friar.

* * *

A Los Angeles gentleman was recently cured of a long-standing case of deafness, when a golf ball struck him on the head. He was, no doubt, also cured of hanging around golf courses.

If the laundry didn't pin up your shirt that way, what else do you suppose would hold it together.

* * *

And now a little advice: Before you invest in a going concern, make sure you know which way it is going.

* * *

Perhaps the most economical animal we know is the moth, he eats nothing but holes.

* * *

Again, an alarm clock is all right if you like that sort of ting.

* * *

We are told that certain musical notes prevent sleep. So also do certain promissory notes.

* * *

When a wedding takes place the father of the bride invariably worries himself sick over the loss of his daughter, when as a matter of fact he is quite likely to have her back very soon. And a son-in-law to boot—yes, to boot.

* * *

A large stock of five cent cigars was threatened by fire recently. Unfortunately, the blaze was extinguished before any real good could be done.

* * *

We have never been able to understand why the various factions in China can't iron out their own difficulties.

* * *

A team of Americans has just beaten a British team in an international bridge tournament. London bridge is falling down.

* * *

Our boss must be one of the Three Musketeers. He is continually telling us we musketeer at eight o'clock.

* * *

In conclusion, remember when a man has a deep scar on his right arm he is not necessarily a veteran of the Great War. He may have got it reaching for the butter.

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