



The Lufkin Line

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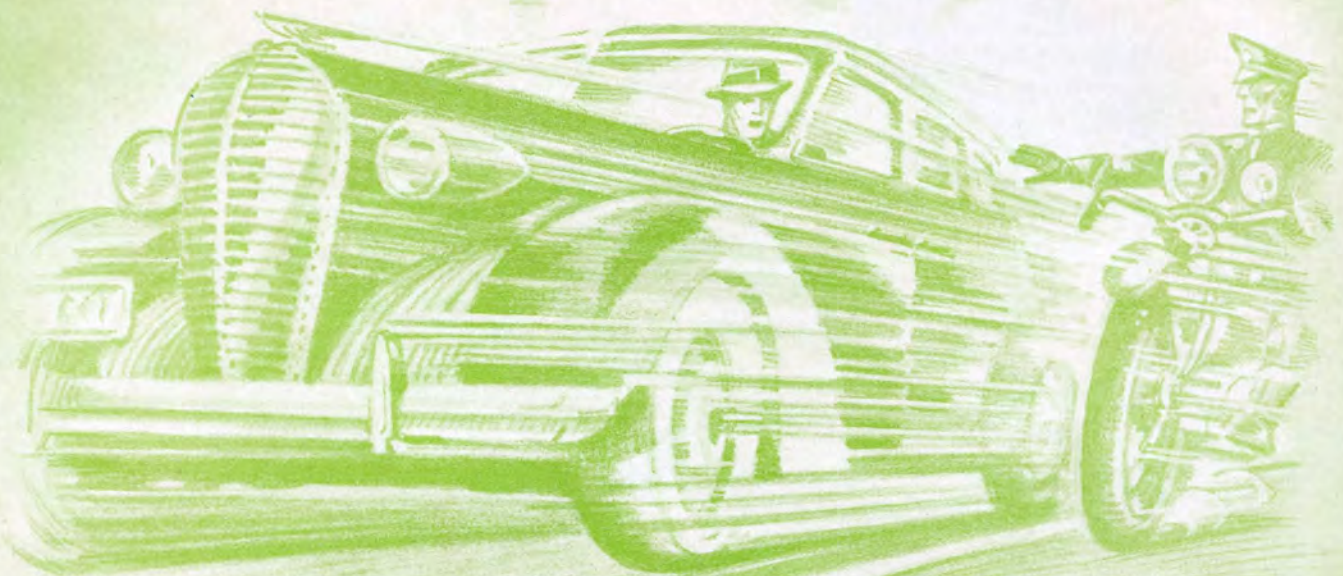
THE FASTER YOU GO . . . THE SOONER YOU MAY BE GONE

*Don't Race
every motorist
who wants to
pass you*

"Hey, you, pull over to the curb!" . . . that's the signal for you to go into your under-the-breath swearing act. You explain to the officer. You remember that once you talked yourself out of a ticket . . . and so you talk some more. And the officer listens politely . . . but at the proper lull in your monologue . . . he moves toward the front of the car, puts his foot on your bumper. He then deliberately takes his book of tickets from his inside coat pocket and begins to write.

Of course, you've shown him your driver's license and you feel that THAT should get you out of any difficulty. You're a law abiding citizen, you feel. Here you are going along peacefully . . . minding your own business . . . at 60 miles an hour . . . carrying a driver's license . . . carrying the Certificate of Title to your car at peace with the world when this traffic officer suddenly interrupts your mad dash to somewhere or other.

All we can say to you is this: when you speed, you endanger your own life . . . you endanger the lives of others . . . and you deserve any penalty the law can possibly impose. If you don't want trouble . . . don't race every motorist who wants to pass you, and **DRIVE CAREFULLY!**





VISITORS find hospitable accommodations on the shores of placid Lake Hamilton, near Hot Springs.

The Valley of "BIG MEDICINE"

By LOIS SNELLING

EDITOR'S NOTE: Hot Springs National, the only thermal Spa of international fame on the North American continent, has been owned and supervised by the Federal Government for over a century. The United States Government, and the National Park Service Division, particularly, has taken its stewardship of these waters seriously as is evidenced by the fact that more than \$20,000,000 have been invested by the government and private interests to perpetuate their use.

THERE is an ancient story which has been told of many watering places in many lands. Of each place it is recited as though it were brand new, and applied to this one spot alone. The story has been told of Hot Springs, and here it is in all its pristine originality:

A native tells a visitor of the marvelous restorative qualities of the springs. "Why," says he, "an old man bathing in those waters returns once more to his youth."

"Ah," replies the impressed visitor, "And if a young man takes the baths?"

"He is a boy again."

Almost overwhelmed, the visitor gasps, "And a little child—What if a mother should place her babe in the water?"

Not a whit discomfited, the native answers, "She would take out a little monkey."

Though the most Darwinian of the Hot Springs natives probably do not believe this story in its entirety, yet no one will dispute the powerful medicinal properties of the steaming waters which pour out of Hot Springs Mountain. From all parts of the world people have been coming for the last fifty years to this sheltered nook in the rugged Ouachita Mountains in search of health. Prior to the arrival of white men in Arkansas, the Indians

A PRIZE CATCH from Lake Hamilton which almost surrounds Hot Springs National Park, Ark.





THE SERVICE AND CUISINE of the Arlington rank with that of the most elaborate hotels in America and Europe.

had for untold centuries used the site of the springs as a ground of hospitalization. Tradition says that many a bloody war was waged among the different tribes over possession of the "Big Medicine." At last the humanitarian triumphed over the warrior and a truce was declared, whereby the area around the springs was to be regarded as neutral ground even in time of war. Here an ailing chief could come for recuperation, and though his bitterest enemy might also be "taking the baths," he was secure from harm. Here where the Great Spirit forever hovered, braves forgot their hatreds—or at least, they were compelled to keep their hatchets buried. The fame of the springs was far-flung



A SECTION of world famous bath house row.

among the Redmen, and it is thought by some historians that they were the illusive Fountain of Youth for which Ponce de Leon was so diligently searching in the New World. The Knight of Leon never reached the magic waters, but a few years later another bold Spanish adventurer undoubtedly passed that way. For three years De Soto and his 600 *conquistadores* trekked back and forth across the Southwest, and it was on the banks of the Ouachita that the leader contracted the fatal illness which at last was to cause his body to be sunk into the Mississippi he had discovered.

ONE OF THE SPA'S thousands of bathing beauties.





SOCIETY dons its finest feathers for the annual March races, when money changes hands as rapidly as the hooves fly.



INTERIOR VIEW of Uncle Sam's Thermic Hydrotherapeutic Pool.

Since the springs are but a short distance from the Ouachita, it is not probable that his native guides would pass them up on their itinerary.

In the early years of the 19th Century the Ouachita region was as wild as on the day of its creation. The health-giving springs were utilized only by the Indians. But as civilization crept Westward and the location of the hot springs became known to white men, they also started making pilgrimages to the serene valley with their sick. In ox-drawn wagon they came, on horseback and afoot. Tents were pitched in the narrow strip between the high-walled hills, and there the families or individuals dwelt until such time as they felt inclined to move. No permanent settlement was made until the year 1807, when one Manuel Prudhomme established himself there. Others joined him, and by 1820 the springs' visitors were numerous enough to warrant the erection of an inn for their accommodation.

Ten years later the first bath-house was built. Prior to this time, the baths had been taken in sheltered pools on the hillside.

In 1832 the United States Government, now well aware of the value of the gift which Nature had given into its hands, peered into the future. What it saw there was the inevitable exploitation of the hot springs territory for private gain. To prohibit this, Congress set aside a tract of four square miles, including the forty-seven springs which flowed from the base of Hot Springs Mountain with a daily discharge of 1,000,000 gallons of water, and called it the Hot Springs Reservation. Yellowstone National Park was our first National Park under that specific title. But in reality, Hot Springs was our first National Park, being forty years older than Yellowstone and, indeed, older than the National Park Service itself. When Yellowstone was created in 1872 it was administered by the Govern-

HIGHWAY, LAKE AND MOUNTAIN.





AN AIRPLANE VIEW of Lake Hamilton, where the Broadway of America Highway bridges the chain of islands—near Hot Springs National Park, Arkansas.



HIKING, a popular pastime along the pine wooded trails of Hot Springs National Park. This trio were snapped on Goat Rock Trail.

ment in exactly the same way as the Hot Springs Reservation had been. As the other parks were created by Congress, they too were handled according to the original plan established with the Hot Springs Reservation. In time, Hot Springs' name was changed from Reservation to National Park, but in no way was its administration changed.

Hot Springs is unique in several respects: It is our first National Park, it contains the first Government-established hospital, and it is the only spa in America whose thermal waters are owned and controlled by the Government. Uncle Sam guards those curative waters with a watchful and jealous eye. The water from each of the forty-seven springs is the same. It rises from the ground with a temperature of from 95 to 147 degrees, but is tempered for the bather. In none of the bath-houses

HOT SPRINGS still retains some of its horse-drawn carriages and one of the favorite methods of "taking the air" is in a landau.



are the charges exorbitant, because the Government regulates the fee. The charges vary according to the equipment and accommodations afforded.

It was in 1882 that the first Army and Navy Hospital was built. In the dark days following the Civil War, sick and crippled ex-soldiers flocked to the southern spa in search of health. Observing the benefits derived from the steaming waters, the Government saw fit to establish a permanent institution for their rehabilitation. The building now in use is one of the most completely-equipped hospitals of its kind in the nation, accommodating 500 patients and erected at a cost of \$1,500,000.

After the establishment of the Hot Springs Reservation, a thriving little town grew up around it. The settlement continued to thrive until today the city of Hot Springs has a resident population of 30,000. It is kept physically and administratively separate from the Park, but a close co-ordination exists between the two bodies. The city is located on several national and state highways, and due to the mild climate it is a very popular resort in winter. It is equally popular with Southerners as a summer resort. Cuddled at the feet of four mountains which rise abruptly from busy streets, the little city maintains some of the most luxurious



MILES OF BRIDLE PATHS.



A SCENE ON ONE OF THE THREE CHAMPIONSHIP COURSES of the Hot Springs Golf and Country Club.

hotels in the United States, the largest affording accommodations for 1,000 guests. All of the major hotels have their own elaborate systems of baths.

Hot Springs by no means limits its appeal to the sick. While the healing waters restore the ailing, there is an abundance of means for the healthy pursuit of pleasure for the sturdy. In the spring sport lovers and society flock to the race tracks to watch the fleet-footed horses win or lose their laurels. There are four excellent courses for golfers, and a number of tennis courts. No fisherman ever goes away disappointed from Lake Catherine and Lake Hamilton, located a few miles from Hot Springs. These lakes, with a wooded shore-line of 320 miles, were formed by two great dams erected for hydro-electrical purposes across the Ouachita River. They are continually being restocked with fish, and there is not a month of the year that some species of finny creature cannot be captured. Black bass, of several varieties, wall-eyed pike, crappie, bream, and perch—they all bite in these beautiful lakes. The Ouachita itself is a favorite haunt of fishermen, as it was in the days of the Redmen, if we are to judge by the numerous arrowheads to be picked up along its shores.

Another form of amusement indulged in at the

spa is that of riding behind horses in an old-fashioned open-top carriage. Why this antiquated means of locomotion has lingered in Hot Springs is not known. Perhaps it is inspired by man's unconquerable desire for precedence, for in the Government's Rules and Regulations regarding the Park area we read, "Horses have the right-of-way at all times and must be given the inside of roads when they desire it."

A few miles from Hot Springs is the Ouachita National Forest, in all its primeval denseness. Here for mile on mile one can drive without ever seeing a human being. Except for the network of excellent motor roads and the picturesque picnic and camping areas constructed by the Forest Service, parts of the forest are as untouched as when the Redmen roamed within its shadows.

MUSIC AND SHADOWS on Lake Catherine—



TREASURE ISLAND is the most unique site ever planned for a World's Fair. Two monumental bridges link it with California's highway system, and ferry service completes its connections with San Francisco and Oakland.

—Cuts and story courtesy "The Standard Oil Bulletin"

"TREASURE ISLAND"...



. . . Gayway to the Golden Gateway

ELEVEN Western states and thirty-five foreign nations are now staging their World's Fair Premiere, just inside the Golden Gate. Two years to build, representing an investment of \$50,000,000, embodying the cultural refinements and industrial progress of the entire Pacific area and much of Europe—and there it shines!

Hardly anyone planning to take the West's most exciting vacation has missed the news of Treasure Island—how it was scooped up out of San Francisco Bay and anchored for all time on the shoals of Yerba Buena Island, in the lee of San Francisco-Oakland Bay Bridge, the world's greatest, and within easy camera distance of Golden Gate Bridge, the second greatest. How its four hundred acres were planned with exactitude as the site of the Golden Gate International Exposition in 1939, and as an airport in the years to follow. How the silvery trans-Pacific Clipper Ships have already begun to make themselves comfortable in the broad

new lagoon known as the Port of the Trade Winds.

The Golden Gate International Exposition is built in the form of a walled city, with a new "Pacific" type of architecture that blends old Mayan, Incan, Malayan and Cambodian forms. Buildings are finished with iridescent stucco that reflects sunlight or flood lights with dazzling beauty, and skilled landscaping has turned the sandy island floor into a luxuriant subtropical garden of exotics and tall trees.

Dominating this all-new "magic city" in the central Court of Honor is the Tower of the Sun, 400 feet high and crowned by a gleaming golden Phoenix, symbolic of San Francisco's rise from its ashes after the fire of 1906. This tower, brilliantly illuminated at night, mounts a melodic carillon of 44 giant bells whose notes can be heard for miles out over the Bay. From it radiate the main axes of the Exposition—the Court of the Seven Seas and Court of Pacifica toward the north; the Courts of Flowers and of Reflections eastward; and the Court of the Moon and Enchanted Gardens toward the south. These courts are framed by the massive exhibit halls and there are impressive murals and sculptures wherever you turn.

Assurance of participation on Treasure Island came early from British Columbia, Guatemala, Nicaragua, Costa Rica, Mexico, Ecuador, Brazil, Peru, Argentina, El Salvador, Venezuela, Uruguay, Paraguay, Chile, Bolivia, Hawaii, the Netherlands East Indies (Bali, Dutch Borneo, Sumatra, Java, Celebes, Timor and Netherlands New



A SCULPTURED FIGURE FROM THE COURT OF PACIFICA.



THE EXPOSITION is a walled city rich in finely carved detail. This scene is from the Court of the Moon. In the foreground is one of the massive urns that flank the Fountain of the Evening Star. All courts on Treasure Island radiate from the central Tower of the Sun and are easily accessible.

To the question, "How much fun can we have on Treasure Island?" the answer is easy. It's "Gayway." Millions of Gayway fans will find, along Hollywood Boulevard, real-life talking pictures made for the first time in public. They will rub elbows with movie stars known around the world, and they will have an unexampled opportunity to watch the unfolding of Hollywood's secrets from sound-stage

"shooting" to final screen projection on the self-same boulevard.

The Gayway will have an immense Rocket Ship, built to give its 250 passengers a thrilling "Trip to Mars." And a giant Aerial Crane, swinging its passengers fourteen stories above Treasure Island for a panoramic view of the Fair, the Bay, and San Francisco. And a breath-taking Cyclone coaster from abroad that has chosen Treasure Island as the spot for its American debut. Exposition people have named the Gayway, "Forty Acres of Fun." Four of its forty will be occupied by one concession alone—Streets of the World—comprising an almost bewildering variety of foreign restaurants, cafes, shops and theaters.

Treasure Island is keyed directly into California's great highway network by the wide, new causeway connecting it with the San Francisco Bay Bridge. To free the Island of traffic-tangles a parking lot for 12,000 cars, equipped with a service station, lies beside the walls of the Exposition city. Or, visitors may choose to come by bus or by ferry boat, from either the Oakland or San Francisco side of the bay. Causeway and ferries, together, are capable of transporting visitors to Treasure Island at a rate of 65,000 every hour for the 288 days of the Fair.

Guinea), Japan, French Indo-China, New Zealand, Australia, Johore, France, Czechoslovakia, Holland, Norway, Denmark and Italy.

Many of these nations have erected their own buildings, of colorful native architecture, in the Exposition's Pacific Basin area—beside a chain of mirror lagoons that stretches eastward from Treasure Island's main palace group. Many others will be found in the hall devoted to international exhibits. In size, the governmental exhibit buildings range from the seven-acre United States Federal Building to the tiny ski lodge of Norway and the Johore "Dewan," or council house. Some of the nations stress cultural wealth; others emphasize tourism, industry or agriculture—but each faithfully presents its own native characteristics.

Seeing one great exposition fortunately does not mean seeing them all. There are a good many points of originality about the fair on Treasure Island to distinguish it from all world's fairs of the past.

The China Clipper operations present a rare opportunity to see a "complete airline under glass"—with regular terminal overhauling being done in the Hall of Air Transportation. An absorbing Indian presentation will dramatize the six distinct civilizations of the American Indian, stressing his high rank as an artisan. The historical Cavalcade of the Golden West, the Oregon Wild Life area, the Gayway, Hollywood Boulevard, Chinatown, Treasure Mountain, the gigantic relief map of the Industrial West, the Story of Land and Sea, the monumental Fine and Liberal Arts exhibit—all are unique in concept and artistic treatment.

PETROLEUM FACTORY. One of the twelve sections in a model oil refinery being built for the exhibit on Treasure Island. It's all hand work and infinitely painstaking. The model when assembled will be scientifically accurate, built on a scale of one-half inch to one foot.



MODERN LUFKIN INST



M. L. Kline lease, East Texas, Lufkin Assembly TC 55-7.



Typical Lufkin installation Unit Assembly TC 55-7A.



Lufkin S.C. 26 Unit Assembly with "A" frame post back crank new style stroke post S. C. Smith No. 10. East Texas field.



Lufkin TC 3-18A Unit, K & P Oil Co., Brock Estate, East Texas field.



Lufkin installation of Assembly TC 55-7A, East Texas field.

IN STALLATIONS

Lufkin S.C. 21-B Unit on steel base—an "East Texas Special." Gralenor Oil Co. A. A. King lease well No. 8, Margaret Tension Survey, East Texas field.

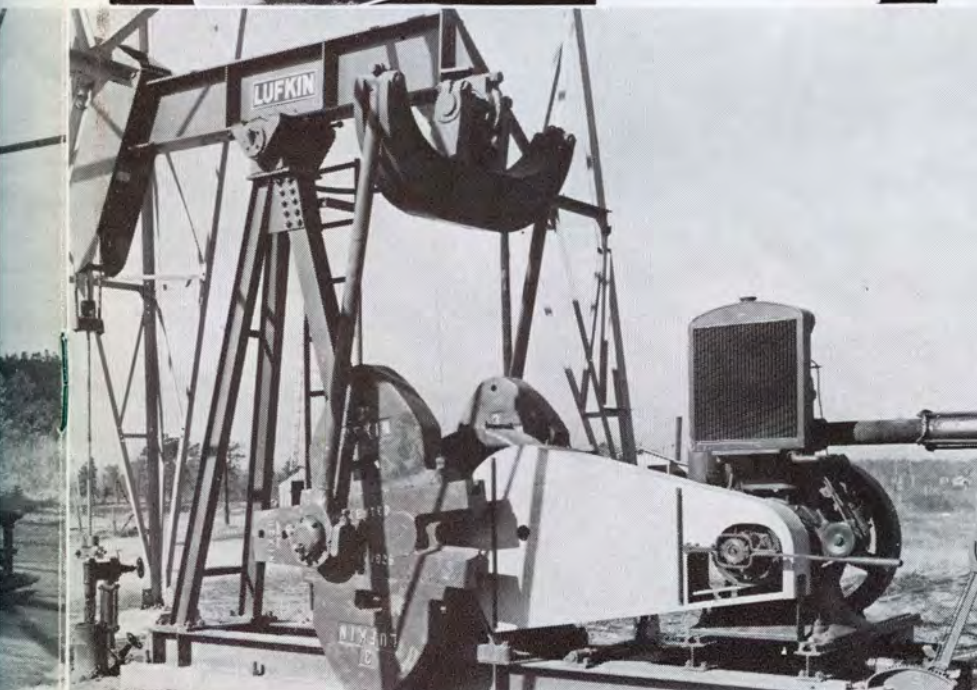


Lufkin TC 3-18A Unit Assembly showing Magnolia's safety platform, East Texas field.



Arkansas Fuel Oil's Edwin Bealle No. 11, East Texas field Lufkin TC 3-18A.

it Assembly
post back
stroke post—
East Texas



Lufkin TC 3-18A Unit, C. G. Durham Estate and S. W. Clark, Well No. 4 Mathews lease, East Texas field.



Lufkin S.C. 31-C Unit, J. B. Salmon Oil Co.—Lula Martin Lease, Well No. 3, Johnson Survey, East Texas field.

CALIFORNIA CAMERAMAN

ED TROUT, STAFF PHOTOGRAPHER



Venus from Venus—from Venus, Texas, comes this shapely siren, Judith Barrett. Recently signed to a long term contract by Paramount.



On the beach at Santa Monica.



George Crail, executive, diplomat, financier, capitalist, oil producer and ambassador of good will without port folio.



Fred Crail



Hans Crail, left Los Angeles December 28, married in Honolulu, honeymooning around the world.



George Goodrich, superintendent of maintenance, Macrate & Co., Long Beach, Calif.



Al McConville, recent addition to our California sales force in the Long Beach area.



Bob Casson of our California office says: "California breakfast food enroute to its market."



Roy Blodgett, Macrate & Co.



Shell Oil Company's Mc-Cammon, Bakersfield, Cal.



Left, Jimmy Sayer, Standard Oil Co., & his pusher.



Perils of mountain climbing. Just look what one might meet around any California mountain—and such fetching costumes. They are: Laurie Lane, Lola Jensen, Joyce Mathews, Yvonne Duval, Harriet Haddon and Norah Gale.



Left to right: Mr. Levy, attorney for Western Gulf Oil Co., Paul Huggins, Jr., Chet Yocum and Paul Huggins. Picture taken in front of the June Lodge on July 4, 1938. The fish weigh between 2 and 3½ pounds each and are German Brown Cutthroat Trout.



Mr. Paul Huggins and his string of fish.



Frank McAteer, superintendent Caminol Co., Harbor City.



The way the boys take delivery of Lufkin equipment in California. Imagine this in Texas with its load limits, etc.



Chas. Pruett, vice president Golden Bear Oil Company, Los Angeles, Calif.



Roy Gunn, chief maintenance engineer Standard Oil Company.

SNAPSHOTS

WITH THE LUFKIN CAMERAMAN



Annual employees banquet, Lufkin Foundry & Machine Co.



John E. Daxson & wife, Phillips Petroleum Company, Houston, Texas



Left: Fred Kreft, East Texas Superintendent for Jones-O'Brien, Inc. Right: J. W. Koonce, President, Jones-O'Brien, Inc.



J. C. Manor, lease man for Jones-O'Brien, Inc.



Left to Right: A. E. Brink; Fred B. Graham; F. D. Brindel; Fred L. Mace; D. H. Wise, and W. C. Farmer, Carter Oil Co., Dix Office, Illinois field.



C. S. Hardin and Elvin Read. Medium of transportation in Illinois field. 2 H.P. Hayburners. Four wheeler Mud Scow.



Mr. Lewis Johnston, Production Supt., J. B. Salmon Oil Co., East Texas field.



Left to Right: Paul Newsom, pumper; Joe M. Mills, Geol.; S. R. Mealy, drilling contractor; Charles F. Newsom, operator; Denver Daugherty of Denver Drilling Company.



Mr. D. E. McMillan, Supt., Smith, Guerin & King and Supt. for Texas Jersey Oil Company, with Mrs. D. E. McMillan.



Left: George Swan, with Jersey Oil Company. Right: Sam Guerin, Partner, King, Guerin & President Jersey Oil Company.



Lufkin TC 66-5A Unit Assembly; installation of the Basin Oil Properties, Inc., McCamey field. One of 5 such installations. Oliver Inman, Supt., left; Ernest Pendleton, Farm Boss, right.



Lufkin Warehouse, St. Elmo, Ill.



Ed Ruse, Supt., Sells Pet. Co. Art Bennett.



Mudge Oil Company's installation of a Lufkin TC 66-5A unit with a 7 1/2 H.P. Fairbanks-Morse engine.



Lufkin TC 77-3 Unit installation for Carter Oil Company, Dix field, Ill.



W. D. Winston, Jr., Secretary, Lufkin Foundry & Machine Co., and buck killed within 10 miles of Lufkin.

WE HAVE nearly 2,300 airports and air fields in this country. Even so, all but a very few of them would be overtaxed if called upon to accommodate the latest and largest of our planes.

An official of the U. S. Bureau of Air Commerce has recently summed up the situation in these words: "The cold fact staring us in the face is the realization that within the next twelve months there will be mammoth transport planes in the air which, in all probability, cannot satisfactorily use more than five or six, at the most, of the airports in this country in their present condition."

The main problem arises from the increasingly long runways needed to launch these big craft into flight. The accompanying article suggests a possible means of overcoming the difficulty.



—Story and cuts courtesy
Compressed Air Magazine

CATAPULTS

May Solve Airport-Space Problem

Marine Launching Apparatus Suggested for Use by
Huge New Land Planes to Restrict Lengths of Take-
Off Runways

By ROBERT G. SKERRETT



LAUNCHING A PLANE FROM A SHIP—The "Oostmark," which serves as a seaplane base on the German air-mail route between Africa and South America is pictured at the top of this page. The vessel is equipped with a derrick to lift planes aboard for servicing and refueling them, and with a catapult for launching them. It is 245 feet long and is powered by two oil engines. Center picture shows a



PREPARING TO TAKE OFF—A large transport plane taking passengers aboard at the Newark airport before starting a flight. It is lined up on a runway. Only a few years ago planes were of such size that they could take off with a full load in less than 400 feet. Now, however, some of them occasionally have difficulty in getting into the air after the 1,000-foot run that is permitted by the Department of Commerce, with the result that exceptions to the ruling have already been made in some cases.

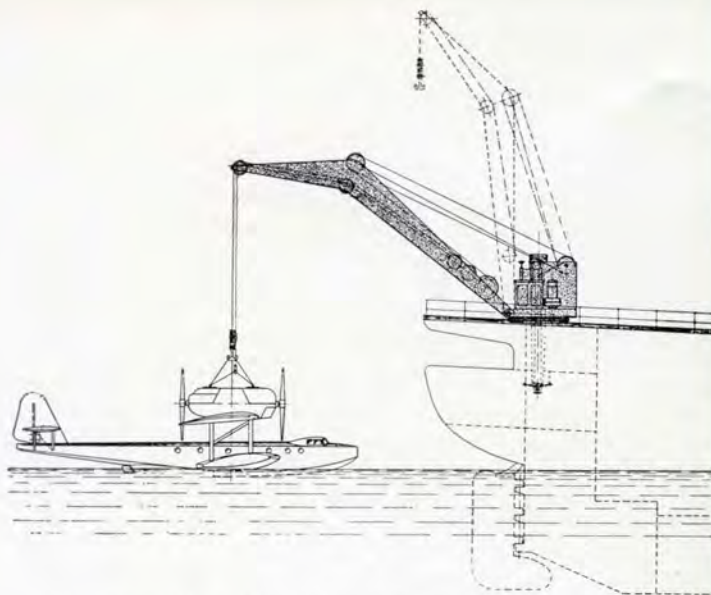


large ocean-mail flying boat on the runway of the catapult of the "Ostmark." In the foreground are the cables that draw the plane forward and, at either side of the central slot, the air-operated brakes that retard the progress of the carriage after the plane has taken off. Lower picture is a view from the opposite end of the same runway, showing a plane that has just been successfully shot out into space.

BIGGER AND BETTER PLANES for both overseas and overland services have recently been turned out by plants in this country. Still larger ones are under construction, and plans are in preparation for a type that will far outstrip in size, motive power, and carrying capacity the largest of the machines now in course of fabrication here. Relatively few of us comprehend what all this means.

On December 17, 1903, Orville Wright guided, for the first time, a self-propelled, man-carrying biplane that stayed aloft for 59 seconds and covered the then astonishing distance of 852 feet! That flimsy contraption was equipped with a 12-hp. engine that was designed and built, like the whole machine, by the two Wright brothers. The biplane, loaded, weighed considerably less than 1,000 pounds, flew at a height of not more than 10 feet, and made an overground advance of not quite 10 miles an hour against a 20-mile wind—the wind helping to make the flight possible. Today we have transport planes that weigh a maximum of 24,000 pounds, can carry 21 passengers, and make speeds of more than 150 miles an hour in flying between our principal cities.

According to an official of the U. S. Bureau of Air Commerce, transport aircraft weighing 83,000 pounds are now under construction in this country, and one of America's leading aeronautical companies has been engaged lately in designing one that will weigh 186,000 pounds—93 tons. Before the end of 1939 we shall probably have in service transport planes capable of making in excess of 200 miles an hour when driven by four motors and of accommodating 40 passengers. Our transpacific flying boats have a dead weight of 50,000 pounds, and for more than a year have been making regular passenger and cargo runs. Not so long ago the Pan American Airways System asked for bids from eight American aircraft builders on three or more machines each to carry 100 passengers a maximum distance of 5,000 miles at speeds ranging—depending upon altitude—from 200 to 300 miles an hour; to have a pay-load capacity of 25,000 pounds for the complete distance; and to be equipped for a crew of sixteen. These figures indicate in gen-



TAKING A PLANE ABOARD—The drawing illustrates the crane on the "Ostmark" lifting a plane aboard for servicing. The vessel is equipped with a wide canvas strip that can be unrolled and towed astern to serve as a ramp on to which a plane can be taxied in case the ocean is too rough to permit it to approach close enough to be picked up. The photograph shows a plane hoisted aboard the "Schwabenland" and placed on the turntable. The air-operated catapult which will launch it is shown at the right.



eral terms how amazingly we have progressed in mechanical flight in the course of the last 34 years.

In the same period the aeronautical engineer has designed engines that have mounted steadily in power while being reduced in weight per unit of power, step by step. Today, instead of the crude 12-hp. engine devised by the Wright brothers, airplane engines are available that can develop 1,500-hp. each, while the newer cross-country transport planes and the bigger of the latest flying boats will be equipped with four motors, each ranging from 1,000 to 1,500 hp.

Whether the aircraft be of the transport or the seaplane type, the bothering problem in either case will be how to get it into the air at the take-off, especially when carrying a full pay load. Profitable operation of course demands that each shall have aboard a full passenger list and the maximum cargo. Commonly, both depend upon their own power and take-off speed to get them up and away. The land craft does this by an accelerating run on a prepared straight course of sufficient length, while the seaplane speeds along on the water until its velocity and the reactions of the air enable it to begin its flight. Fairly smooth water is essential to success, and waves and a strong wind may prevent its take-off, especially if full laden.

Just how pressing this problem is becoming was brought out recently by Col. J. Monroe Johnson, Assistant Secretary of Commerce, when dealing with some of the vital matters relating to our airports. After referring to the giant 40-passenger transport planes now building for service in the United States, he remarked: "We know that they will be heavier—that their inertia will be greater—that it is, therefore, unlikely that they can be accelerated to take-off speed so rapidly as the present craft—and that consequently they will probably need considerably longer runways for their take-offs and landings. . . . We know that some of the planes which served us well in earlier days could take off with a full load in less than 400 feet because the early engines were designed so that the full power output was operative at sea level. . . . But today an entirely different picture is presented. . . . Gradually, then, we have been wit-

nessing longer and longer take-off runs. And still longer ones appear to be looming just ahead of us. Even now, the 1,000-foot limitation on such runs, which was fixed by the Department of Commerce in 1929, is being pushed very close by many of the planes in use today. The need of an upward revision of that figure to facilitate operations of the planes of today and tomorrow has become so plainly apparent that a new regulation recently went into effect allowing some airline carriers a longer run in cases where the airport terrain and the airplane's performance are considered suitable."

Some important airports now have runways 3,500 feet long; but even 5,000-foot ones are advocated. Such runways may entail the acquisition of more property, and it is conceivable that that might be costly and even objectionable at certain places because of the upbuilt status of the neighborhood. It is not generally known that the Federal Government, municipalities, and commercial companies have conjointly spent fully \$342,000,000 on our airport system; and to accommodate the machines just built, as well as those under construction and planned, it will be necessary either greatly to amplify a few of the principal airports or to establish commensurate facilities elsewhere.

A novel solution of the problem of getting transoceanic flying boats into the air is offered by the Short-Mayo pickaback seaplane—a large and rugged 4-engined flying boat equipped to carry on its back another flying boat designed for long-distance operation. The mother or nether craft must have sufficient power and seaworthiness to effect a take-off from rather rough water and has to climb to a suitable altitude before releasing the flying boat—conditions being favorable—for continued flight under its own power. The mother plane then returns to the base port. In this way the long-distance seaplane would not be hampered by rough water in making its take-off and would be launched into the air with its maximum pay load and fuel tanks filled for the nonstop run. The fundamental shortcomings of this composite arrangement are that both planes must be in perfect operating condition to make it practicable and safe to launch the upper one, and that success hinges

upon complete cooperation between the personnels of the two craft.

People familiar with what the U. S. Navy has done to adapt the airplane to marine use will probably recall how our aeronautical experts of that service, as far back as 1912, wrestled with the problem of "shooting" a plane from the deck of a ship after an initial run of not more than 50 feet. Capt. Washington I. Chambers, U.S.N., then devised a crude air-driven catapult which, after months of experimenting, finally reached a stage where it was possible to project a seaplane with its pilot aboard into the air. The trial catapult was mounted upon a float, and the launchings took place when only a gentle breeze was blowing. Later, based on those pioneer efforts, men of the Navy developed mechanically efficient catapults that could shoot large seaplanes from the decks of vessels of the fighting fleet. They could be moved in an arc so that the aircraft could be launched against the prevailing wind to make the maneuver safe and effective. The naval catapult has successively undergone improvement during the intervening years.

Some of the speedy French and German transatlantic liners have been equipped with pneumatic catapults for launching seaplanes when several hundred miles offshore either to carry mail back to the ports of departure or to deliver it at the ports of destination hours in advance of the arrival of the boats. Another commercial and peacetime application has been in connection with the transatlantic seaplane service maintained by the Lufthansa-Condor Syndikat between Berlin and South America.

Profiting by their experience with old, adapted steamers, the Germans designed and built a ship especially for use in the tropical waters between Africa and South America to service the seaplanes flying between Berlin and Brazil. The *Ostmark*, as she is named, has an overall length of 245 feet, a beam of 37 feet, twin screws, and two oil engines, each of 900 bhp., which can drive her 14 miles an hour. The engines contribute to operating economy because no fuel is consumed when the craft is not under way. They are direct-coupled to the propeller shafts; and while this would ordinarily not

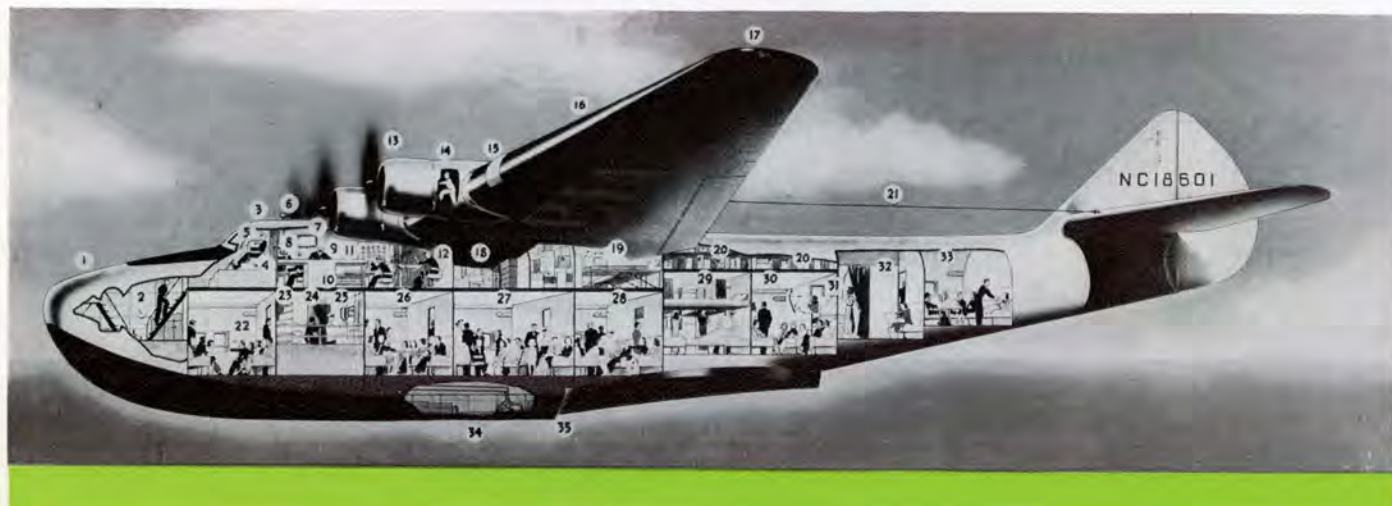
be good practice, the arrangement is satisfactory because the *Ostmark* is moving under power only during relatively short periods. She idles along the seaplane route, standing ready to serve an aircraft whenever needed.

A second seaplane-service vessel, the *Ostland*, has recently been completed. This craft is for the North Atlantic run and is much like the *Ostmark*.

A number of difficulties had to be overcome before it was practicable to pick up a seaplane and to put it on board the base ship. When the surface of the water is smooth, the aircraft can alight upon the sea and taxi within reach of the crane designed to raise it from the water. When the condition of the sea is too disturbed to permit this simple operation, then the mother craft tows astern of her a wide and strong canvas strip stiffened transversely on the underside. This is usually rolled up on a reel close to the vessel's square stern. The sail is unrolled and dropped overboard as the ship travels slowly ahead, and may reach out behind for a hundred feet or so. The lower side of this strip is fitted with pockets that face toward the craft. As the vessel advances, these pockets open and act like sea anchors, gripping the water and stretching the canvas taut so that it will serve as a ramp upon which the seaplane can settle. It does this by taxiing into position just before the ship increases her speed, which causes the canvas to rise up and to strand the flying boat upon it. As the canvas is wound in on the reel, the plane is dragged near enough to the motorship to be picked up by the crane. To offset the rise and fall of the seaplane on waves during the hoisting operation, which would cause alternate and sudden stresses on the lifting tackle, the cranes on the *Ostmark* and the *Ostland* are equipped with automatic controls that compensate for wave action and lifting speed. This was a problem that was only partly solved in the case of the earlier vessels adapted for base service.

When a plane is picked up it points in the same direction as the ship; but to get it aboard it is swung through a half circle, its bow then heading toward the stern of the mother craft. Therefore the plane is lowered

THE AIR LINER OF TOMORROW—Cutaway view of one of the six 42.5-ton flying boats being completed for Pan American Airways for trans-oceanic service. Each plane will be driven by four 1,500-hp. engines at a top speed of 200 miles per hour and have a cruising range of 3,200 miles. Fifty persons will be accommodated on long flights and 75 on shorter ones. 1—Anchor hatch; 2—Seaman's compartment; 3—Bridge where the flying controls of the liner are located; 4—First pilot; 5—Second pilot; 6—Radio-direction-finder "loop"; 7—Navigation compartment; 8—Radio officer's post; 9—Chart room—navigator's post; 10—Map case, marine library, drift sight bombs, flares, and navigational instruments; 11—Engineering officer, and mechanical engine and aircraft controls; 12—Captain's office; 13—Wright "Cyclone" 1500-hp. engines equipped with Hamilton constant-speed, automatic-adjusting propellers; 14—Mechanic's wing station; 15—Controllable landing lights; 16—Wing spread, 152 feet; 17—Navigation lights; 18—Main cargo hold which extends into wing; 19—Crew's sleeping quarters; 20—Luggage holds; 21—Over-all length of ship, 109 feet (height 28.5 feet); 22—First passenger compartment with accommodations for ten persons; 23—Spiral staircase to bridge; 24—Men's retiring room; 25—Galley in which two stewards can work simultaneously and where food can be prepared for 85 persons; 26—Second passenger compartment for ten persons; 27—Dining lounge with accommodations for fifteen passengers; 28—Third passenger compartment for ten persons; 29—Fourth passenger compartment for ten persons, illustrating method of making up berths for conversion of air liner into ocean sleeper; 30—Fifth passenger compartment for ten persons; 31—Ladies' dressing room; 32—Sixth passenger compartment; 33—Private cabin suite; 34—Fuel pumps for transferring fuel from seawings to wing tanks; 35—Auxiliary hold.





PASSENGER-SHIP CATAPULTS—Several of the speedy French and German liners are equipped with catapults for launching small planes that carry mail back to ports of departure or speed it to ports of destination in advance of the arrival of the ships. These pictures were taken on the "Bremen" and the "Europa."



on to the catapult car, which at that stage rests upon a turntable that permits swinging the plane around and pointing it toward the bow of the vessel ready to be moved forward on to the catapult track.

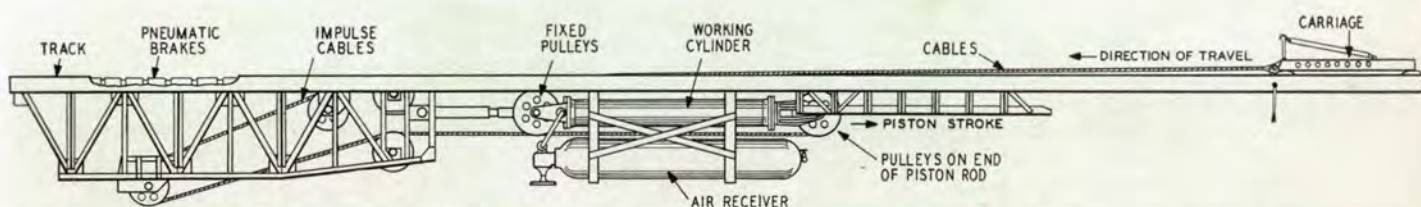
The essential mechanical operating features of the catapult are a compressed-air-driven piston which has a stroke of approximately 17.5 feet, a piston rod connecting with multiplying pulleys and ropes, and the launching carriage to which one end of the towing tackle is secured. The arrangement of the blocks and ropes makes it possible for the movement and speed of the piston to be increased in the ratio of 1 to 6 in pulling the carriage forward. The air that actuates the piston is stored at a pressure of 2,275 pounds per square inch in a receiver placed beneath the catapult runway, and is delivered to the driving cylinder which is directly above the receiver. The cables of the catapult are tautened just before launching to obviate any jerking motion. This is done by admitting air to the cylinder at a pressure ranging from 114 to 142 pounds per square inch.

When pressure is applied for catapulting, the admission of the air to the cylinder is governed so nicely that acceleration reaches the desired maximum after about two seconds—the entire run of the carriage being effected in approximately $4\frac{1}{2}$ seconds. Just before the end of the stroke, cushioning air is by-passed to the advance side of the piston and the stroke thus gradually reduced to zero without shock. The maximum force developed by the piston is 518 tons. The acceleration imparted to the seaplane is $3\frac{1}{2}$ times that of gravity, and the maximum velocity reached is 93 miles an hour. The catapult on the *Ostmark* can launch a seaplane weighing as much as 16.5 tons and at the same time move the launching carriage, which weighs nearly 2 short tons. The total weight of the catapult, its associate apparatus, and the compressor plant is close to 105 tons. The aircraft is securely held in position on the catapult

carriage until climbing speed has been imparted to it. Then it is released by tripping gear, actuated by a ramp placed near the end of the runway. There are various interlocking controls that prevent any interference with sequential operations; and most of these are brought into play pneumatically. The catapult can be tested to make sure that it is fit for action without actually launching a plane; and communication can be maintained between the catapult operator and the seaplane pilot up to the instant of starting. The importance of this will be readily grasped.

The catapults aboard the *Ostmark* and the *Ostland*, as well as those carried by the German transatlantic liners *Bremen* and *Europa*, were constructed by the Ernst Heinkel Flugzeugwerke, at Rostock, Germany. That concern has been engaged in designing and building catapults for more than a decade. Dr. Heinkel, after much experimenting, decided that compressed air is superior to both explosives and electricity as a motive medium for catapults. He found that compressed air offered greater construction possibilities, and he also proved to his satisfaction that it permits of much nicer control of the starting operations.

In the face of the situation developing at our airports where longer and longer runways will be needed to enable the bigger planes to effect their take-offs by initial accelerating runs, it would seem that the catapult offers a better, more economical way of overcoming the difficulty.



THE HEINKEL AIRPLANE CATAPULT—With this apparatus, a plane weighing 15 tons or more can be brought up to a speed of 93 miles an hour during a run of 103.5 feet that lasts only $4\frac{1}{2}$ seconds. Compressed air, held at 2,275 pounds pressure in the receiver, is admitted to the working cylinder and drives its piston forward. By means of multiplying pulleys and ropes, the speed at which the airplane carriage is drawn is increased until it is sixfold that of the piston speed. Just before the piston reaches the end of its stroke, air is by-passed to the forward end of the cylinder, thereby cushioning the stroke and stopping the piston without shock. The aircraft is automatically released from the carriage when it has attained climbing speed, and the carriage is brought to a stop by the deceleration of the piston and by pneumatic brake blocks near the end of the runway.

The Lufkin Line

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FIRST QUARTER, 1939

No. 1

Confucius once said: "I love the past, but I often doubt whether it is as good as the future." Too many people are content to sit and mourn for the good old days instead of eagerly awaiting the exciting adventures the future has in store for us.

Live within your means. One of the swiftest toboggans I know of is for a young man just starting in life to get into debt. *John D. Rockefeller.*

We do not count a man's years until he has nothing else to count.

—Emerson.

I believe, in spite of adverse forecasts, in trying new lines of research, however unpromising they may seem at first. —Marconi.

Every one complains of the badness of his memory, but nobody of his judgment. —La Rochefoucauld.

"Just enough to get by" isn't good enough. It's the man with reserve power . . . something more than he needs normally . . . who wins.

—Williamsburgh Savings Bank.

When thy hand has done a good act, ask thy heart whether it was done well. —Fuller.

Take your luck too much for granted, and there's just a chance that your luck may run out on you some day.

—N. Y. Daily News.

RECUPERATING

Nurse: "I think he's regaining consciousness. Doctor; he just tried to blow the foam off his medicine."

BURNS BOTH ENDS

Teacher: "Who was the smartest inventor?"

Pupil: "Thomas A. Edison. He invented the phonograph and radio so people would stay up all night and use his electric light bulbs."

—Think.

A CURE FOR HAY FEVER

Three years ago an Abilene man, a hay fever victim for years, began attending Sunday school. He has not had hay fever since. Which may be worthy of consideration among the large number of sufferers who have tried everything else.

Horton (Kan.) Headlight.

Advertising is a human institution. It is an offspring of the human mind. It is no better or no worse than the

individual man responsible for its use. —J. W. Darr.

SHARPEN THE HORNS

Clerk: "I'm to be initiated in the local lodge tonight and I'm scared stiff."

Foreman: "Why?"

Clerk: "About a month ago I sold the local president my second-hand flivver."

No matter how tough you may appear to be, there's always some one who can top you. A trio of section hands out west dropped in at the only hash house in town for an evening dinner. Seeking to impress the waitress with his he-man qualities the first ordered a steak "as thick as me two hands." Well, that was pretty good till the second man spoke: "I'll take a steak too," he said. "Make it thick—THICK AND RAW—it's got to be drippin' with blood or I'll have none of it." The third man wasn't to be outdone. He said: "Just drive the steer in here, gal, and I'll bite a hunk out of it."

Then, there was the traveler who asked a native in a remote region of the Ozarks if he didn't have trouble getting the necessities of life in that inaccessible spot.

"Yes, we do," said the mountaineer, "and half the time we do git it, it ain't fit to drink."



STAGE STAR MEETS NEW SCREEN "FINDS"—Vivienne Segal, musical comedy star of "I Married An Angel," meets "Grease Boy" and "Miss Polish," two of the unique rubber puppets to be featured in a brand-new type of Technicolor puppet film being produced by Joseph Losey for the Petroleum Industry Exhibition at the New York World's Fair, 1939. Newly developed stars in a film expected to be as revolutionary as was "Snow White," these 8-inch rubber puppets "the Pet Roleum Cousins," are flexible enough to express the whole range of the emotions. "They make possible a film comedy medium possessing all the appeal of the animated cartoon, but with three-dimensional depth and with greater mobility," according to Mr. Losey. Animation in the film is secured by moving the puppets fractionally from one position to the next. The figurines and settings are designed by Howard Bay, theatrical designer, and created and animated by Louis Bunin, noted puppeteer. In the background is shown part of a working model for the "Modern City" setting for the film's later sequences, with New York's skyscrapers.

a Lufkin "NATURAL"

FOR SHALLOW PRODUCTION

LUFKIN TC-55-7A ASSEMBLY

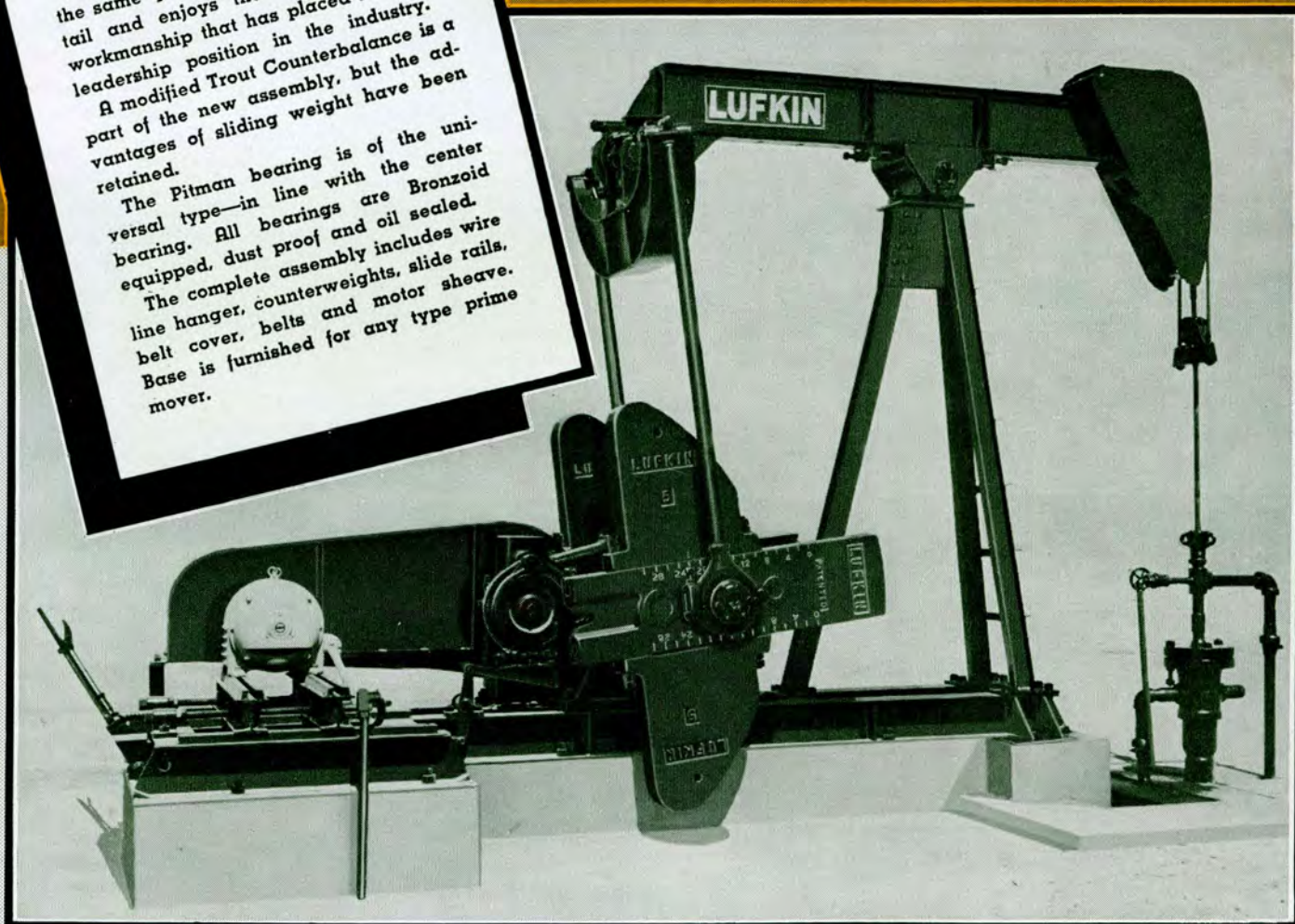
Polish Rod Capacity: 10,000 Lbs.
Strokes: 22", 32" and 42"

Gears: Double Reduction Herringbone
Rating: 11.1 Normal A.P.I. H.P. at 20 S.P.M.

Weight: 11,660 Lbs. Complete

The new LUFKIN TC-55-7A unit assembly is believed to be a "Natural" for a small, but very economical and substantial unit for shallow production. Designed after the fashion of the larger Lufkin units, this assembly is made of the same quality materials in every detail and enjoys the same degree of workmanship that has placed Lufkin in leadership position in the industry. A modified Trout Counterbalance is a part of the new assembly, but the advantages of sliding weight have been retained.

The Pitman bearing is of the universal type—in line with the center bearing. All bearings are Bronzoid equipped, dust proof and oil sealed. The complete assembly includes wire line hanger, counterweights, slide rails, belt cover, belts and motor sheave. Base is furnished for any type prime mover.



Other Popular Lufkin Shallow Production Units Include:

LUFKIN TC-66-5A
LUFKIN TC-77-3

POLISH ROD LOAD 8,000 LBS.
POLISH ROD LOAD 6,000 LBS.

LUFKIN PUMPING UNITS

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