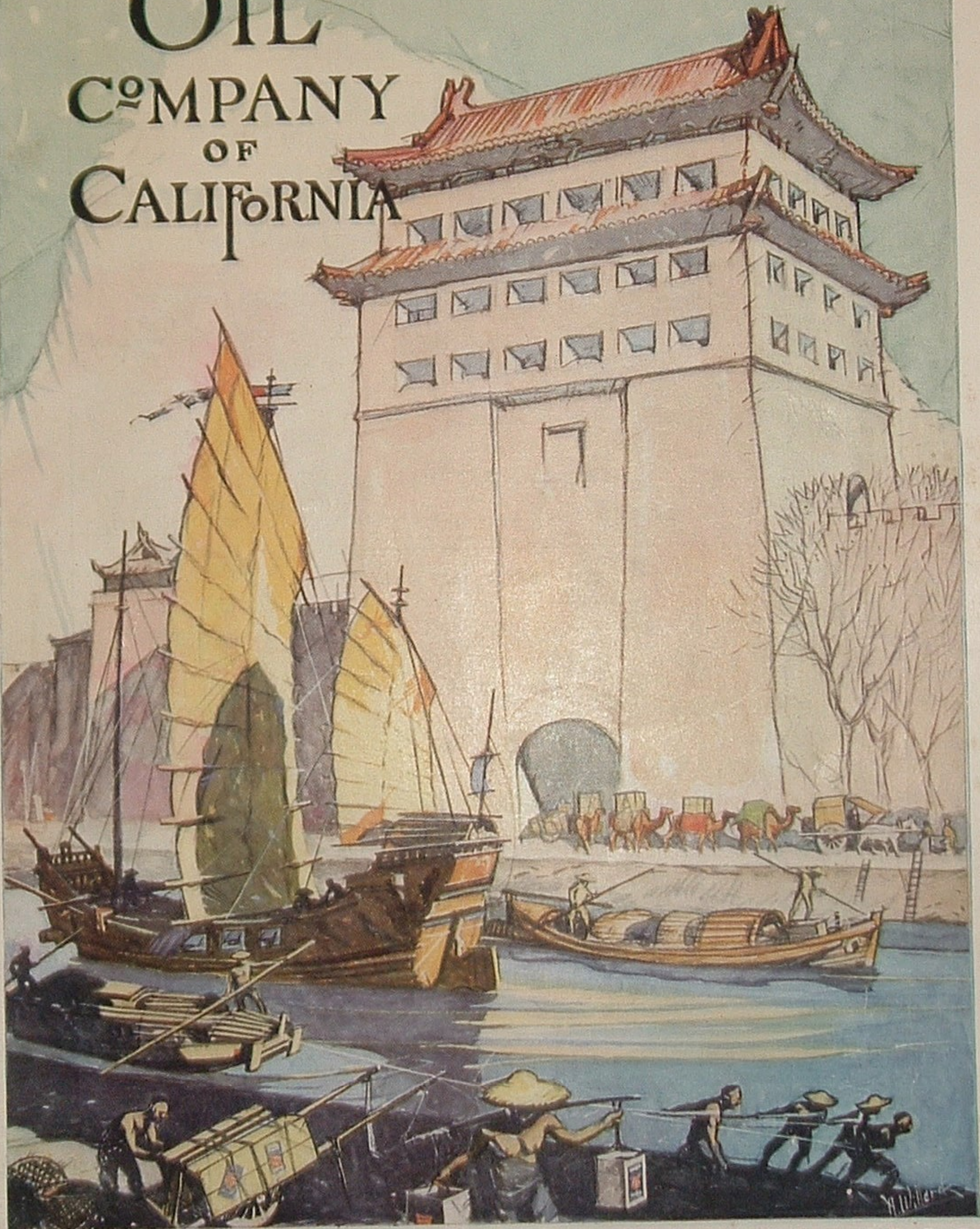


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UNION OIL COMPANY OF CALIFORNIA



BULLETIN NO. 19 SEPTEMBER 1922

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Union Oil Company of California



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VOLUME 2

SEPTEMBER, 1922

BULLETIN NO. 19

More About Oil Shales

BY A. S. CROSSFIELD

In the January issue Mr. Burnham very interestingly told the readers of the Bulletin some of our experiences in Colorado and Utah in examining different areas of the vast shale deposits of the Uintah Basin. In that article it may be recalled that he spoke of our being stimulated in overcoming some of our difficulties by the thought that we were doing a pioneering work. The acts of a



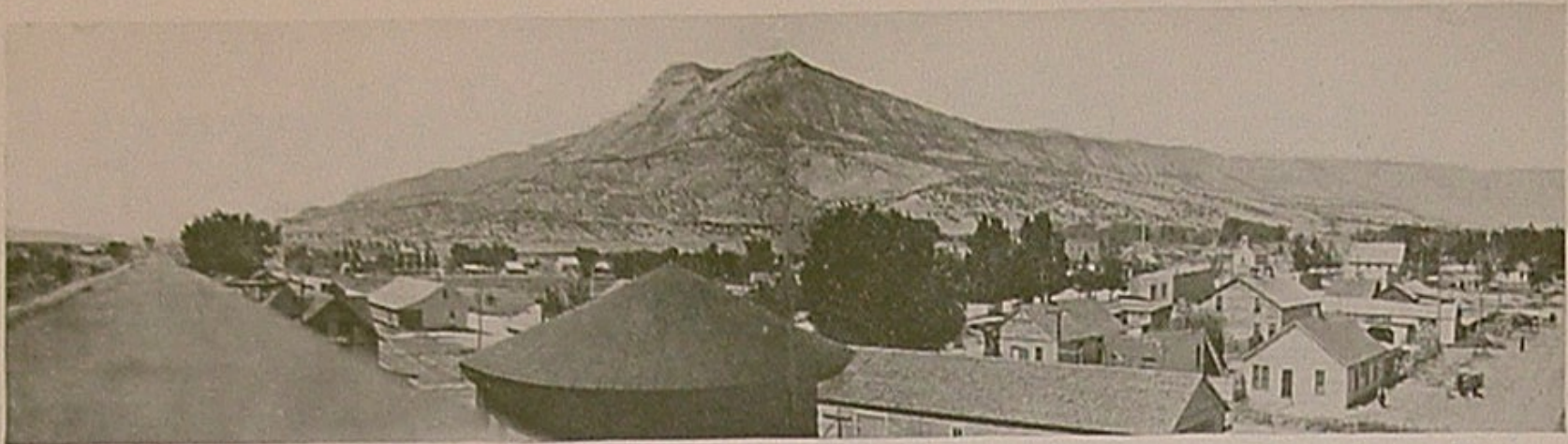
pioneer are always worthy of considerable praise, yet I do not wish to be seeming to seek any commendation when I say that the purpose of communicating the meager knowledge that I have was fostered by the hope that it might serve as one more tree blazed in the untrod wilderness of information concerning oil shale. Meager it will be, for even at that time when our children's children shall have conquered parts of the forests and have passed to "that bourne from which no man returneth," there still will be new areas to track, to map and to till.

In the early part of 1920, the directors of the company recognized that the time was ripe to augment their petroleum properties with a reserve for the future in the form of oil shale lands, concerning which considerable had been published by the various

government bureaus. All such lands were in the public domain, though a considerable and the most desirable portion had been located as mining claims by many different people and were held by them under possessory mining titles. Accordingly a scout was sent into the shale field to round up those properties, titles to which were for sale. After a few months' work he reported the results of his investigations which covered, among many others, certain properties in the vicinity of the Forks of Parachute Creek, Garfield County, Colorado. I shall more or less confine my remarks to the shale deposits of this district, as it is with them that I am most familiar, and as they are the ones to which the company eventually secured title.

The Company, having received the preliminary report, sent Mr. Burnham and me into the fields to make detailed geological and chemical examinations of the various deposits on properties recommended. We accordingly proceeded to Denver (all roads of the Rockies lead to Denver), and there we decided to make Parachute Creek our first objective. Early one morning, after an all-night ride from Denver, we reached the little town of Grand Valley, situated on the western slope of the Rockies.

There we were met by Mr. Joseph Bellis, the pioneer of the shale fields, who perhaps has done more than any other individual to bring before the people of the country the



MOUNTAIN OF SHALE - GRAND VALLEY, COLORADO

knowledge of the enormous treasures that are locked up in the shale fields of Colorado; Joe Bellis, who years ago made an excellent paint from shale products, who, not satisfied with that start, produced a more or less satisfactory rubber substitute, and who, when we met him, had recognized the excellent structural qualities of the shale rock itself, and had taken slabs of it, put them in a lathe and had turned out some remarkable products, among which I recall automobile battery boxes of great strength and resistance to acid corrosion, automobile steering wheels of beautiful patterns, large petticoat insulators for high tension power lines and excellently carved pieces of furniture, the most beautiful of all being a table top which, for texture, beauty of polish and graining, could hardly be surpassed even by the best of the hard woods of the Orient. Let me recommend that, if you are going to the shale fields, you see Mr. Bellis, for with the wonderful hospitality of the true Coloradoan, he will take you in and will give you of whatever he has, whether it be entertainment or information on shale. After having met and chatted briefly with other shale pioneers of the little settlement, Mr. Bellis asked us

what our pleasure was. As it was rather early in the morning, we innocently ignored the invitation and asked to be shown some shale. Swinging his arm in a semi-circle, Mr. Bellis said, "Look, all that you see is shale."

Towering hundreds of feet above us at a distance of only a few miles on the west, north and east, were lofty, yellow and gray precipitous cliffs, approached by rapidly rising cut slopes of varied colored sandstones with a predominating hue of red. The upper edges of these inclined approaches were covered with the yellow talus debris, which had fallen from the cliffs above. A spectacular, awe-inspiring view it was, and I must needs unpack my kodak and attempt to preserve several poor semblances of the scene.

Mr. Bellis pointed to an apparent break in the continuity of the cliffs, and told us that there was where Parachute Creek cut through. We, vain in our blase urbanity, wondered "why, Parachute?" and immediately sensed the East Side vaudeville answer of "because of the water falls or because the creek comes down." Clever? It was not. An artist must have named Parachute, for soon we were told the answer to



MORE SHALE - MILES OF CLIFFS FROM GRAND VALLEY

the riddle. Again Mr. Bellis pointed (he must have sensed our inquisitiveness) and called our attention to several small rounded domes scattered over the valley floor which, in the bright sunlight, reflected a kaleidoscope of perfectly blended colors and asked of what they reminded us. Burnham beat me to it with a quick "Circus Parachute," and, indeed, that's what they were. Nature had so carved and smoothed over these domes of many colored sandstones that they appeared as gracefully fallen parachutes just before they collapse upon the ground.

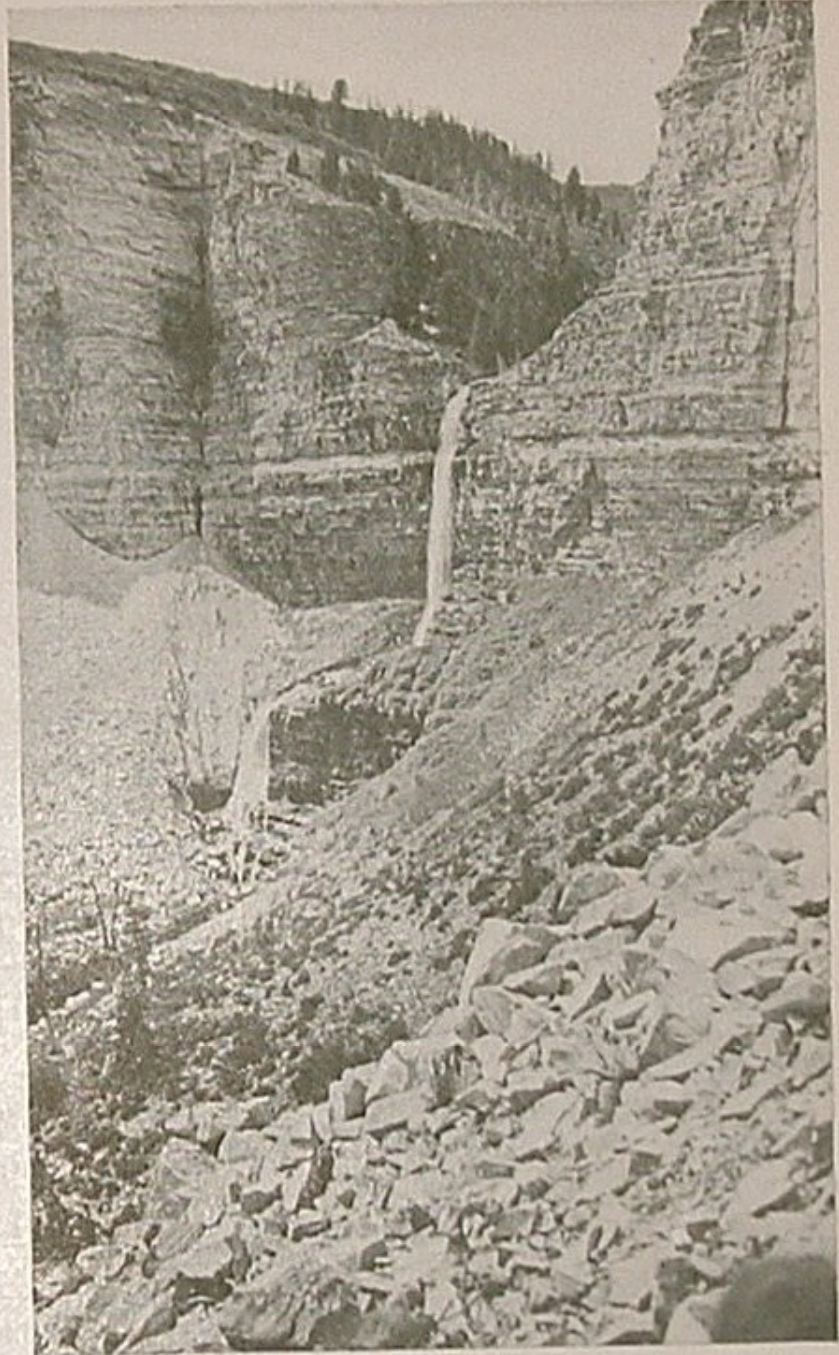
For some time we gazed, but as we were not there on a sight-seeing party, Burnham suggested that we get a "close up" of the shale (he is of the South and speaks the language). So, under the guidance of Mr. Bellis, we motored up Parachute Creek for about six miles, where we stopped and our attention was called to a sharp horizontal line of demarcation in the appearance of the soil on both sides of the valley. Below the line the color was a distinct dark red, which we were told was characteristic of the red sandstones of the Wasatch formation, which contained no oil forming material, but above that the yellows and grays that we saw extending upwards for about two thousand feet were the oil shales of the Green River formation, hardly an inch of which did not contain material from which oil could be produced. Mr. Bellis asked us to look carefully and we could see about a thousand feet above the red sandstones a dark layer, which appeared to be about two feet thick. It was easy to detect this stratum and we could follow it with the eye for miles on either side of the valley. This we were told was about 25 feet thick and was known locally as the "pay bed," consisting of "mahogany," or "lignum vitae" shale, so called because of its close resemblance in appearance and characteristics to a very hard wood. It was supposed to be the richest shale of the district and was variously reported to yield from 40 to 100 gallons of oil to the ton.

Again we resumed our way and in a short time came to a broadening of the main valley where the creek branched into three forks through still narrower valleys which finally ended in precipitous cliffs and usually in very picturesque water falls.

Because of the wild beauty of this spot it was remarked that it would be a delight-

ful place for a camp. Little did we think that the wish which prompted the remark would be realized and that here we would build a camp which would be our quarters and home for many months.

At this point we abandoned the automobile and took a tortuous trail up the side of the cliffs. Layer after layer of oil shale of all degrees of oil content were passed over until we reached the "pay bed," and here we were well rewarded for the work

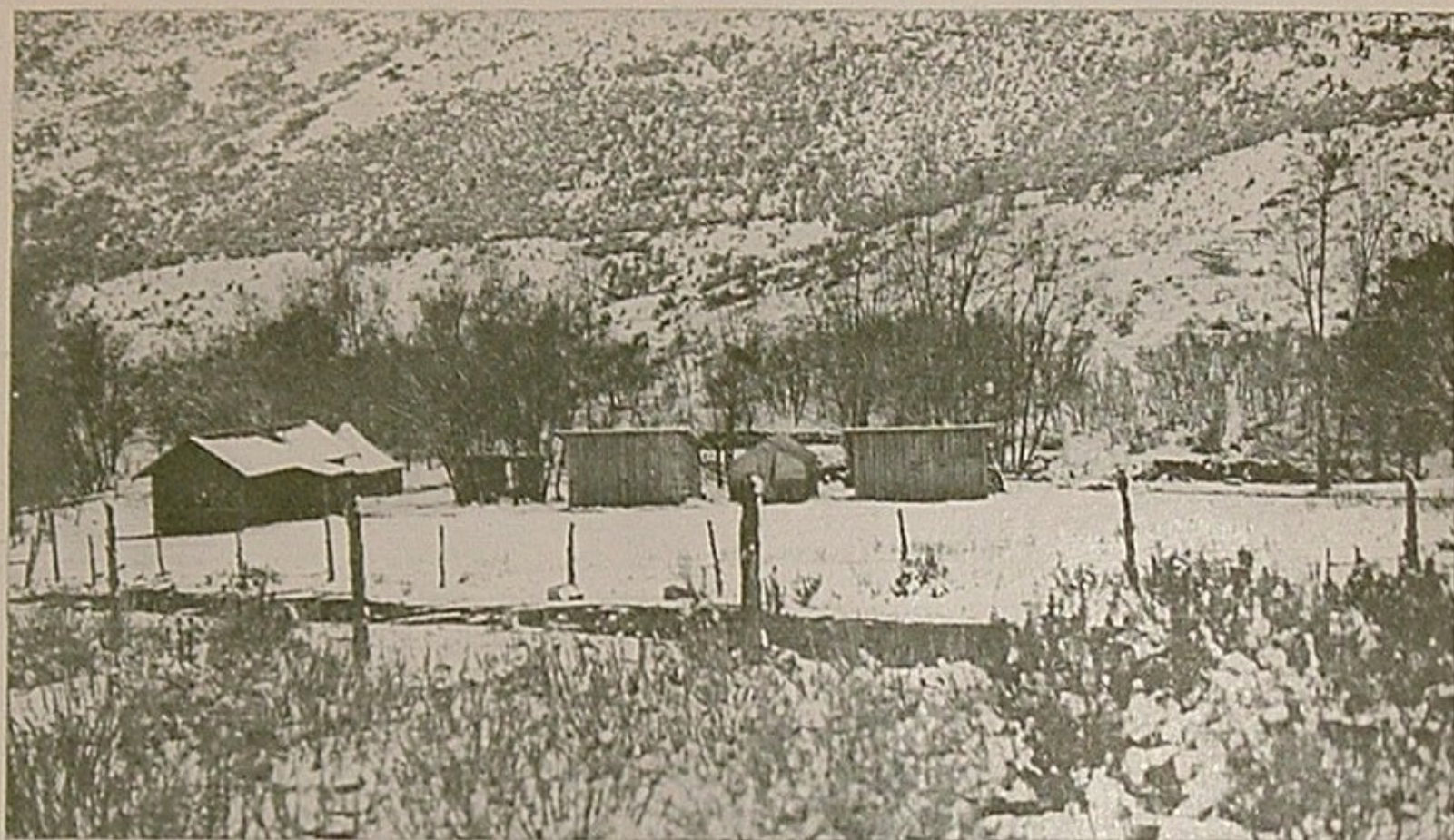


FALLS OF PARACHUTE CREEK

and perils of the climb. Little had I realized that there could be anything beautiful in a rock, but the mahogany shale is all of that. On the weathered surface it takes on a rather dull blue color, due to the action of the elements, but merely scratch the surface or rather knock off a projecting point and observe the fresh surface. A jet black it is in color, with glistening, satiny striations running through it, sometimes regularly but more often in wavy lines or in intricate curled designs. Scratched with a piece

of steel, it leaves a brown streak which emits a faint petroleum-like odor. Light it is in weight and when struck with a hammer it will cause the hammer to rebound as would so much hard rubber. It splinters much like wood and a sliver of it will ignite easily from a burning match. In large masses it burns with a most intense heat, and, indeed, it has been used locally for many years as a fuel. The high ash content, however, does not make it particularly desirable

proposition at all. I could merely answer, "ye-ah?" with, I know, a vacant expression on my face, for I thought I had seen nothing all day but wonderful evidence of the mighty forces of nature acting through countless geological ages and I so expressed myself with another questioning, "ye-ah?" Burnham noticed it, and immediately qualified his statement by saying that there were excellent examples of geologic action, but that it was all very simple.



UNION OIL SHALE OFFICES - HOME OF BURNHAM AND CROSSFIELD

for this purpose. In many places we observed indications of enormous fires having once occurred in the faces of the cliffs, fires probably started by lightning, but which the old settlers would have us believe were the signal and watch fires of Indians.

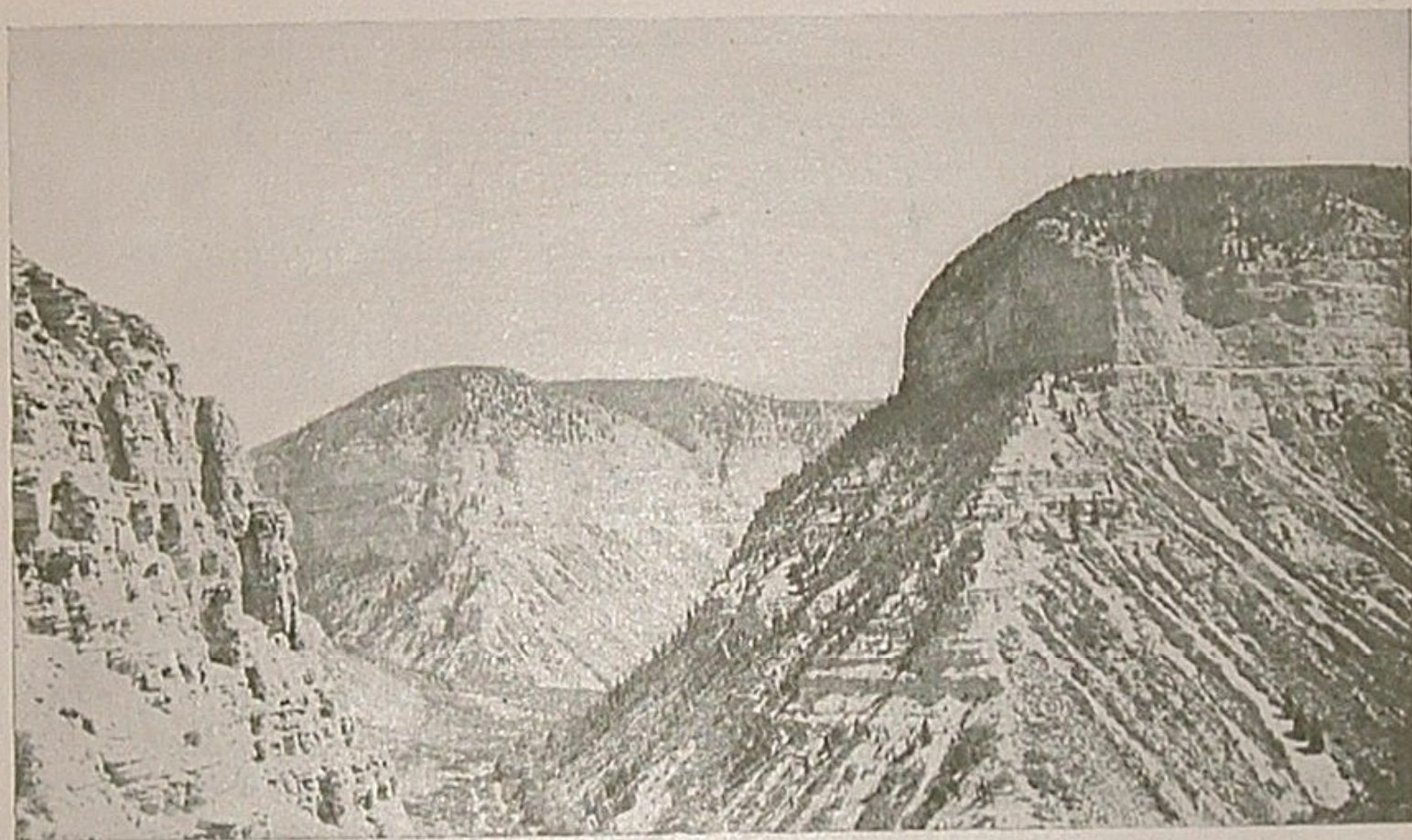
Having gained all that we could by such a brief examination, we returned to Grand Valley convinced that there was "some shale" in Colorado. Burnham had been particularly observant all day; he was seeing mountains, reviewing enormous ages, picturing the formation of the valleys, changing worlds, peopled by strange beings and then correlating all these things to an idea that would answer our immediate problem of desirable shale properties. That evening at supper, and we did enjoy it for an appetite produced by the violent exercise of climbing shale cliffs particularly adds to the delicacy of a piece of tender venison, he remarked that there was no geology to the

He then gave me a very instructive discourse in petroleum geology which I shall endeavor to repeat as he told it to me. If a geologist recognizes errors in the description, will he kindly blame it on my faulty memory, for I am fully confident that the information as given me was exact and true in every detail.

"Countless ages ago the surface of the earth was no more level than it is today, mountain ranges existed and parts of the surface were under water. Depressions occurred here and there. Into these depressions water flowed, sometimes salt and sometimes fresh, carrying with it enormous quantities of the material eroded from the surrounding drainage basin, just as the Missouri River today is largely mud. With the dirt and clay carried along there was a great deal of the remains of vegetable life, both macro- and microscopic, bacteria, insect life and even large animal, bird and fish life. All this material settled quietly to

the bottom of the basin and in the silt formed and in the waters above more life grew, only to die and settle to the bottom to add to the ever-increasing amount on the basin floor, there protected from the air and ultimate rot and decay. Such deposits vary greatly in age, some having occurred in the earliest of sedimentary ages and some in the most recent. Finally, after thousands of years, the pressure of the overlying material and the internal heat of the earth, or perhaps other forces, would convert these large quantities of organic material into petroleum. It is not the time here to discuss the details of the processes nor to go into the geodynamics which resulted in oil fields as they are known today, but to give a short

carried, because of some inhibition on organic growth, practically nothing but sand, which was deposited on the basin floor. Anticipating a little the processes, those are the sands which Mr. Bellis pointed out to us today as the Wasatch formation. Then clays gradually took the place of the sandstones, the organic material gradually increased and there were begun the depositions which were later called, and which we saw today, the Green River shales. Year by year, age by age, and period by period, this deposition went on affected by seasonal changes of the periods of times which explains the strata of different shales which you saw today, but with an ever-increasing amount of organic material until the maxi-



PERPENDICULAR SHALE SIDES OF PARACHUTE CREEK

account of the origin of petroleum and how it applies to shale, though, as you will shortly see, it is an Irish method of proving a corpus delicti of a father by the existence of a son. At one time the areas of northwestern Colorado, northeastern Utah, and southwestern Wyoming were included in one of these depressions which we have come to call the Uintah Basin. It was all under water and into it large streams flowed, from what sources is not of any moment now, probably from different sources as the ages progressed. Of the earlier depositions there was probably coal forming material (a fact which we later ascertained was probably the truth). In fairly recently times, the waters

reached in the mahogany shales of the pay bed, which today contains nearly 50 per cent as the residue of organic life. From here on until the latest depositions the amount of organic life slowly decreased but has never entirely disappeared. For very long times these depositions continued until there was a total thickness of more than 3000 feet and then there was another change and a new formation started with which we are not concerned, as it doesn't appear in this locality. Now we come to the difference between petroleum and shale, or rather the organic material in oil-shale. As the original organic material from which petroleum was derived was subjected to

pressure, so has been the material in oil-shale, but the oil-shale material has never been subjected to the intense heat of the earth (and perhaps other agencies), as was the parent substance of petroleum and, consequently, we find no oil in oil-shale at all, but only the remains of organic life which, when subjected to heat, will produce an oil very similar to the petroleum that we obtain from wells. Therefore, the organic material in shale is the parent of petroleum. This idea is contrary to the opinions of some eminent authorities and approved by some others, but at any rate, it serves as a good working hypothesis. Later, through geological disturbances this basin was drained dry and there started the erosive forces of nature whose work we have seen today in the deep valleys cut down through the Green River and Wasatch formations." "Now," he told me, "you can see that the geology is simple," and I guess I had reached the neolithic age of understanding. "It is in fact so simple that there is no work here for a geologist."

The next day he returned to Denver to investigate the mining and other engineering problems and to direct the necessary legal and other business procedure incident to the acquiring of any properties decided upon.

I had with me suitable apparatus for testing the shale in the field for oil content. It was very simple, consisting merely of a small iron boiler or retort in which I could cook the shale by means of heat from an ordinary plumber's torch. Through the application of the heat, the organic material of the shale, called "Kerogen," by the Scotch, that is "kerosene-generating," was converted into oil and escaped from the retort like steam from a teakettle to be condensed again to oil by leading it through a pipe cooled by contact with water.

After employing a fine old character by the name of Pete Lindauer as guide and helper, I set out to collect samples of the shale. My first effort was to concentrate on the so-called pay bed, so that if it panned out according to reports, the property could be considered as quite valuable. Up and down the forks of Parachute Creek we traveled for miles, ascending every now and then to the mahogany shale in order to secure a sample. Regardless of where we went over an area representing 40 to 50 square miles, we always found the same bed of shale at elevations almost exactly the same above

sea level. Occasionally there would be very slight variations, but in general it was marvelous how uniform the deposition had been. Loaded with a large number of samples, we returned to a temporary camp, where the retorts were set up and the samples were subjected to distillation. Sample after sample yielded oil always in approximately the same amount, which converted into understandable figures was equivalent to about 39 gallons of oil per ton of shale. With the oil produced there was always a large amount of combustible gas, which later investigations showed was equivalent to about 2500 cubic feet for each ton of shale retorted. The residue in the retort was a light black substance, containing still some organic material which, however, was incapable of producing more oil, but which might serve as a low grade fuel or be used in a gas producer to generate gas much the same as coal is used. With the oil there was always condensed a small amount of water containing ammonia compounds which are of great value as fertilizers. After several months of examination of the pay bed, we were convinced that our first examinations were confirmed and that the bed extended uniformly for miles in all directions without any great change in the amount of oil that could be produced from the shales.

With the above part of the examination completed, we then set about to discover if there were strata other than the pay bed which might be of value. Suffice it to say that of the 2300 and more vertical feet that we examined there were no strata which would have commercial interest at the present time, though there was hardly a foot of the whole deposit which did not contain some oil-forming material. Occasionally a narrow stratum would be encountered which had a very high oil content, one instance being recalled in which a yield of 91 gallons of oil per ton of shale was obtained.

Samples of shale were sent to the Oleum laboratory, where more complete examinations could be made than were possible in the field. We were agreeably pleased to have our field results confirmed even to the extent of obtaining slightly higher oil yields, so now we can conservatively state that twenty feet of the mahogany bed will yield at least a barrel of oil to the ton of shale. While in the field we had heard numerous reports of the value of shale in precious

metal and potash content, but we have not been able to confirm these reports. In the main, we were interested only in oil, and conclusively demonstrated that enormous quantities of oil can be produced from shale but we have yet to show how good the oil is.

The investigation of the quality of the oil has not been gone into very extensively, though it can be said that the crude oil is not as good as petroleum, but that from it the same products of as good quality can be made as can be obtained from petroleum. Refining losses and costs will be greater on the assumption that the same methods will be employed.

Once before I have enthusiastically discoursed on the value of shale and, at that

time, was stumped by the question from one of my audience to the effect of "Yes, there is all that shale, but what are you going to do with it?" That is the problem, for up to the present time there seems to be no method of producing the oil from shale that will enable it to compete commercially with petroleum today. However, we can confidently expect that American ingenuity will devise a method when the necessity arises, and indeed, there is considerable talent being devoted to the problem at the present time.

I can no more fittingly close than by quoting an oft heard slogan of the shale fields to the effect that "Oil is King, but in Colorado there can be heard the lusty yell of an heir apparent."



PEAKS OF COLORADO ROCKIES IN WINTER

Cop—"You're pinched for going too fast."

Ford Owner—"What's the big idea? Doesn't that sign say 'Fine for speeding'?"

Whatever the weather may be, says he,
Whatever the weather may be,
It's the songs ye sing, an' the smiles ye wear,
That's a-makin' the sun shine every-
where.—Riley.

Chinese Methods of Transportation

BY WILLIAM HUNTER



The greatest single factor in the commercial development of any nation is its transportation

facilities. Hence to Americans the subject of such methods means a discourse on huge networks of railroads, thousands of miles of paved highways, millions of automobiles, fleets of great steamers, even aeroplane systems. These are the key points to our industrial advancement. Likewise the lack of these facilities indexes the absence of so many other common steps of progress in the country of the Chinese. To those interested in the petroleum industry a study of how China manipulates

the moving of her millions of inhabitants and the products of her millions of square miles is an absorbing one. You seem to be carried back a thousand years—yet you must face the fact that these are conditions existing today. The oil supply of the world will play a big part in giving this immense territory asphaltic concrete roads for its present mud sloughs and in replacing the human carrier, the barrow man, the camel, the cart and the river junk with motorcycles, trucks, automobiles, tractors and steamers of all kinds.

Dr. Hunter, who has written the following article for the Bulletin knows China as few Americans do. For the past thirty years he has been connected with educational and missionary work in the Far East.—Editor's Note.

Don't think I am going to tell you confidentially that the transcontinental rail systems of China cover the country more completely than those of any other nation; that the river boats make me ashamed of my homeland; or that every little China family house has its garage in the rear. China, unfortunately, is not Southern Cal-

ifornia or Kansas. Instead, I am going to take you right into the heart of great China and tell you how they do what you of America do in such vastly different ways.

The original and still the most popular method of transportation, of course, is to carry. Probably there is no language so rich as the Chinese in the various terms descriptive of carrying. Certainly it outstrips English. It provides a special word for each of the following methods: to take in the hand; to carry on the shoulders, on the back, the chest, or the arms; with one hand, or with a rope; one person with two packets suspended at each end of a pole; two persons with one packet suspended between them from a pole.

One terse, distinctive word describes each of these descriptive phrases, as well as many others, for I have only mentioned those bearing upon ways in which the burden is in some way attached to the person. They enumerate also the different methods much used in China for personal transporting of goods from one place to another. Thus the water carrier transports his 8 to 10 gallons of water from the public well to his home. The travelling tinker, the blacksmith, and the peddler of clothes and "notions" all use the same flexible *bien-dan* or pole as the water carrier, and to the sway of whose motions his steps are rhythmically regulated.

The latter named one-man department store, however, substitutes for the wooden buckets or tin oil cans two gigantic light wicker work baskets, covered on the outside with oil paper. In these he carries a veritable East Side variety shop of cloth, silks, threads, ribbons, scraps, and all the odds and ends which any properly constituted matron or maiden should desire.

This method is also used when a poor



TRAVELLING DEPARTMENT STORE
AND BIEN-DAN

man wishes to "flit." He puts all his pots and pans in one basket, his bairns in the other and contentedly trudges to and fro until he has transferred all his *lares et penates* from his old mansion to his new one. If the transfer be to a place of considerable distance he is content to turn the most of his belongings into cash, packing the more precious in one basket, and the unable-to-walk children in the other. With this balanced, swaying load he marches one hundred, five hundred, and often up to a thousand miles, sometimes begging his way, his small-footed wife hobbling along with a stick beside him—a mate but not a help on the journey. Sometimes, though not often, he lightens his burden by selling one or two of his children.

The vendor of stove hatched chicks (precursor of our incubator-hatched) will in the same way carry his stock in trade of a thousand dainty, fluffed charges around the country. The *bien-dan* remains unaltered but the containing package modifies itself according to requirements.

Don't be too scornful of these humble methods, for there is a rough ingeniousness in their construction and a man can carry a good deal a long distance. The speed made is good, too, the rate being fixed by

the resilient motion of the *bien-dan*. To illustrate—the man from whom we were accustomed to purchase our beef, mutton, etc., made a trip to a town on the Mongolian border thirty miles away, going one day and returning the next with from 100 to 120 pounds (net) of meat. Though well over fifty years of age he seemed none the worse for his journey, and in times when the demand for his products warranted it, he has maintained this schedule for weeks at a stretch with no idle days at all.

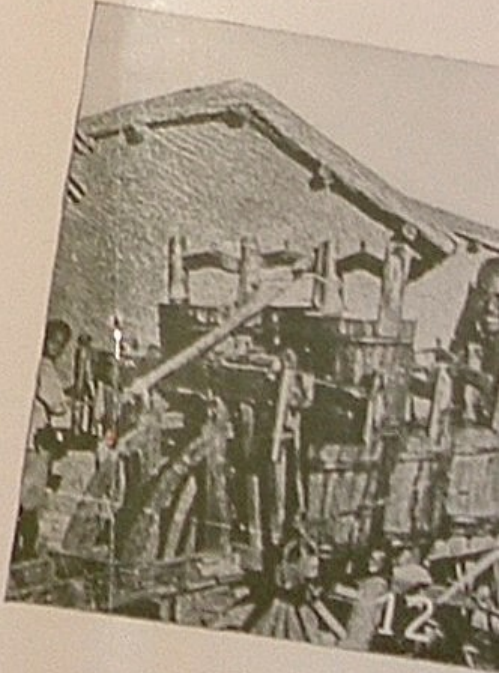
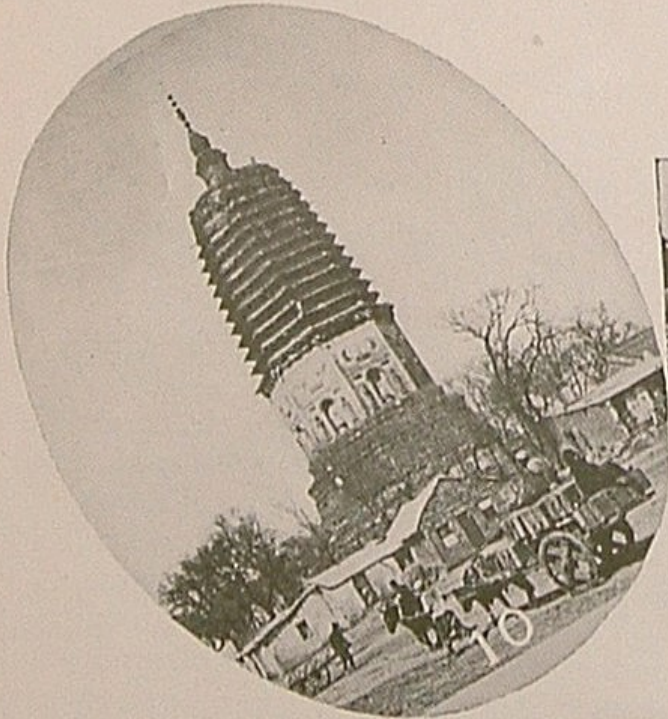
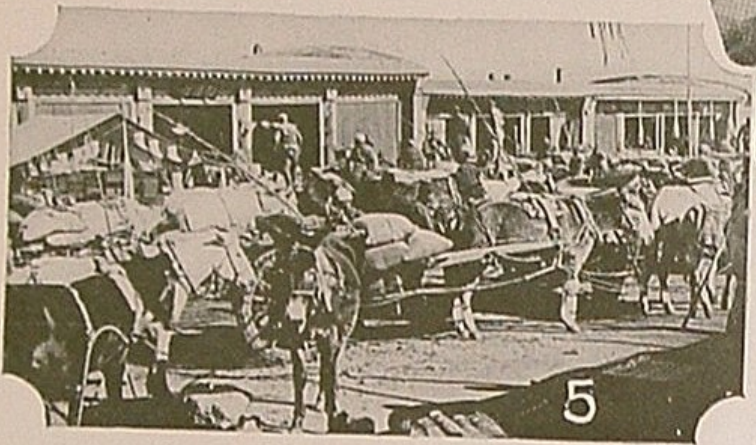
Next to carrying on the person, pack animals are the most common means of transport. All sorts and conditions of animals are pressed into service—ponies, donkeys, mules, camels, and in the mountainous country approaching Thibet, yaks. They are all well-trained beasts of burden. The leader of a train usually has a bell attached, and one man may have charge of five to fifteen animals, who obey his orders, generally shouted from the rear, where his own body and simple impedimenta form part of the burden of the last animal. A



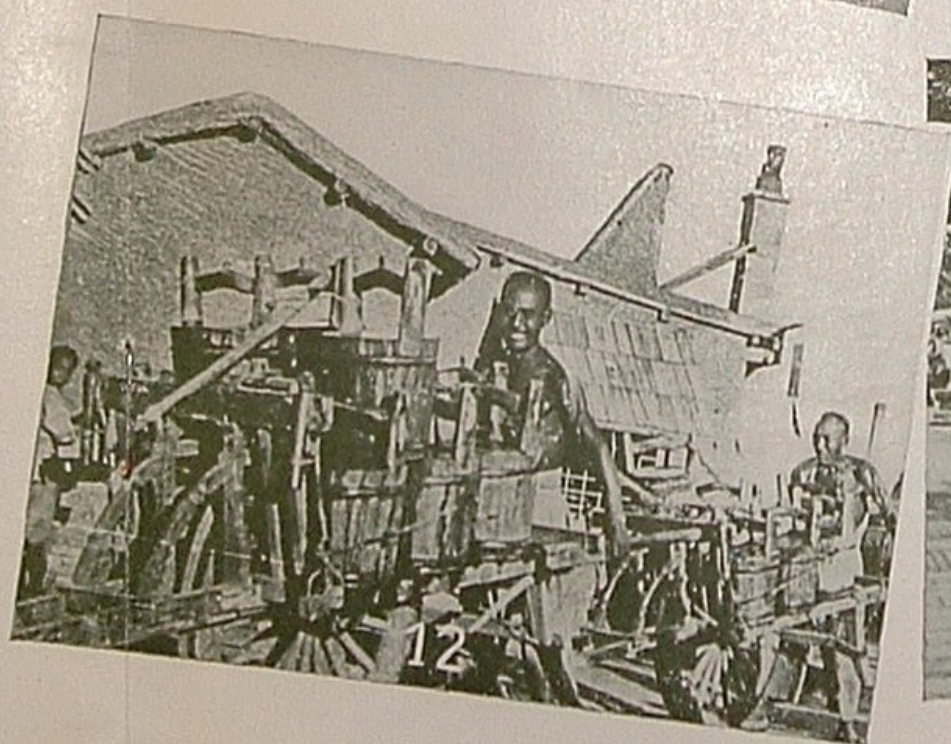
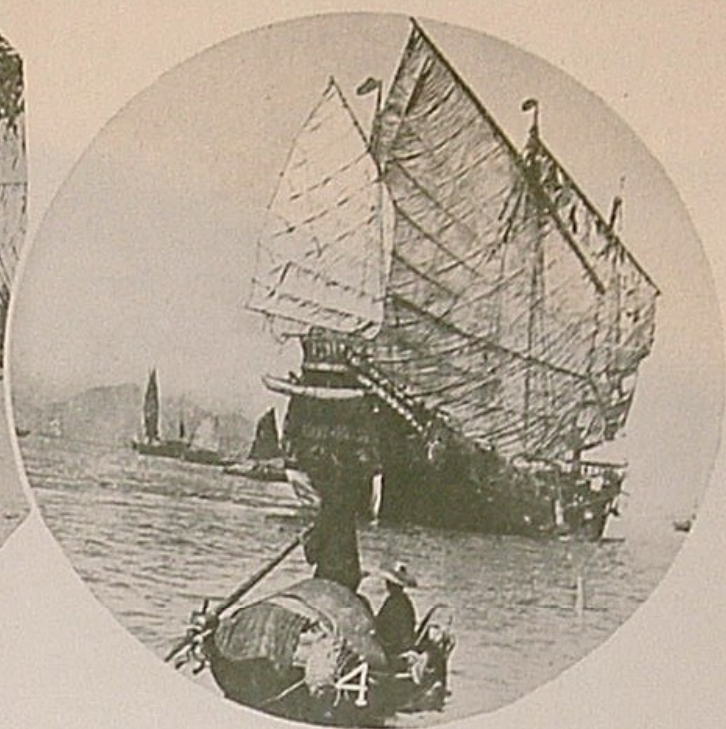
THE FAMILY'S PRIVATE CAR

fair load for a donkey is 250 pounds, a mule or pony 500 to 750, while a camel, with its stately, supercilious air, carries 800 or 900. However, if your humped carrier fancies himself overloaded he simply lies down and won't move further until his load is adjusted according to his desire.

The camel, too, is either more intelligent and wilful, or less intelligent than the other animals, for usually only two or three camels can be left under one man's care, and a rein must attach even these to each other. The other animals mentioned travel independently of each other and are guided by



1—CARAVAN PASSING THROUGH ANCIENT GATEWAY IN GREAT WALL AT HEAD OF NANHOW PASS, NORTH CHINA. 2—AMERICAN MISSIONARY AND FAMILY. 3—GLIMPSE INTO PAST AGES—ANCIENT CHINESE JUNK, CHINA SEA. 4—GLIMPSE INTO PAST AGES—ANCIENT CHINESE JUNK, CHINA SEA. 5—THE BUSY MARKET PLACE. 6—HOUSEWIFE BACK FROM SHOPPING TOUR. 7—STUDENTS. 8—STUDENTS. 9—STUDENTS. 10—OLD LIAY-ANG TOWER, MANCHURIA. 11—TYPICAL MANCHURIAN VILLAGER'S HOME. 12—WHOLESALE WATER DEALER, TIENTSIN. 13—WHOLESALE WATER DEALER, TIENTSIN.



ASS, NORTH CHINA. 2—AMERICAN MISSIONARY AND FAMILY READY FOR THE INTERIOR. 3—JUST PRIOR TO THE SUNDAY AFTERNOON SPIN. 4—A
6—HOUSEWIFE BACK FROM SHOPPING TOUR. 7—STUDY IN CHINESE FACES. 8—CHILDREN ON WAY TO WORK. 9—THE FARMER'S PROBLEM—TWO
HOME. 12—WHOLESALE WATER DEALER, TIENTSIN. 13—STONE IMAGES OF ANIMALS AT ROYAL TOMB, NEAR MUKDEN.

voice alone. They go long distances, and when travelling on known roads require little guidance, knowing every step of the way for hundreds of miles. If they meet another train they mutually accommodate each other, and if they encounter some other obstacle, often before the muleteer has observed the difficulty, they have solved it by a detour or other means. Usually they march 30 to 40 miles daily "Sunday to Saturday" and even in the sub-zero temperature of Northern Manchuria require no housing but are content, when their packs are unladen, to refresh themselves with a luxurious roll, and soon begin to munch their well-balanced meal of chopped straw, bran and grain. Prior to the advent of the few railroads that we have stretched across China, they were the great means of fruit transport, their steady motion being preferable to the terrible jolting of carts.

Leaving the field of personal carrying by the Chinese himself and his faithful pack animals the first and still the most popular venture on wheels is the barrow—a different one from the western variety. The Chinese national barrow has a large wheel, two to three feet high, right in the middle, and the structure is built and the load balanced around this center. It appears to be of awkward construction, but actually it is the development of ages of experiment and has long since come to stay. Its one great



FERRY BOATS, SOUTH CHINA

In most cases the wheel is unshod, and its wooden axle rubs with a distressingly creaking sound in its socket. The foreigner ponders over this and at times surreptitiously administers an allaying dose of grease—but the indignant barrow-man, missing the song of his barrow, scrapes the lubricant away. A sullen, silent, unresponsive barrow he cannot work with. Thus perhaps does temperament interfere with a good national Union Cup Grease market.

On these barrows seemingly impossible loads are carried. A pony cart with three animals will haul 200 to 250 bricks; a barrow-man will push 70 or 80, and more if he has a man helping him with a trace rope. A comment on the cheapness of labor and the badness of roads is the fact that for short distances this man power can compete with any other, and win. In Shanghai, where autos, electric street cars and rickshaws mingle with other vehicles, the lowly barrow competes, as a coach, for the trade of taking men and women—principally women—around town, and wins "hands down."

It is also so practical that it can go by paths which centuries of patient feet have made, and in some provinces is the principal and often the only means of transport, whether for goods or passengers, foreign merchants or missionaries.

In at least one province, the well-known

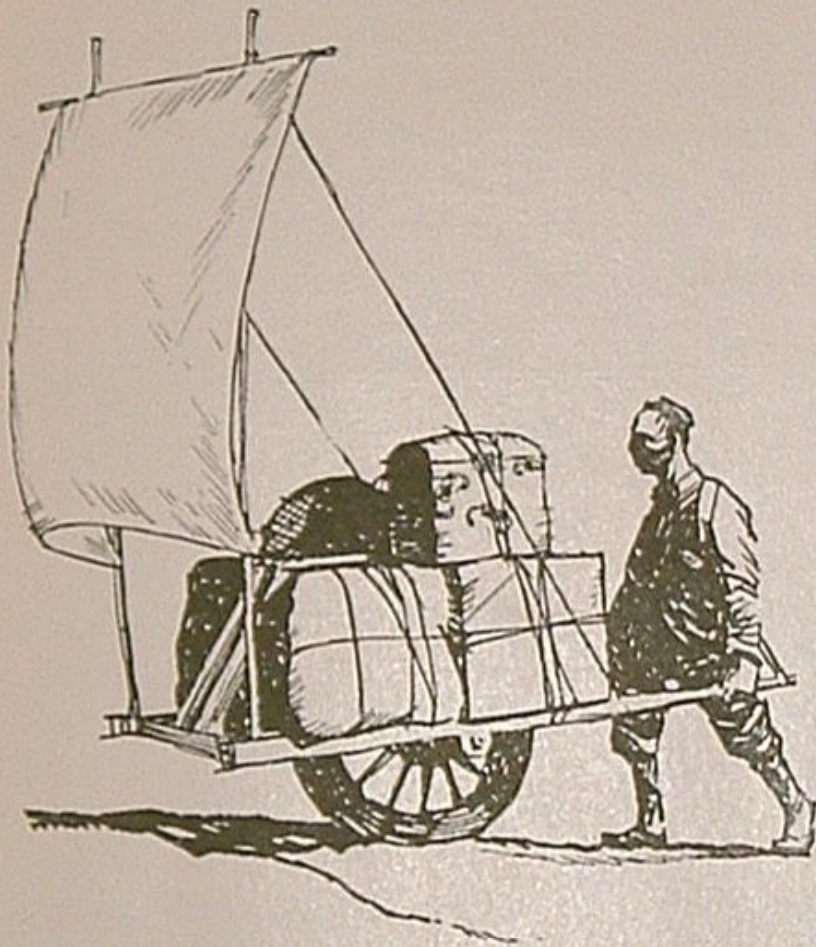


FARM CARTS - MANCHURIA

advantage is that little weight is thrown on the barrow-man and all his strength can be reserved for propulsion.

Shantung, there is a special development in the use of barrows. There a barrow-man attaches a sail to his barrow and, like the sailor, borrows a favoring wind to help his craft along. On a breezy day one coming over a height may suddenly view with pleasure the suggestion of miniature junks on a river, where there are only streams of barrow-men "wending their weary way" lightened by the helping wind.

Some provinces of China have no roads, so that with the exception of the barrow,



BORROWING A CONGENIAL WIND

wheeled vehicles are not in use. Some places do not even have barrows or ways on which barrows can travel.

In the northern provinces carts are possessed by almost everybody. This method of transportation is divided into two classes—small and big carts. The former is the hack or private car of the country, the latter serves in farm work and for transporting goods.

The small cart has often been described as a "largish Saratoga on wheels." Inside it the traveller folds his legs beneath him in tailor fashion, his body forming an upright pendulum, swaying slowly or suddenly in conformity with the cart motion, which is largely determined by the road ruts. A sudden dip and the unaccustomed traveller swings his head too far, comes in contact with the wooden side, and sees

stars. Dr. Arthur Smith says, "A Chinese cart is the only thing that can hit you on both sides of the head at once." The native or foreigner accustomed to its motion avoids using his head as a hammer and sits in comparative comfort.

Carts can be engaged for an hour or a month and will go anywhere. Inside are bedding and a food box; outside, the baggage is attached. As a rule three mules pull the cart. For city visiting one is enough, but on the boggy country roads three mule-power is needed. There is an eternal war between carters and farmers. The farmer, who is perennially short of fertilizer, digs up the road enriched by the animals who pass over it. The road is thus gradually reduced to such a low level that heavy rains make it impassable and often a morass. Carts must get through somehow and they trespass on the fields. When caught there is a row; when not caught there is a track, which the carter next passing perceives and uses, and pleads "want and use" in his defense. When this condition is noticed the farmer digs a ditch, throws up a supposedly unclimbable barrier—and so the argument progresses.

Big carts are the chief means of freight transportation in North China. Until the advent of railroads they were the sole means of carrying heavy goods. In Manchuria a fully equipped cart has seven animals. In this number is always included a stout Manchurian pony in the shafts, whose function it is to steady all things, apply pressure in all directions and at the



SMALL JUNKS - PORT OF SHANGHAI

proper times either pull or act as a set of brake-bands. Most drivers of the mule teams are men of skill and will transport 3,000 to 4,000 pounds 100 to 800 miles



RIVER JUNKS - YANG-TSE KIANG

without a mishap.

To the north these carts carry fruit, cotton, cloth and other things, bringing back tobacco, flour, wheat, wood, etc. They can still compete with railways, for each winter farmers who have animals—and cannot use them till spring softens the ground—combine to do trading expeditions by cart. They expect to make very little if any money by this trip and even reckon the journey pays should they lose slightly. The animals and men at home would be consuming food all the time; but on the journey they feed well, and it costs nothing, being made up of the profits on the goods. So, though they lose they gain, and their animals are in good fettle and hard for the spring work. Their home resources are thus saved, and what is not needed can be sold.

(TO BE CONCLUDED IN NEXT ISSUE)

Winners of Net Tournament

On the opposite page are presented the winners and near-winners of the Fourth Annual Tennis Tournament for the Cup presented by W. L. Stewart, President. The honor of winning the cup goes this year to the Manufacturing Department, P. S. Clarke of the Los Angeles Refinery at Wilmington winning his way to the top rung by displaying a brand of cut strokes which other contenders were unable to master. Arnold Johnson of the Orange Field Department won the trophy racquet awarded the runner-up.

In the Men's Handicap Doubles, Gerald G. Blue and Roy H. Hornidge carried off

the prizes, defeating Jack Sheridan and T. F. G. Boyd of San Francisco and Oleum in the finals. Sheridan and Boyd made the trip South as representatives of the Northern districts. They afforded strong opposition to Clarke and Johnson in the singles and played a strong game against Blue and Hornidge. Miss Fern Tynan of the Purchasing Department won the Ladies' Singles, defeating Natalie Burton in the curtain match.

In addition to the cup won by Clarke, prizes of the best racquets were awarded to the winners and runners-up in the doubles, the runner-up in the singles, and the winner of the Ladies' Singles.

This Month's Cover

The covers of this issue of the Bulletin were drawn by Howard Willard, a Los Angeles artist, to illustrate the article, "Chinese Methods of Transportation" which begins on page eight. From the front cover drawing an impression can be gained of the principal methods of transport in China, the freight "junks" and lighters coming down the river, the biendan carrier, barrow-man and, on the other side, the pleasure cart and pack camels.

The rear cover sketch depicts a steamship unloading lubricating oil and asphalt at a Japanese port.

"Did you participate in many engagements while in France?" asked the interested old lady.

"Only five," replied the exAEF-er with becoming modesty.

"And you came through them all unhurt?"

"Not exactly," he returned sadly, "I married the fifth."



ARNOLD JOHNSON



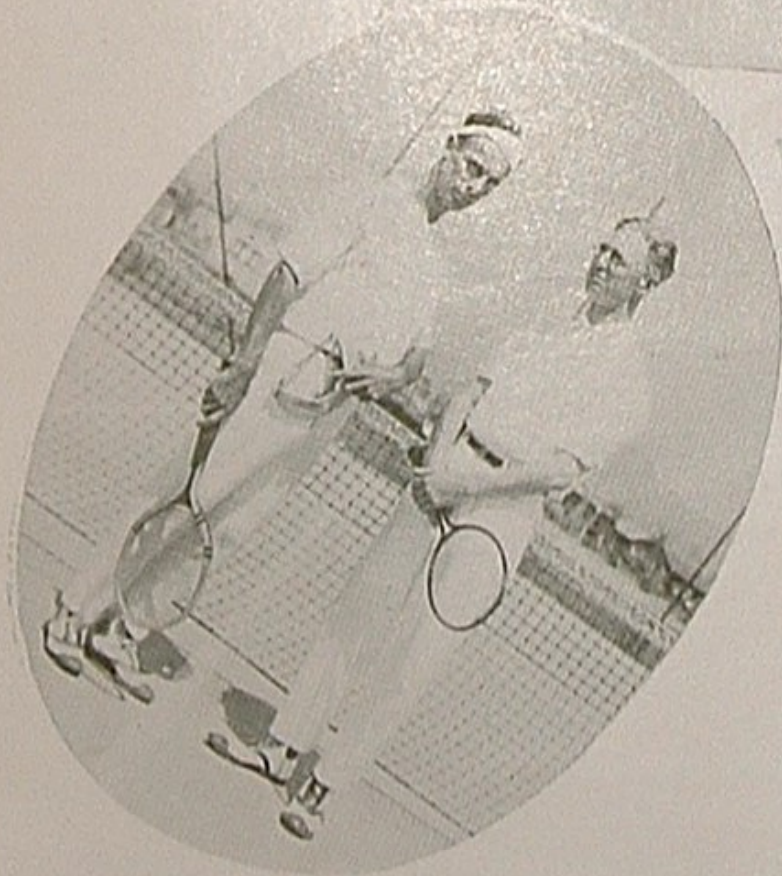
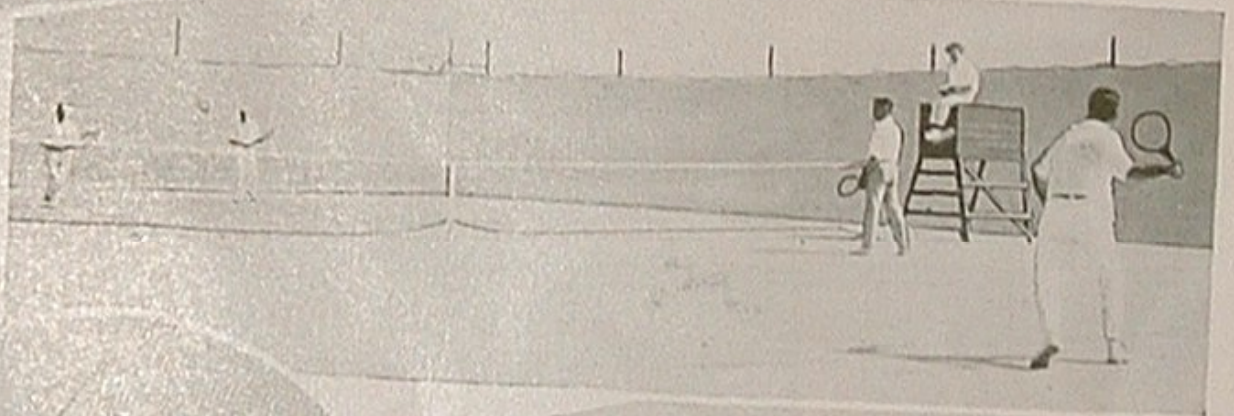
GERALD G. BLUE



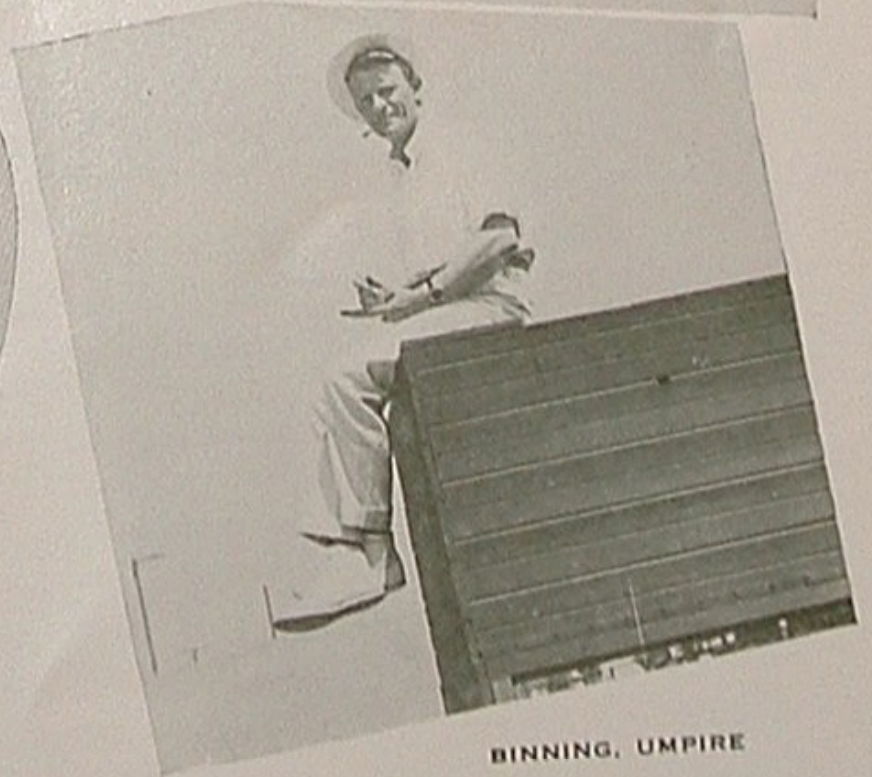
P. S. CLARKE



SEMI-FINAL DOUBLES MATCH.
BLUE AND HORNIDGE
VS.
HANNAY AND WHITAKER



J. I. SHERIDAN, T. F. G. BOYD



BINNING, UMPIRE

PHOTOS BY C. E. BULLOCH

Accommodations of Tanker Santa Maria

Life on one of the huge oil tankers which carry the California crude product to all parts of the world is thought by a great many to be somewhat of a hard proposition—with unfavorable conditions and quarters not entirely the best. With this impression in mind a Bulletin photographer recently took camera in hand and paid a visit to the Los Angeles Harbor dock of Union Oil Company of California where the S. S. "Santa Maria" was loading with fuel oil.

Several hours and a few pictures on this Scotland-built American petroleum carrier served to effectually dispel these ideas. The picture on this page shows an engineer's helper oiling the thrust blocks of the giant triple expansion single crew steam engine installed in the vessel. Plenty of room is provided around the machinery units and everything which tends for the comfort of the workers has been included.

The pictures on the opposite page show the aft poop deck, the officers' mess room and the forward deck.

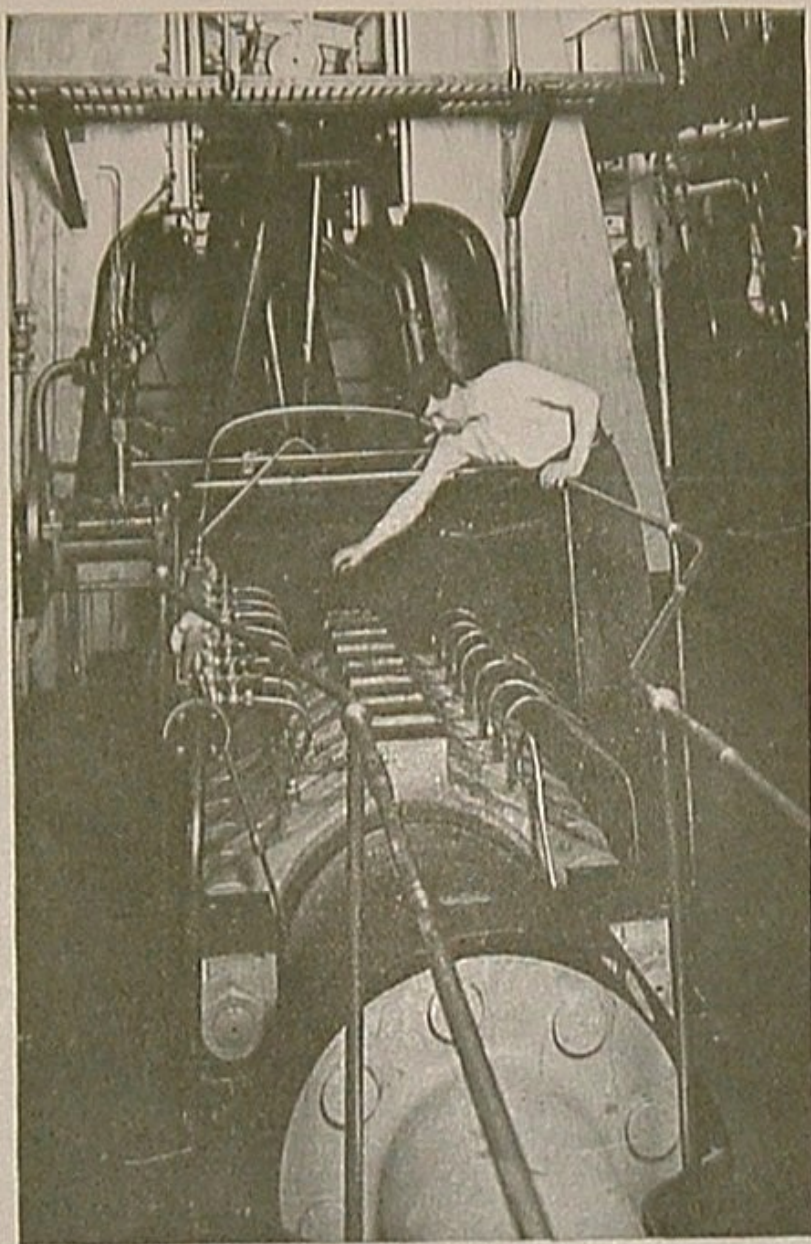
Nothing looks as if it were exactly impossible for anyone to bear, does it? In the construction of the vessel special plans were made to better insure the comfort of the officers and members of the crew. Quarters of the Captain, First Engineer and other officers are fitted with mahogany tables, beds, morris chairs—in fact they remind one of rooms in the best of hotels, including in their appointment radiators,

electric fans and private shower baths. Other features are a finely furnished smoking room and the dining saloon represented in the middle picture.

The deck officers' quarters are located amidships while the engineer with his assistants are housed aft, or in that section of the ship near the stern. The quarters of the crew are located aft, and while not as pretentious as those of the officers, are clean, comfortable and commodious. During the course of long voyages the men work regular eight hour day shifts, occupying themselves chipping the decks, red-leading and painting the steelwork, rigging, splicing rope and keeping up ship's gear.

The smokestack of an oil tanker is aft, due to the fact that the engines are installed in this portion of the vessel. The cargo is carried in tanks located forward and separated from the engine room by a bulkhead called the cofferdam which prevents contact of the oil with the machinery and fires of the boiler room.

The general impression gained after an inspection of a tanker of the "Santa Maria's" type is that a period of seeing the Pacific Coast, Alaska, Honolulu, Japan, Mexico, Central and South America and acquiring the knowledge of the sea coming from long voyages, would be full of valuable and pleasant experiences.



Digging wells is about the only business where you don't have to begin at the bottom.

He—May I have this dance?

She—Yes, if you can find someone to dance with.



The Pageant of Progress

Los Angeles will long remember the Pageant of Progress and Industrial Exposition, which was staged at Exposition Park during the two-week period of August 26th



to September 9th inclusive. Designed to visualize Los Angeles' advancement and present position in the world's work, the Exposition, held under the auspices of the Chamber of Commerce, included exhibits displaying the products of the hundreds of

manufacturing firms doing business in the city.

The two pictures herewith show the exhibit of Union Oil Company of California. While displaying samples of petroleum and its products, it was thought more



in keeping with the days and nights of festivity to distribute free drinks of Coca-Cola to the lined-up patrons of the exposition service station.

Get Up and Start Over

*Get up and start over whenever you fall,
For one little bump is just nothing at all.
One foolish temptation, one silly mistake,
That isn't a matter to make or to break.
Get up and start over, get back on your feet,
And show 'em a fellow the bumps couldn't
beat!*

*Get up and start over whenever you slip,
For life is a ticket that's good for the trip.
Don't alter your purpose, abandon your
load—*

*Get out of the brambles and back on the
road!*

*Get up and start over and show 'em a man
Who's good at the finish, how'er he began.*

*Get up and start over! The fellows who
won*

*Were seldom the fellows who never had
done*

*A thing that was foolish, they are mostly
the men*

Who often fell down—but got up again!

*Get up and start over!—the thing, after
all,*

Is always to rise, and not, never to fall.

*Get up and start over! Don't foolishly
think*

*The rest lived a life that was perfectly pink.
We mostly are mortal, we're human a lot—
A man's often made by the bumps that he
got.*

*Get up and start over. Get back on your
feet!*

*And show 'em a fellow the bumps couldn't
beat.*

—Lyrics of Life.

California Oil Statistics for the Month of August 1922

PRODUCTION

(Figures for Production and Stocks are in Barrels of 42 Gallons)

DISTRICT	Barrels Per Month	—DAILY AVERAGE—	
		August	July (Production figures for July not compiled by fields by this office.)
Kern River.....	608,440	19,627	
McKittrick	193,699	6,248	
Midway-Sunset	2,358,453	76,079	
Elk Hills.....	902,175	29,102	
Lost Hills-Belridge	208,493	6,726	
Coalinga	481,159	15,521	
Santa Maria.....	268,169	8,651	
Ventura-Newhall	264,339	8,527	
Los Angeles-Salt Lake.....	105,377	3,399	
Whittier	59,466	1,918	
Fullerton	354,615	11,439	
Coyote	560,788	18,090	
Santa Fe Springs.....	984,249	31,750	
Montebello	598,888	19,319	
Richfield	679,130	21,907	
Huntington-Newport	850,346	27,430	
Long Beach.....	2,358,828	76,091	
Redondo	5,754	186	
Summerland	4,638	150	
Watsonville	1,876	61	
Total	11,848,882	382,221	
July	*11,591,418	*373,917	
Increase	257,464	8,304	

* Average of figures published by Independent Oil Producers Agency and Standard Oil Company.

FIELD, REFINERY, PIPE LINE AND TANK FARM STOCKS OF CRUDE, RESIDUUM AND TOPS

Heavy Crude below 20° A.P.I., including Residuum at July 31st.....	36,883,407	
Refinable Crude 20° A.P.I. and above, including Tops at July 31st.....	14,808,883	
Total Stocks at July 31st.....		51,692,290
August Production		11,848,882
Total		63,541,172
Indicated Consumption.....		9,268,978
Heavy Crude below 20° A.P.I., including Residuum at August 31st.....	39,124,761	
Refinable Crude 20° A.P.I. and above, including Tops at August 31st.....	15,147,433	
Total Stocks at August 31st.....		54,272,194
Stock Increase August.....		2,579,904

DEVELOPMENT

DISTRICT	New Rigs Up	Active Drilling	Completed	Daily Initial Output	Active Producing	Aban- doned
Kern River	2	1	3	165	2,182	4
McKittrick	1	5	..	..	285	..
Midway-Sunset	22	73	16	3,797	2,207	2
Elk Hills	13	19	8	2,832	110	1
Lost Hills-Belridge .....	..	5	..	..	483	..
Coalinga	1	15	1	35	700	1
Santa Maria .....	..	9	..	..	331	..
Ventura-Newhall	3	41	2	105	561	3
Los Angeles-Salt Lake.....	..	2	..	..	673	..
Whittier .....	..	5	..	..	174	..
Fullerton .....	..	8	..	..	375	..
Coyote .....	..	5	..	..	231	..
Santa Fe Springs.....	22	104	10	15,415	25	1
Montebello	1	21	2	201	152	..
Richfield .....	..	32	3	535	153	1
Huntington-Newport	9	103	13	5,736	136	2
Long Beach	27	98	18	23,732	82	2
Redondo	5	8	..	..	3	..
Summerland .....	..	..	..	..	135	..
Watsonville .....	..	..	..	..	8	..
Miscellaneous Drilling	3	58	..	..	..	3
August	109	612	76	52,553	9,006	20
July	125	630	88	57,353	9,361	16
Decrease	16	18	12	4,800	355	4*
Average Year 1921.....	90	536	57		9,425	14
Average Year 1920.....	77	403	49		9,299	13
Average Year 1919.....	58	340	47		8,774	18
Average Year 1918.....	50	362	50		8,210	18

* Increase

Refined and Crude



Your friend is the man who knows all about you and still likes you.

Thelma—Last night Russell tried to put his arm around me three times.

Ella—Some arm!

Evry—What does Algernon see in her?

Tyme—Her father has been arrested four times for bootlegging.

“God save the fools and don't let them run out, for if it wasn't for them, wise men couldn't make a living.”—Josh Billings.

First Big Car Owner—What's the most you've got out of your car?

Second B. C. O.—Seven times in one mile is my best record so far.

Mrs. Highbrow—Did the Earl you had to dinner last night bring his coronet?

Mrs. Newrich—I didn't even know he could play one.

Englishman (to American)—I jolly well suppose you people come over here to escape the dry spell?

American—Yes, there are so many British lecturers in the States, now.

Economical Eddie was standing on a street corner with his fiancée.

“Taxi mister?” asked the driver of a Ford car.

“How much will it cost to ride from here to Tenth street?” asked Eddie.

“About one dollar, sir,” replied the driver.

“How much for the lady?”

“Nothing for the lady, sir.”

“Then take her, and I'll walk.”

Even a tombstone will say good things about a fellow when he's down.

“I hear you have a boarder.”

“Oh, that was only a roomer.”

Straight from the Mighty Bow this truth is driven: They fail, and they alone, who have not striven.—*Clarence Urmy.*

Can—I think the long skirts are so graceful.

Did—Yes, I'm knock-kneed, too.

Captain—If anything moves, you shoot!

Private Abraham Lincoln Jones—Yes, sah; an' if anything shoots, Ah moves!

Customer—I'd like to see something cheap in a fall hat.

Clerk—Try this one on. The mirror is at your left.

Janet—What do you think of my new dress?

Archie—It's ripping.

Janet—Mercy! Bring my coat.

Irate Papa—No, sir, my daughter can never be yours.

Bright Suitor—Quite right, sir. She cannot possibly be my daughter. I only wanted her to be my wife.

Courtesy opens the door to countless opportunities and levels the rough spots in the road to success. It brings sunshine into the dark caves of despondency, dispels grouches, moods and tempers. It cements the bonds of friendship and is indispensable in business. Courtesy pays regular dividends which re-invest themselves at compound interest. And it costs nothing.

The Joy of Little Things

*It's good the great green earth to roam,
Where sights of awe the soul inspire;
But oh, it's best, the coming home,
The crackle of one's own hearth-fire!
You've hob-nobbed with the solemn Past;
You've seen the pageantry of kings;
Yet oh, how sweet to gain at last
The peace and rest of Little Things!*

*Go couch you childwise in the grass,
Believing it's some jungle strange,
Where mighty monsters peer and pass,
Where beetles roam and spiders range.
Mid gloom and gleam of leaf and blade,
What dragons rasp their painted wings!
O magic world of shine and shade!
O beauty land of Little Things!*

*Perhaps you're counted with the Great;
You strain and strive with mighty men;
Your hand is on the helm of State;
Colossus-like you stride and then
There comes a pause, a shining hour,
A dog that leaps, a hand that clings:
O, Titan, turn from pomp and power;
Give all your heart to Little Things.*

*I sometimes wonder, after all,
Amid this tangled web of fate,
If what is great may not be small,
And what is small may not be great.
So wondering I go my way,
Yet in my heart contentment sings
O may I ever see, I pray,
God's grace and love in Little Things.*

*So give to me, I only beg,
A little roof to call my own,
A little cider in the keg,
A little meat upon the bone;
A little garden by the sea,
A little boat that dips and swings
Take wealth, take fame, but leave to me,
O Lord of Life, just Little Things.*

ROBERT W. SERVICE.

