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in pulp. Dried, the seeds of one pod seldom exceed a weight of two ounces.

When the pods are cut from the trees, they are carefully split open so as not to damage the seeds. The entire contents of the pods, a jelly-like pith surrounding the seeds, is placed in a pile to ferment under the sun for two to nine days, depending on the type of tree yielding the pod and the climatic conditions.

Before fermentation, the seeds have a purple hue, a melon-like aroma, and a bitter taste. After fermentation they take on a rich, brown color and the distinctive fragrance of chocolate. They then are ready for drying in the sun and sacking for shipment.

In the manufacturing process, the first step is sieving. The shells are removed and the foreign substances extract-

ed. From there, the beans go into revolving drums where they are roasted until crisp and even brown in color. Then, they are cracked between rollers and waste material is blown away. Next, they are crushed, and the liquid cocoa butter content which is freed in this process suspends the mass in a viscous liquid.

At this point, the end product desired from the cocoa beans determines the nature of additional processing. If cocoa is to be manufactured for beverage purposes, the liquid is placed in vats where the cocoa butter is extracted by hydraulic presses. The dry cake that remains in the vats subsequently is ground into powder and packaged for sale.

The cocoa butter has a variety of uses. It is used extensively in the preparation of perfumes and cosmetics because cocoa butter is resistant to turning rancid. It also is used as a highly concentrated food and has medicinal properties that make it useful in surgery and as a pharmaceutical.

If the cocoa beans are destined to become cooking chocolate, the crushed beans are dried with the cocoa butter still part of the mass. Sweet chocolate is made by adding additional cocoa butter and powdered sugar before the mass is dried into cakes. If fresh whole milk and flavoring is added, the product becomes the milk chocolate so widely used as a confection.

Cocoa contains both proteins and starches. Its derivates have a high food value and a high calory content. Of the whole cocoa bean, 55 per cent is butter, 22 per cent starch and gum, 17 per cent gluten and albumen. Cocoa and chocolate drinks, unlike tea and coffee, are not only beverages but food as well.

It is from the Aztec tongue of Mexico that both our words "cocoa" and "chocolate" are derived. *Cacahuatl* was the Aztec name for the seeds of the tropical tree from which their beverage was produced. The Spaniards contracted this to *cacao* and eventually it was corrupted in English to cocoa. Chocolate was derived from *chocolatl,* the ancient name for the beverage.

Whatever the name, *Theobroma cacao* quickly established itself as a favorite food and confection. Although Americans still eat more vanilla ice cream than any other flavor, the many other uses to which chocolate can be put makes it by far the most widely used flavoring of its type in the country.

Of the total world output of cocoa, the United States consumes about 40 per cent — well over a half million pounds a year, costing close to two hundred million dollars for the raw beans.

Quantities such as these are a far cry from cocoa as Cortez knew it in the days of the great Indian leader, Montezuma. In ancient Mexico the beans were preferred to gold. And even in our modern world, any child with a sweet tooth knows the reason why.

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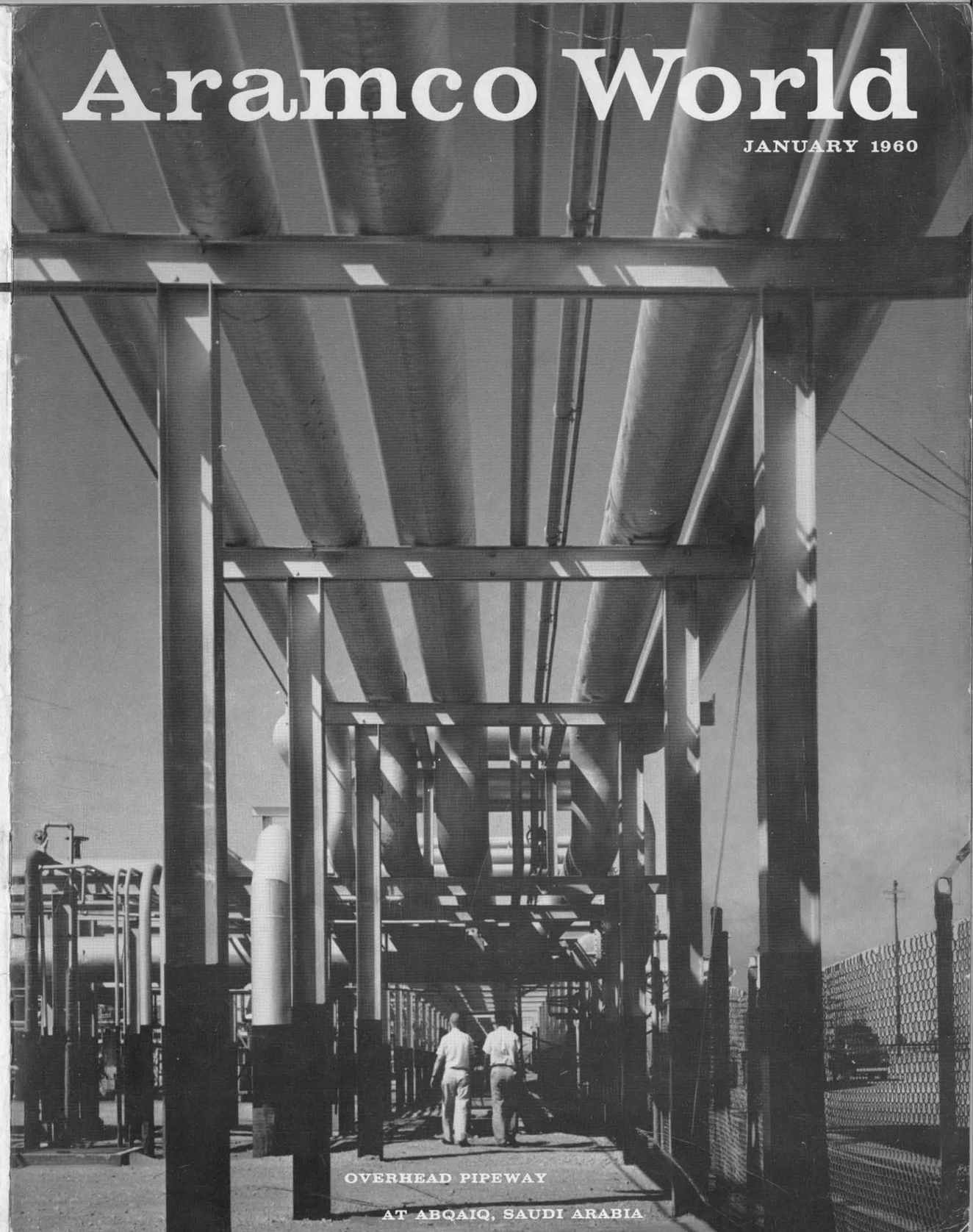
JANUARY 1960



OVERHEAD PIPEWAY

AT ABQAIQ, SAUDI ARABIA

Aramco World

JANUARY 1960 VOLUME 11 NO. 1

FRONT COVER: All the ingredients for sweet-and-sour crude are contained in the pipes of this stabilizer "kitchen." Cooking instructions for this petroleum concoction begin on page 3.

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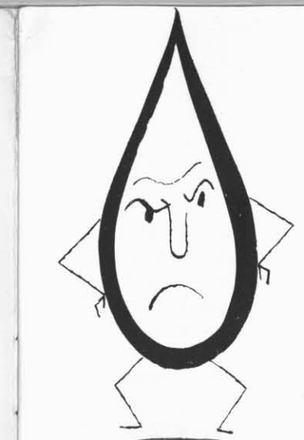
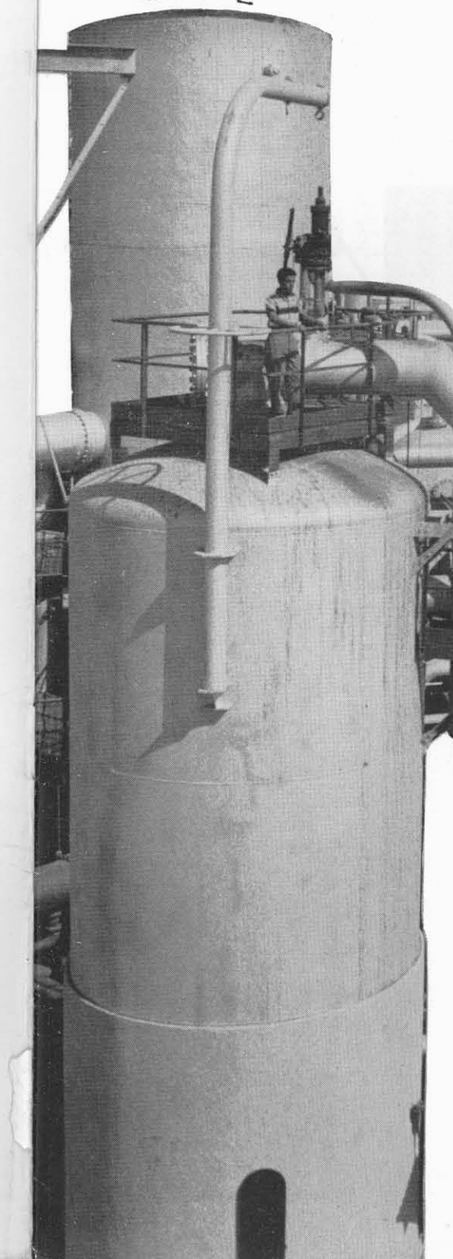


The main job of the big oil "kitchen" at Abqaiq, Saudi Arabia, is

SWEETENING UP THE CRUDE



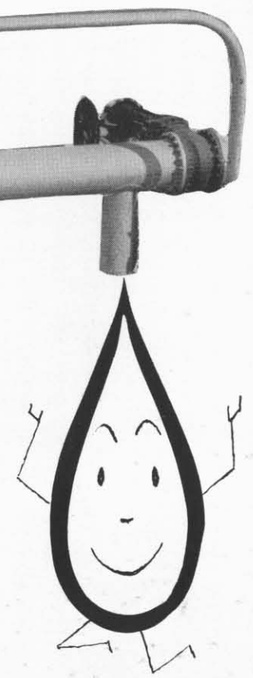
AMONG the petroleum installations at Abqaiq, Saudi Arabia, is a big processing plant known as a crude-oil stabilizer, and, figuratively speaking, you might say that it's main job is to get rid of the "rotten eggs."

"Rotten eggs" means hydrogen sulfide gas (H_2S) – they share a common odor. If you've ever cracked a bad egg into an omelet, you'll get the idea.

This gas is contained in the crude oil as it comes from the wells. It not only has a vile odor, it's also poisonous – it can kill you if you inhale it. And it's corrosive. If the crude is "wet" – that is, if it contains water – the H_2S and the H_2O will react to form H_2SO_4 – sulfuric acid, a heavy oily liquid that can eat its way through a steel pipeline or storage tank.

Hydrogen sulfide has to go. And one of the Aramco plants that does this job at Abqaiq is the world's largest crude-oil stabilizer: it can process up to 950,000 barrels of crude daily. That's equal to 39,000,000 gallons – a pretty fair batch in anybody's kitchen.

The stabilization process – basically a form of partial distillation – does two jobs at the same time: it sweetens "sour" crude oil (removes the hydrogen sulfide) and re-



duces vapor pressure, thereby making the crude safe for shipment in tankers. Vapor pressure is exerted by light hydrocarbons, such as methane, ethane, propane, and butane, changing from liquid to gas as the pressure on the crude is lowered. If a sufficient amount of these light hydrocarbons is removed, the vapor pressure becomes satisfactory for shipment at approximately atmospheric pressure.

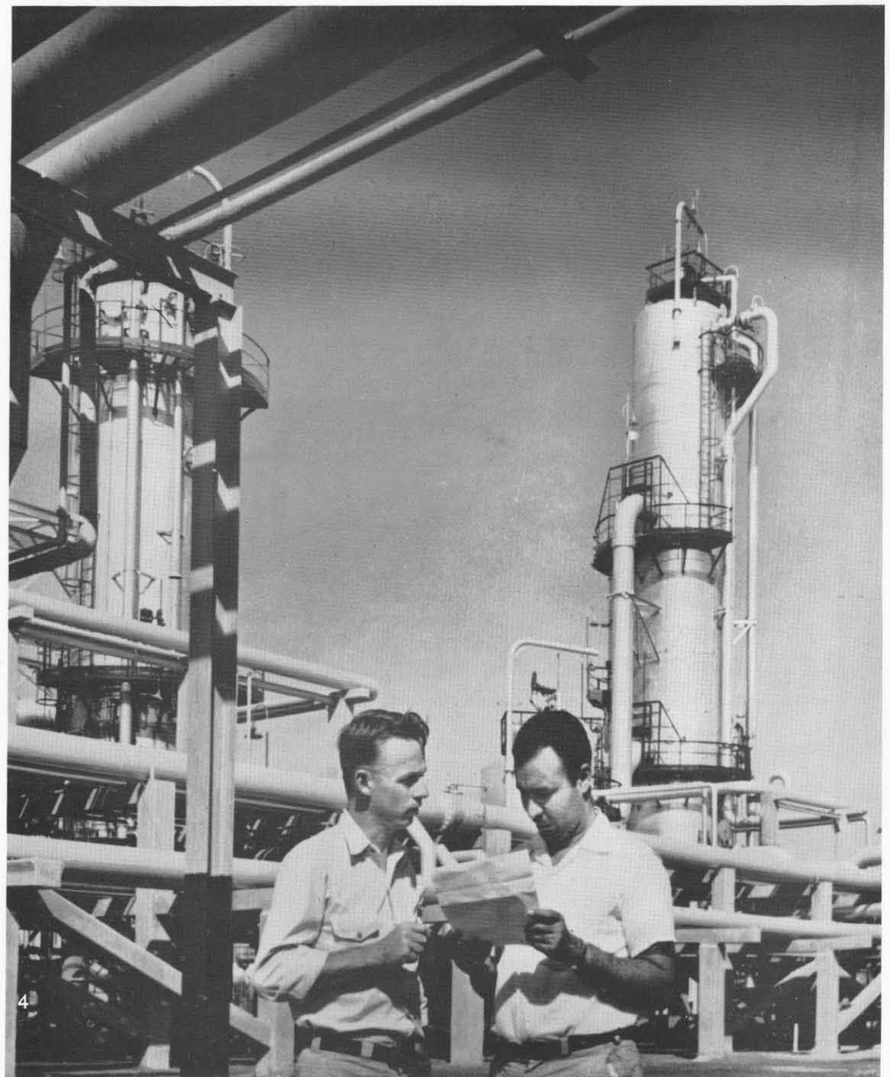
All the crude produced in Saudi Arabia — except for that of the offshore Safaniya Field in the Persian Gulf — is "sour." At ground level the pressure may be as high as 1,000 pounds per square inch (or "1,000 psi," as the engineers say). It must be reduced considerably before it reaches the stabilizer, so it's sent first to a gas-oil separator plant, or "GOSP." There are eleven of these in the Abqaiq area.

Now, the gas can't be allowed to "blow off" all at once. If it did, a considerable amount of liquid would also be lost — something like shaking a bottle of soda pop before uncapping it.

The gas is released in stages in a series of drums or columns, known as separators, before it reaches a spheroid where the pressure is cut down to about 2 psi. By now, most of the light hydrocarbon gases have been removed, but the gas is still "sour." The next step is to pump it to the sour-crude storage tanks at the stabilizer to await processing.

Booster pumps push the oil from the storage tanks to the top of one of the stabilizer columns. It enters the column and starts to flow down through a series of "bubble trays." Near the bottom, the down-flowing oil is channeled to a reboiler that heats it. By the time it reaches the bottom section of the stabilizing column, it's hot. Gases contained in the crude — both hydrogen sulfide and light hydrocarbons — begin to boil off at this temperature. They rise to the top, while the heavy crude remains at the bottom.

The rising gases, incidentally, perform a useful function



Harley Drury, Engineer in Charge, and Hassen bin Hussain, Head Operator, double-check the performance of this fully-automatic plant.

Abqaiq's giant stabilizer seen from the air: cooling units in the foreground, stabilizer columns in the rear. The giant column, at right, can process 275,000 barrels of crude per day.

on their way up the column. Being hot, they supply preliminary heating to the incoming sour crude, and also "strip out" some of the gases contained in it.

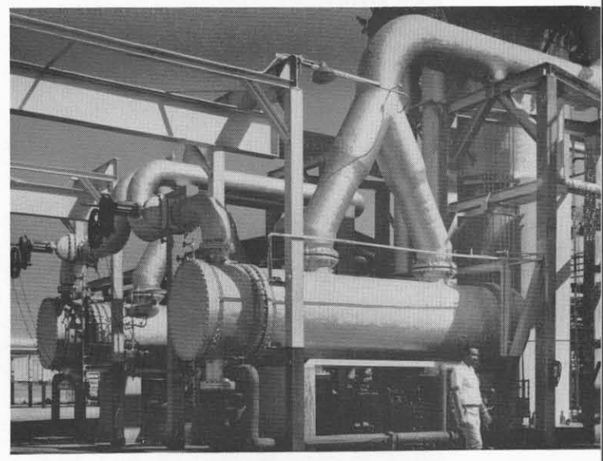
When the hot gases leave the column, they're piped to what's known as a "scrubber." Its purpose is to recover most of the liquid hydrocarbons contained in the gas mixture. The leftover gases — mostly hydrogen sulfide — are ignited and flared off.

Plans are underway, however, for installation of new facilities which will permit utilization of these gases in Aramco's oil conservation program. The gases that come off the top of the stabilizer columns will be combined with spheroid gases, compressed and liquified, and piped to the Ain Dar area. There, they will be combined with high-pressure gases from the 'Ain Dar gas-injection plant and injected into the underground reservoir.

This injected combination serves as a solvent that "flushes out" crude oil and also helps to maintain reservoir pressure, thus permitting a higher percentage of the crude oil to be recovered.

The stabilized crude oil goes on to the cooling unit, where enormous fans reduce the temperature. Why? Because if the oil remained warm, all the lighter fractions of crude oil would evaporate. The cooler the oil, the more stable it is.

The Abqaiq stabilizer can process 950,000 barrels of crude oil in summer, but only about 860,000 in winter. Most crude oil has some water in it when it comes from the reservoir. In warm weather the water vaporizes easily and is taken off at the gas-oil separator before stabilization. But in cold weather it remains in the crude that is pumped to the stabilizer and causes "foaming," which reduces the efficiency of the process. "Foaming" is similar to the action

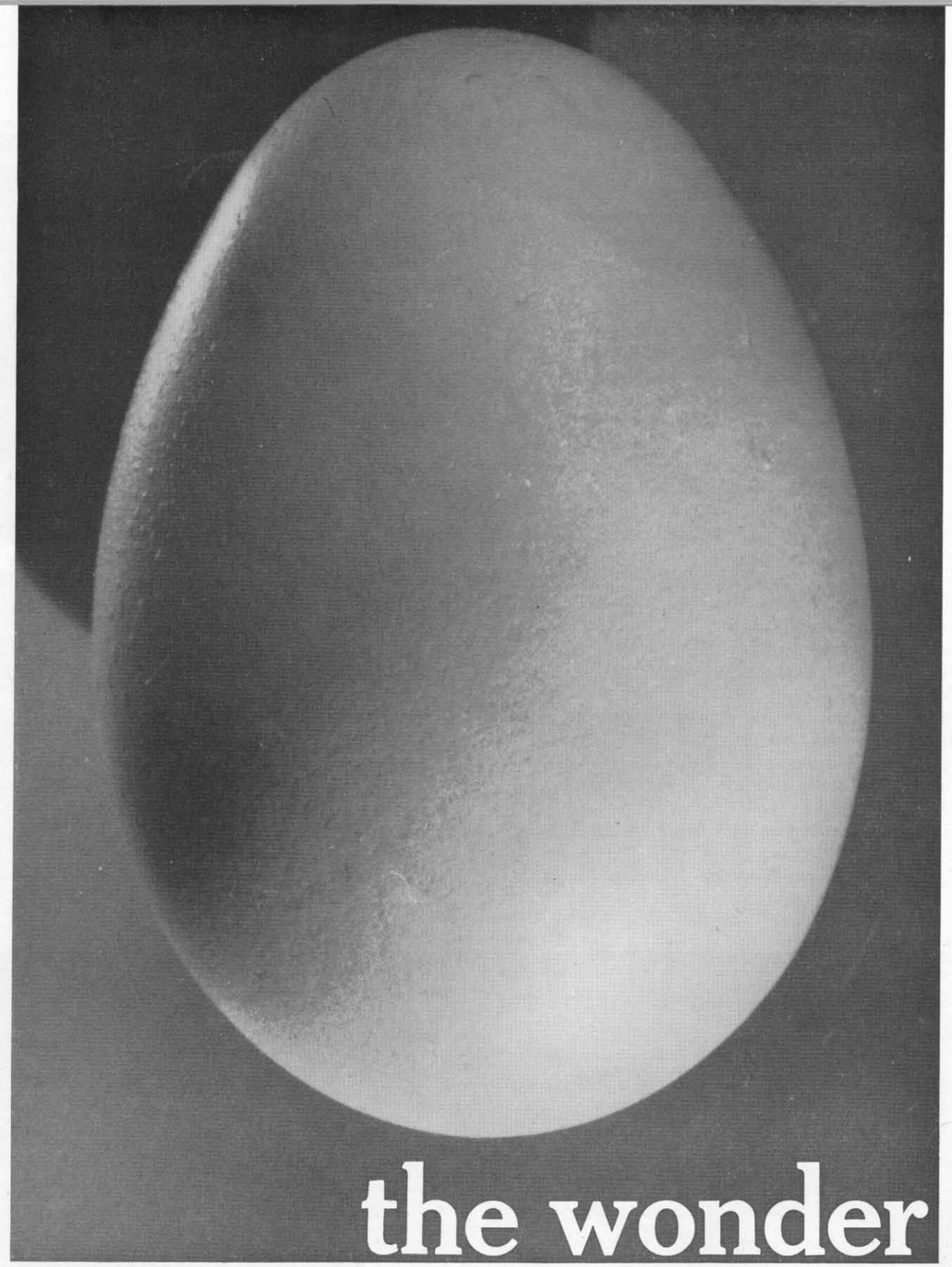


Sour crude oil is heated in the horizontal vessels to "boil off" the hydrogen sulfide and light hydrocarbons.

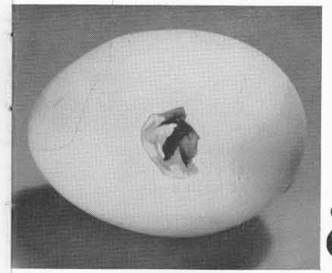
that occurs when you shake water and vinegar to make a salad dressing. Ordinarily the oil floats free above the vinegar, but shaking them together produces a bubbly emulsion, a frothy mixture that will not separate for quite a while.

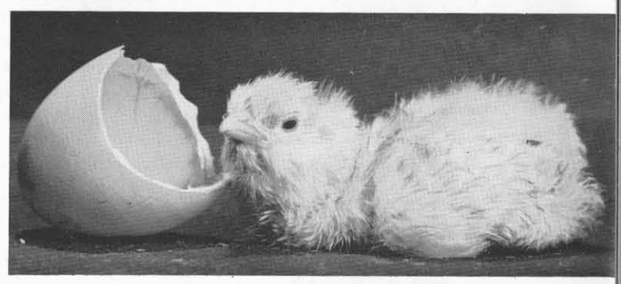
As in other modern oil-processing installations, practically everything is operated automatically from the control room. There are only five men on each shift: a head operator and four assistants, all Saudi Arabs.

By the time the stabilizer has finished its job, the hydrogen sulfide that was in the oil has been almost entirely removed — reduced to an infinitesimal ten parts per million.



the wonder of an egg





A bird's egg is one of nature's masterpieces—a marvelous bit of designing with a purpose behind everything

"I think if required on pain of death to name instantly the most perfect thing in the universe, I should risk my fate on a bird's egg."

So wrote the nineteenth-century American author and soldier, T. W. Higginson. And indeed an egg is a virtual masterpiece — right down to the shape, size, color and the number of eggs in a clutch.

Seemingly fragile, the egg's oval shape gives it quite remarkable strength. Embodying the same principle as that of the arched stone bridge, eggs will bear extraordinarily heavy weights on their convex surfaces before breaking. Scientists found that the average weight needed to crush a fowl's egg was 9 pounds. They had to pile 13 pounds on a turkey's egg before it gave way, 26 pounds on a swan's egg and 120 pounds on a tough-shelled ostrich's egg before they broke.

Birds' eggs come in widely divergent shapes. Some birds, like the domestic hen, lay oval-shaped eggs. The owl, kingfisher, penguin and titmouse lay round eggs. The eggs of the grebe, the pelican, the cormorant and the bittern are pointed at each end. The curlew, the plover, the sandpiper and the gull lay pear- or cone-shaped eggs which taper sharply from the broad end.

There is nothing haphazard about most of the variations in shape. For instance, the guillemot makes no nest and often lays its single egg on the flat ledge of a cliff. If she laid a round egg it might be knocked over by the birds or blown off by the wind. Instead, she lays a pear-shaped egg which, if bumped, does not roll but rotates harmlessly round the pointed end.

Eggs laid on pebbly beaches are often pebble-shaped. Here, as in the case of the guillemot, there is safety in shape. Again, large pear-shaped eggs are laid with the narrow pointed ends inwards and almost touching. This is economy in shape — to pack as many as possible under the mother's breast.

There is even purpose behind the number of eggs a particular bird lays in a clutch. As a general rule, those birds whose eggs are safest from marauders lay the fewest. Thus the cliff-dwelling guillemot lays only one.

Perching birds lay fewer eggs to carry on their race than those which nest on the ground: the raven lays four but the partridge lays twelve. The largest clutch is that of the ground-nesting bob-white quail of America which lays as many as thirty-two.

The greatest egg-producer of all birds is, of course, the barnyard fowl — product of 3,000 years of breeding by man. She doesn't lay in clutches as wild birds do but produces an egg daily, or almost daily, for many days on end. A good hen will produce 300 eggs in a year and 3,000 in a lifetime. But her ancestors, the jungle fowls of Asia, lay only 30 to 40 eggs a year. Moreover, these eggs are only half the size of the domestic hen's.

There's an enormous range of size in the eggs laid by various birds — from the tiny quarter-inch-long eggs of hummingbirds to the seven-inch-long egg of ostriches. The tiny hummingbird eggs go 60 to the ounce; a single ostrich egg weighs three pounds. In between these extremes is the domestic hen's egg of two to two and a half ounces. A naturalist amused himself by breaking hens' eggs into empty ostrich egg shells and found they'd take up to 18 hens' eggs. Ostrich eggs are still small stuff, however, compared with the eggs of the now extinct elephant bird, or roc, of Madagascar. Some eggs of his huge flightless bird discovered on Madagascar are 13 inches long. The shells hold over two gallons. You could break six ostrich eggs or 150 hens' eggs into one of them!

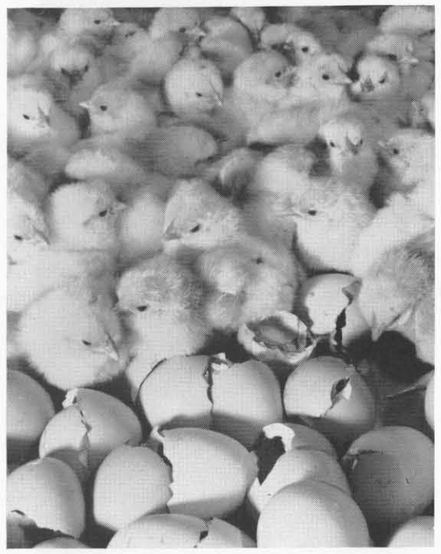
Another now extinct bird, the moa of New Zealand, also ran to size and laid an egg twice as large as the ostrich's.

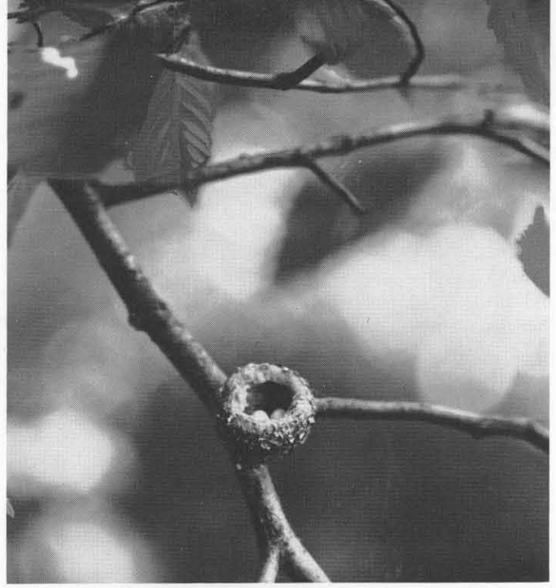
Even in the one species of birds there may be considerable range of size in eggs. A white Leghorn hen, after producing normal-sized eggs, delivered herself of one weighing 11 ounces — five times larger than usual.

A record small hen's egg was one which weighed only one-twenty-fifth of an ounce.

Naturalists have found a relationship between the size of birds and the weight of the eggs they lay. The relative weight of the egg gets smaller as the bird gets larger. A small bird such as a finch will lay an egg about one-ninth of her weight, but a very large bird such as the ostrich will produce an egg weighing only one-fiftieth of her body weight. Most exceptional of all layers is the flightless kiwi of New Zealand. This four-pound bird produces an egg one pound in weight! A comparable effort by the ostrich would be a 75-pound egg!

Exceptionally, the cuckoo is very much larger than the lark but lays an egg about the same size. The reason is that the cuckoo for the main part lays its eggs in the nests





The quarter-inch eggs of the hummingbird fit easily into a nest no bigger than a thimble.

THE WONDER OF AN EGG

of smaller birds such as hedge-sparrows, robins, pipits and wagtails.

Birds' eggs come in a widely diverse range of color and markings. But, here again, there's almost certainly the hand of the great inventor, Nature, though we can't always discern the pattern. Sometimes, as in the case of the ground-nesting plover, the design is apparent: the plover's drab flecked egg blends so perfectly with the surroundings that only the keenest-eyed naturalist can ever find it. Once a man was told to look along a furrow in a ploughed paddock in which there were six plovers' nests. When he reached the end of the furrow he had walked on one nest and failed to spot the other five! Again, the eggs of the wild duck echo the green of the reeds amongst which she nests. The eggs of the red grouse which are white or yellowish white with blotches of reddish-brown or very dark brown, merge perfectly with the purple heather where she nests. It is the same with many other ground nesters.

Paradoxically, protection for the eggs of some birds comes from the bright, conspicuous coloring. Bold-colored eggs are often foul-tasting: a predator, such as a snake, cat, hedgehog, or mongoose has only to spit out a few repulsively flavored eggs before learning to associate the warning color with the unpleasant taste.

Dr. Hugh B. Cott and four colleagues at the University Museum of Zoology at Cambridge tested the eggs of 134 separate species of birds and found 70 different flavors. The flavors included sweet, salty, sour, nutty, mealy, bitter, aromatic, acrid, earthy, fishy and mildewy. Two general rules emerged: the bigger the egg the better it tasted, and eggs with drab colorings or markings were the most appetizing.

Thus, the large four-inch eggs of cranes were tasty. So were gulls' eggs. (Sea birds' eggs were not found to be fishy.) The drab eggs of the chaffinch, hedge-sparrow, moorhen, coot and jackdaw were also pleasant.

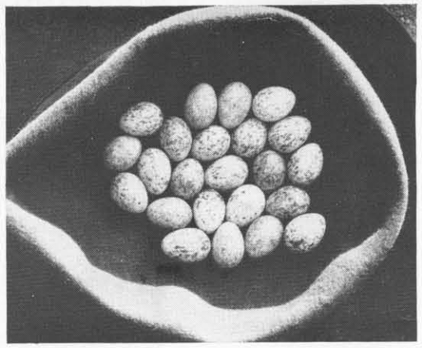
They found that the egg flavors, so foul as to be unforgettable, were invariably combined with a color that would stick in the memory. Birds with unpleasant-tasting eggs include puffins, linnets, wrens and tits. The most obnoxious of all eggs is that of the ordinary wren which is one of the most beautiful of all in appearance. So beautiful indeed that Walt Whitman was inspired to write: "The leaf of grass is no less than the journey work of the stars, and the ant is equally perfect, and the grain of sand, and the egg of the wren."

Sometimes nature uses color not for camouflage or for warning but for visibility. Many eggs laid in dark nests or holes are conspicuously white so the brooding bird can see them more easily. Again, some eggs may be glossy white or light in color for quite another reason — so naturalists think — to reflect back the sun and guard the embryo against too much heat.

At the other extreme, Dr. Cott found that the best flavored eggs were those with drab color and markings and when it comes to that, what could be drabber than the most palatable of all eggs — that of the domestic hen?

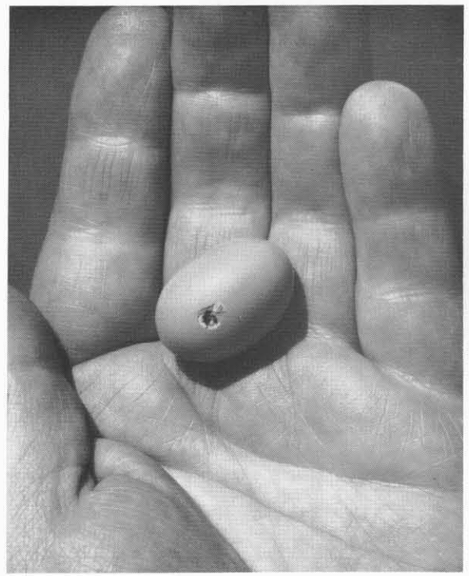
The brown pelican builds a ground nest of sticks and straw in which it hatches eggs, pointed at both ends.

Drab, mottled plover eggs are designed to blend with the earthen, grass-lined nest.



A clutch of English sparrow eggs, varying in shell markings, nestle in a man's hat.

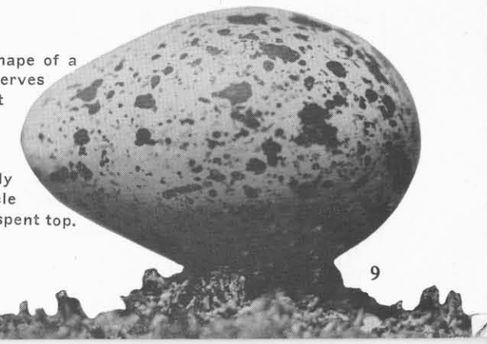
Even the unsentimental vulture waxes maternal in the presence of her eggs.

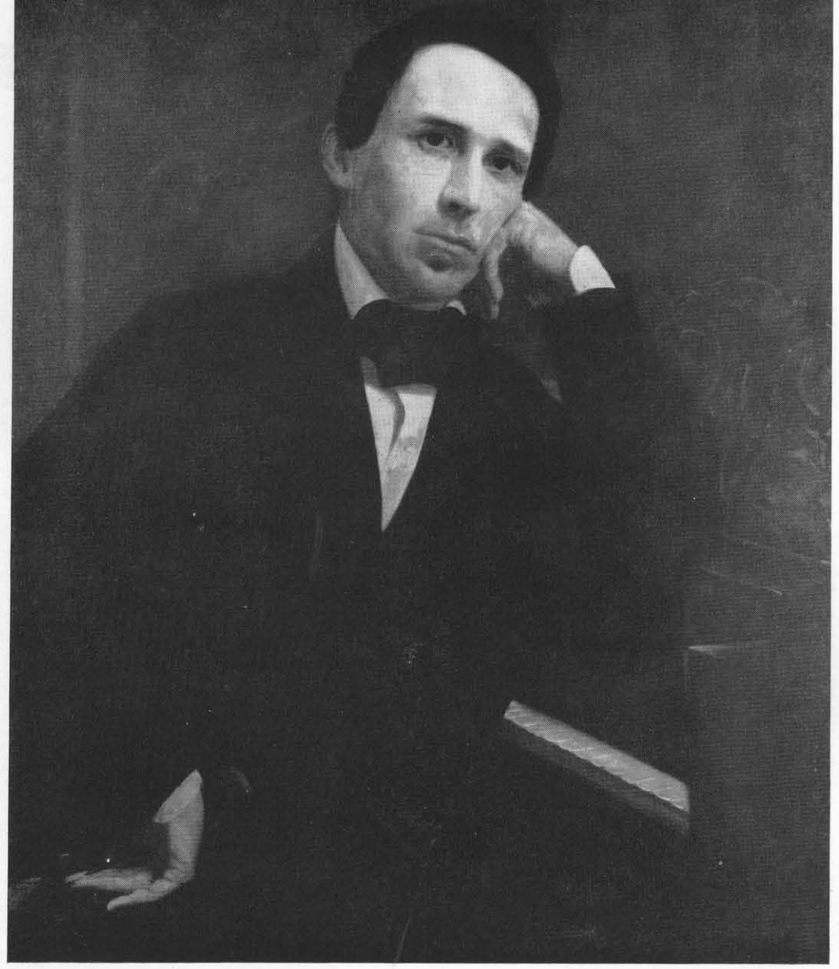


This tiny robin's egg is just about ready to hatch.

Each year, thousands of "jinah" or sea birds lay their eggs on the Island of Juraid, 22 miles off the Saudi Arabian mainland in the Persian Gulf.

The strange shape of a kildeer's egg serves a purpose. If it should roll from its ground nest it would simply rotate in a circle nearby, like a spent top.





STEPHEN FOSTER — HE STARTED AMERICA SINGING

WHEN Stephen Foster's mother described her six-year-old son in a letter as "something perfectly original," she was pinpointing this ninth child of hers with complete accuracy.

Even his birthdate—the 4th of July, 1826—set him apart. On this day two of the founders of America passed away—our second President, John Adams, at noon; our third President, Thomas Jefferson, at sunset — and on this day the nation celebrated its 50th birthday as a Republic!

At the age of two, the toddler had surprised the household by picking out harmonies on his sister's guitar. And a year after his mother's sage observation about his originality, he managed a very good version of "Hail, Columbia" on a flute he found on the counter of a music store where Mrs. Foster happened to be doing 15 minutes of shopping. Of course, none of these events startle us today — for, after all, this was Stephen Foster, who at 23 was destined to set a nation singing with "O, Susanna," the theme song of the Gold Rush. This was the Stephen Foster who, despite one or, at best, two trips to the South in his entire 37-year lifetime, so perfectly echoed the pulse of Southern life, that he was heralded as the "Melodist of the South."

How did it come about that one born and bred in Pittsburgh—a new city in a rough-hewn, pioneering land, which was far more concerned with creating muscles for the herculean tasks ahead than with creating music — how did such a land produce a man who could unleash the mighty singing voice of the folk?

Then again, what people had a better right to sing? The fledgling nation just a short time before had found and fought for its political voice which now was heard all over the world, wherever men listened for the sounds of freedom.

The circumstances that influenced Stephen Foster were nothing more or less than paradoxical. He grew up, a gentle boy with a strange talent for music, in a country which was using most of its energy to survive and whatever was left, to expand. Formal music was not encouraged, understood, cultivated, or even practiced except by a very few. Instruments were scarce when Stephen was a boy. The first upright piano was not even brought over the Allegheny mountains into the Pittsburgh area until 20 years later. His family, too involved with growing pains of a young city, were uneasy about this lad, who dreamed and sang and who, worst of all, seemed to be making no attempt to "adjust" to the practical demands of the world.

Apparently, he was unable to settle down to school. He told his brother as much — that there was "too much confusion in school." Yet, as one biographer notes, "No one seems to have suggested the 'strange talent for musick' as a solution of the difficulty." Even after Stephen wrote two songs within a week of each other in 1844, no one in his family caught on. It was decided that 19-year-old Stephen had better get to work, and off he was shipped to his businessman brother in Cincinnati.

But Destiny plays her hand doggedly, one card at a time, and none of the family suggestions were in the cards — not bookkeeper, not midshipman. As a child, Stephen had managed to prepare his way. He had absorbed a good deal of Negro singing at the church meetings he attended with the family maid. At nine, he had been a star performer, singing popular tunes of the time in a neighborhood carriage-house show. At 13 he had written an Alma Mater song, at 19, two songs for a political campaign, at 21, "Way Down South Where de Cane Grows" for a music hall contest, and so on, immersing himself always deeper and deeper into the ways of song.

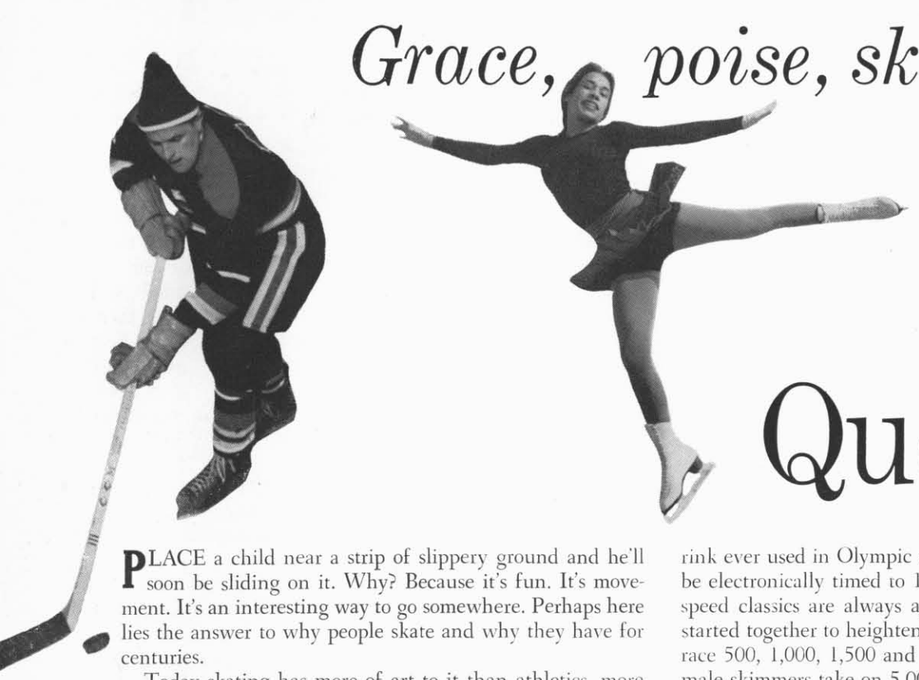
This was a time for singing. People were less self-conscious, less sophisticated, and they sang out when they had something to sing. Sailors chanted at their work, blacksmiths sang at their hearths, the rough board churches of the time rang with the enthusiasm of Sunday hymns, and soldiers thundered to the cadence of their own marching feet. It was a time when people needed to sing — to raise their morale, to symbolize their desire to go on against the sometimes forbidding odds that nature seemed to have stacked in their Westward way. It was a time when there were forces existing that themselves struck music into the air: a new nation, a Westward push, Negro spirituals, and the rise of the fabulously popular minstrels. America, then, was the kind of a place where you would expect to hear simple folk music burst forth. But it needed its own songs, taken from the spirit and experience and sinews of its heartland. It was as though the land held out an armful of raw materials for song, saying, "Write, Stephen! Write!"

And he did.

Stephen Foster wrote approximately 150 songs between 1850 and the year of his death, 1863. For this he earned about $15,000. Though the construction of his music was sometimes almost too simple and most of his songs expressed sadness, somehow he found that emotional denominator — nostalgia for the past — that is common to the whole race of man.

One of his biographers, Harold Milligan, nobly describes how indelible the impression was that Foster left on the world. "No other single individual produced so many 'folk songs' — songs that so perfectly express the mood and spirit of the people . . . So completely do the 'folk' absorb these songs and adapt them to their own uses, that the individuality and frequently even the name of the originator is completely lost, thus giving rise to the erroneous idea that a 'folk song' is a song created not by an individual but by a community."

OLD FOLKS AT HOME ✲ MASSA'S IN DE COLD, COLD GROUND ✲ O SUSANNA COME WHERE MY LOVE LIES DREAMING MY OLD KENTUCKY HOME ✲ OLD BLACK JOE BEAUTIFUL DREAMER ✲ Jeanie with the Light Brown Hair ✲ CAMPTOWN RACES



Grace, poise, skill, and 5000 years of practice have combined to make ice skating

Queen of the Winter Sports

PLACE a child near a strip of slippery ground and he'll soon be sliding on it. Why? Because it's fun. It's movement. It's an interesting way to go somewhere. Perhaps here lies the answer to why people skate and why they have for centuries.

Today skating has more of art to it than athletics, more of skill than muscle. The proof of this will best be seen during eleven days, February 18th through the 28th, at the VIII Winter Games of the XVIII Olympiad. In the fabulous man-made mountain village of Squaw Valley, California, 34 nations will meet each other on the ice and snow slopes of the picturesque Olympic scene.

Aside from the 15 lively skiing events, 8 hockey teams will fight it out; 44 women and 41 men will vie for figure skating laurels; and 28 women and 76 men will skate against the clock.

The ice events are recent in Olympic history. They began in 1924, the year the Winter Games themselves were inaugurated as a logical supplement to the rest of the Olympiad.

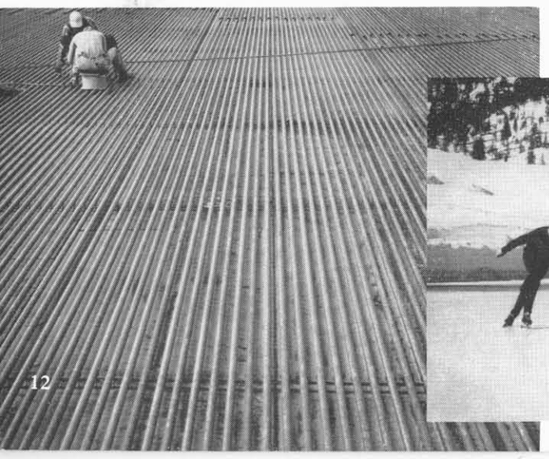
All told, five ice rinks will serve the 1,000 competitors for performance and practice. The beautiful Ice Arena where the figure skating and much of the hockey will take place, seats 11,000 people and has an 85 x 190 foot rink. A huge 400-meter speed oval is the first artificially refrigerated rink ever used in Olympic competition, and races on it will be electronically timed to 1/100th of a second. Since these speed classics are always against the clock, two racers are started together to heighten the spectator interest. Women race 500, 1,000, 1,500 and 3,000 meters. The more rugged male skimmers take on 5,000 and 10,000 meter events.

Although the swiftness of the ladies was recognized officially only as recently as 1936, a woodcut in a 1498 volume pictures an injured lady, Saint Lidvina, who obviously skated too fast and broke several ribs in 1395. As for the gents — well, up to the middle of the 19th century, speed racing was the only kind of skating that interested them— and the public in general.

As far back as 1555 a Swedish Bishop named Olaus mentions skating races in a Latin book of travels called *History of the Northern Peoples.*

There are no records of the earliest racing, but Norse sagas speak proudly of achievements in skating that very likely were "speed" achievements. A well-travelled monk, Fitz-Steven, recorded with astonishment in the *Description of London* the obvious relish for speed shown by skaters as far back as 1180: "They ran against one another, as it were at tilt with their skates . . . not without some hurt to their bodies . . ."

Many paintings and engravings by Hendrick Avercamp, Rembrandt van Rijn, Pieter van der Borcht, and other masters make it obvious that racing was popular in Holland three centuries ago.



Skaters drill on speed oval at Squaw Valley winter games site. Piping, left, is for artificial ice facilities which will be first ever used at an Olympics.

True figure skating was a product of the 19th century. Skating garb was long and soberly styled and technique was stiff and exact but not without considerable grace.

However, the first match recorded for posterity took place in England in 1814 when Youngs of Nepal beat Thomson of Wimblingdon. Then in January, 1823, *Sporting Magazine* reported the first amateur match between *teams* of six gentlemen. But the speedsters had to wait until 1892 for an International Congress at Holland to give official sanction to racing.

The earliest ice skate remains were found in Hungary, Switzerland, Germany, Great Britain and Norway. They date back to the Stone Age. These primitive bone runners, smoothed and bored to take a thong binding, were tied under the wearer's feet. No one knows exactly when metal runners replaced the bone but it would have been possible any time after the 3rd century A.D. when the knowledge of working iron was introduced into northern Europe. However, the skating that was known in France and England during the Middle Ages clung to bone runners, for Fitz-Steven noted it: "When the great fenne or moore (which watereth the walls of the citie on the north side) is frozen, many young men play on the yce . . . asome tye *bones* to their feete and under their heeles, and shoving themselves with a little picked staffe to slide as swiftlie as a birde flyeth in the aire or an arrow out of a cross-bow."

When the Dutch fitted a blade lengthwise into a wooden sole in the 17th century, it heralded the day of the modern ice skate. Along with it, they gave us their word, *schaat.*

By the time of Charles II — about 1670 — skating was as popular with the aristocracy as with the people, according to the famous diarists Pepys and Evelyn. Indeed, historian Macauley mentions that Charles II's son learned to skim on the ice from Dutch ladies on the frozen canals.

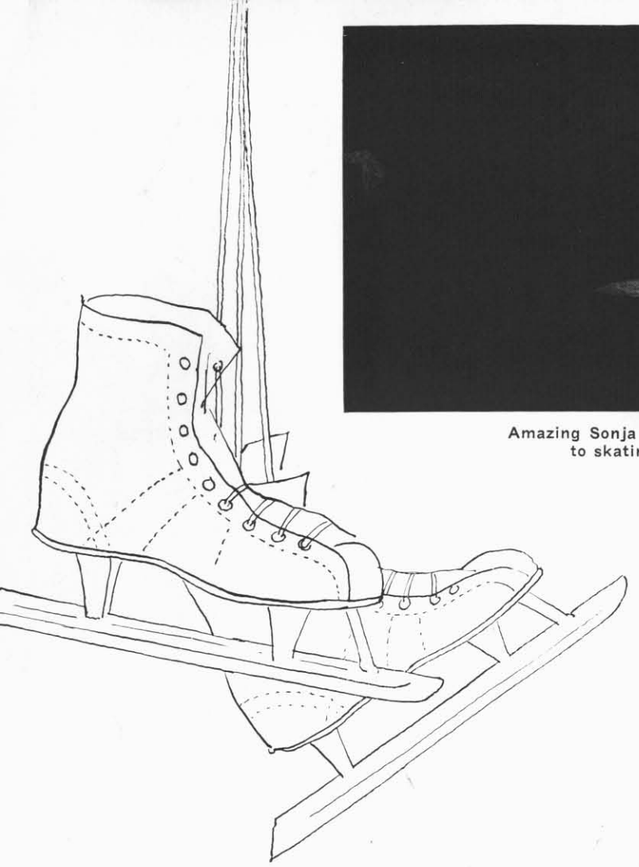
Holland, therefore, must have been a particularly broad-minded country, for in neighboring Germany where Goethe devoted much time to skating in the last part of the 18th century, women were still being stoned for their audacity on the ice as late as the 1850's.

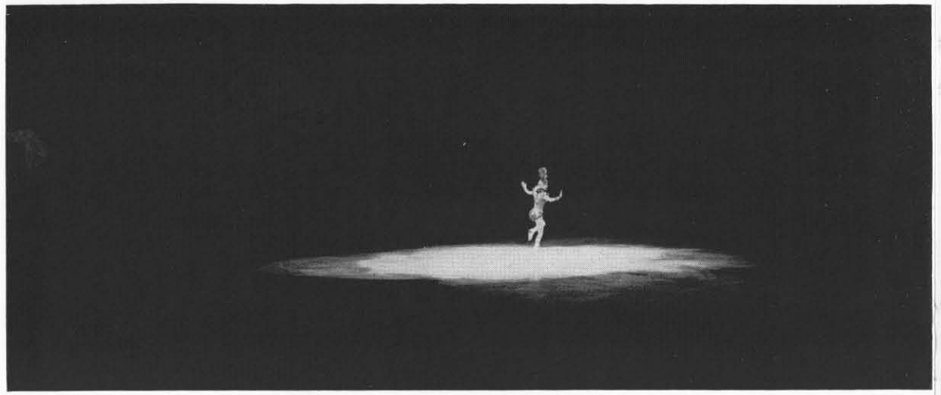
Over in the New World, reckless schoolboy accidents caused Harvard trustees in 1820 to forbid skating on deep water without permission. At that time most skates were imported from Holland and sold here at about 25 cents a pair.

By 1870 every kid in the United States was skating. Twenty years earlier the development in this country of an all metal skate riveted to a boot replaced the old fashioned wooden base affair that had to be strapped on.

The introduction of ice hockey in 1888 at Kingston, Canada, added considerably to the already wide limelight that skating enjoyed.

Who the world's first figure skater was, is not known. But a membership requirement of the Edinburgh skater's club indicates an interest in artful ice antics as far back as 1642. Membership was confined to those who could "skate a complete circle on each foot and jump over first one, then two and three hats." A century later *A Treatise on Skating* by one R. Jones, Gent., was published, the first work on the subject in English. And although Mr. Jones went to great pains in his sophisticated description of what he considered good ice technique, true figure skating was a product of the 19th century. It saw its greatest development at the hands of well-off English people with considerable leisure time. The English style, not without grace and skill, was a stiff affair. The various figures that had to be traced on





Amazing Sonja Henie brought dramatic movements and colorful costuming to skating. She dominated sport for decade and brought it into films.

QUEEN OF THE WINTER SPORTS

ice were done with the body held as nearly as possible upright. Long, drab skating garb matched the stiff colorless movements of the technique.

In America a similarly inflexible style with small movements and merciless emphasis on accuracy lasted into the early 1900's. In fact, American figure skating circles missed the forest for the trees when they contemptuously ignored the pleadings of one Jackson Haines, who eventually gave the world the International Style of modern figure skating. Haines broke all the rules. As a dancer who had already won the figure skating championship of the United States, he threw caution to the winds and thrust new creativity into skating. He skated to music, adopted ballet movements, new poses and emphasis on grace. Ignored in the United States, frowned on in England, he found an enthusiastic welcome in Vienna. Thirty years after his death in 1879, American skating circles "discovered" him. By that time his influence was felt everywhere people skated.

Today, an International Skating Union (founded in 1891) controls figure skating in Europe and America, and most nations have their own central organization.

The performance of each contestant is divided into compulsory figures and free skating. Like ballet, figure skating is stylized. Every skater must have a thorough control of certain movements and a whole series of standard patterns. Forty-one figures provide 69 combinations in all. Judges select beforehand the series to be performed and each contestant must do them. Not only are they judged for grace and ease of movement but often the ice tracings of the figures are carefully measured by a tape.

In *Winter Sports in Europe,* Waverly Root likens the free-style part of a figure skating contest to a concerto. "The body of the concerto is written down, note by note, by the composer, as he hoped the player might be moved to perform it: but the place where the cadenza was to be inserted was merely indicated. This allowed the virtuoso an opportunity to perform whatever tricks he could bring off most brilliantly on his instrument; and in the same fashion, the free-skating part of the figure skating contest allows the skater the chance to demonstrate his own special abilities."

Modern skating came of age, stride in stride, with the success of artificial ice. Man-made skating surface permitted the enthusiasts to concentrate on their pastime and forget about the weather. Surely natural ice, floating as it does on its cushion of water, has a resiliency that gives a better spring to the skater. But there is little controlling the wind that ripples water as it freezes. On the other hand, artificial ice, outdoors or indoors, while deader, is easily controlled to provide a glass-like surface, satisfactory to the most demanding skaters.

From 1812 on, there were a number of attempts at forming ice artificially. Professor John Gamgee of England finally patented a process in 1870 but although his copper pipes with their glycerine and water chilled by ether produced the first artificially refrigerated rink in history, they unhappily caused a heavy mist.

Today, artificial ice depends on a comparatively simple formula. Through multiple rows of pipes set in water is pumped a coolant, usually brine, which has been chilled anywhere from 17°F. to 25°F. The brine is constantly rechilled and constantly circulated. If the area is to be used during other seasons, as a roller rink or, as in the case of the famous Rockefeller Center rink (the first permanent outdoor artificial ice skating rink in the United States), as a restaurant, the pipes are usually embedded in concrete. When the time comes to remove the ice, the process is reversed: hot brine is circulated.

The "plain skaters," those of us who just like to skate around and around, or off through the woods, have a tremendous stake in ice facilities. Most of us are not very fussy about how perfect our ice has to be. Along the length

Winter on Central Park lake years ago by Currier & Ives. Today, the man-made surface of the Park's Wollman rink accommodates skaters October to April.

A winter canal scene near The Hague, Holland. Skaters take advantage of good, "black" ice.

and breadth of this land each year when freezing weather sets into motion a flurry of preparations for skating, every place — tennis, volley ball, basketball courts — that can hold a layer of ice is flooded. In Newburgh, New York, even a hard surfaced track, forty feet wide by one-sixth of a mile long, is flooded for speed skating.

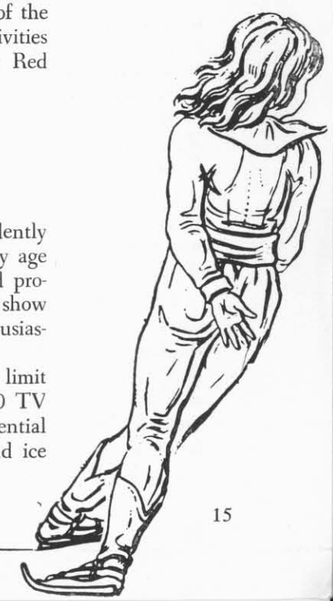
Figures from the National Recreation Association's yearbook most clearly indicate the growing interest in the sport: in 1930, there were 1,806 municipally operated ice skating areas in 291 cities of the United States. By 1939 these had increased to 2,968 areas in 427 cities, and in 1958, 3,296 areas in 836 cities. Added to this are the thousands of lakes, streams and ponds each year where warmly dressed enthusiasts patiently watch and wait for the solid "black" ice that means safe skating — not to mention a great many privately operated ice-skating rinks.

In the Holland of his youth, writer David De Jong relates how first dogs, then small boys, then larger boys and then men — were used to gingerly test the strength of the canal ice. Americans restrict their own ice safety activities to more conservative methods such as the popular Red Cross jingle:

One inch, keep off!
Two inches, one may;
Three inches, small groups;
Four inches, O.K.

There is no particular age group of skaters — evidently every age likes to skate. And just as important, every age enjoys watching skating. When Sonja Henie turned professional in 1936, she launched ice skating on a vast show business career and millions of people became enthusiastically aware of performance on ice.

At Squaw Valley next month, officials expect to limit crowds to 35,000 persons a day. But the 50,000,000 TV sets in this country will make for the greatest potential crowd of spectators that winter sports in general and ice skating in particular have ever dreamed of.



The Cowboy Nobody Knows

"THE Virginian's pistol came out and his hand lay on the table, holding it unaimed. And with a voice as gentle as ever . . . he issued his orders . . . 'When you call me that, *smile.*' "

So reads a scene from the book that is the grand-daddy of all cowboy stories — Owen Wister's *The Virginian.* If it sounds familiar, that's probably because it has been rehashed endlessly. Although not the first book to deal with the intriguing figure of the cowboy-hero, it is rightly regarded as the progenitor of Western fiction because it provided the classic mold in which the theme has been fashioned ever since.

Before Wister, the West had received some attention from writers, but mostly hack-work that made no attempt at picturing the new and strange society that had sprung up beyond the Mississippi. Ned Buntline, for instance, a writer and soldier-of-fortune, had built a young army scout named William Cody into a national figure as Buffalo Bill, by grinding out wild stories of Cody's frontier derring-do. Today, all Buntline's Buffalo Bill stories are considered fictitious.

In the 1880's an Eastern magazine company moved into the field in a massive way. With a staff of prolific writers — some of whom *may* have actually visited the West—*Beadle and Adams Dime Magazine* turned out blood-and-thunder Western tales on an assembly line basis. In ten years they flooded the country with stories — again supposedly true — about such well known figures as Wild Bill Hickok, Kit Carson, Deadwood Dick, and Calamity Jane.

It was not, however, until the appearance of *The Virginian,* in 1902, that cowboy literature came of age and was accepted by all levels of society. And after Wister — the deluge.

The silent movie industry, just then struggling into existence, took up the theme. In no time at all, Westerns were the big money-makers in filmdom, with such stars as William S. Hart (who had never put his foot in a stirrup) and Tom Mix (who had once been a real cowboy). In all the make-believe shooting, rustling, and stage-robbing that followed, the cowboy lost the true elements of his character, and the Old West was largely forgotten as a place where thousands of people lived happy, free lives in a land of great promise.

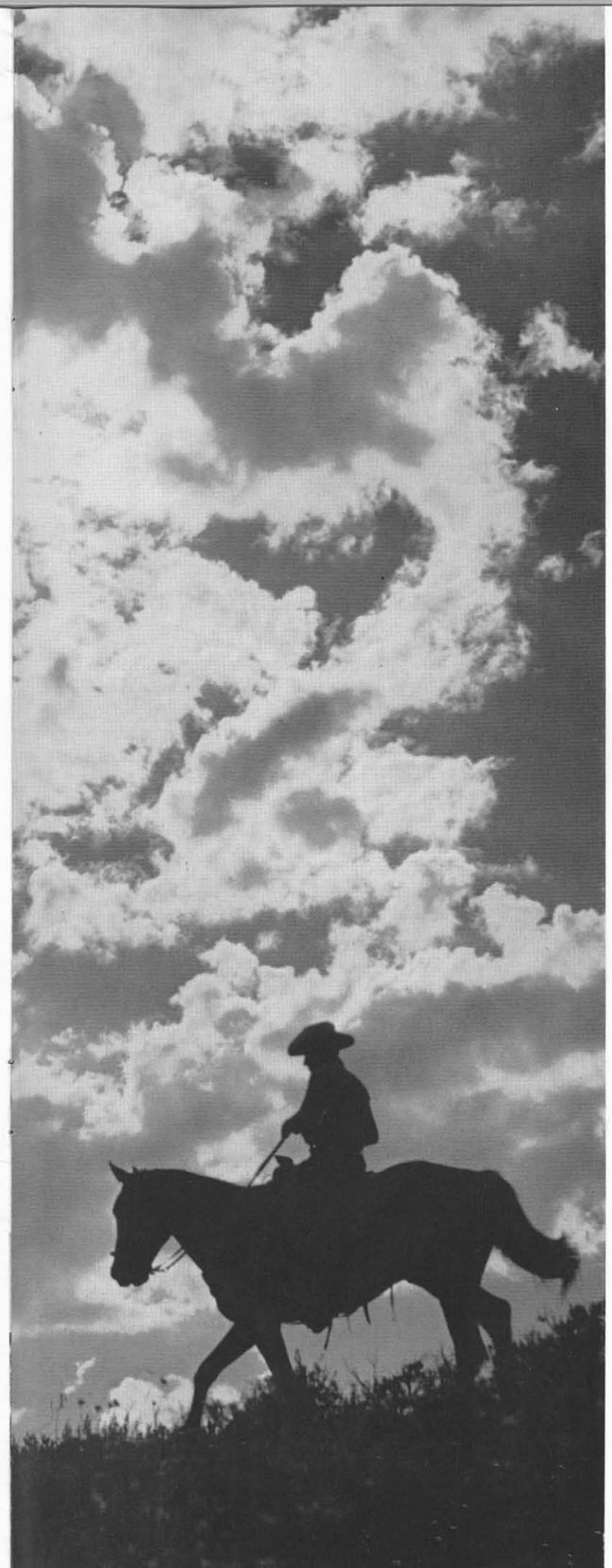
Contrary to the popular error of today, the Old West did not give the name of *cowboy* to anyone with a horse, a broad-brimmed hat and a gun. The name applied to a specific and highly skilled member of Western society, who spent years learning his trade, and who took a deep pride in his calling.

At the peak of the "Cowboy Era" there were probably no more than forty thousand cowhands making a living from the cattle industry. Some were drifters moving about the cattle country as the spirit moved them or as the need to find work arose. Others remained in one place working year after year for the same outfit. Their "ten-gallon" hats, bandannas, and "chaps" were eminently practical items in a country of blazing sun, fierce, dust-laden wind storms, and flesh-tearing underbrush. They did carry guns — mostly .44 or .45 caliber Colt pistols — but mainly for protection against wild animals and snakes. Guns were also a very necessary piece of equipment for dispatching diseased or crippled cattle. Most cowboys never took aim at a fellow settler in their lives.

Of all the famous "bad men" of the Old West, very few were, or ever had been, real cowboys. The Dalton gang, the Younger gang, Ben Thompson, John Wesley Hardin, Doc Holliday, and Jesse James are all names inseparably connected with the days of the cowboy, but it is certain that none of them had anything to do with the hard work of tending cattle. Neither did any of the renowned "law enforcers" — such as Wyatt Earp or Bat Masterson — ever earn their livelihood as cowpunchers. It is true, however, that William Bonney, alias Billy the Kid, and train-robber Sam Bass were both cowhands prior to embarking on their notorious careers.

One really surprising fact in the story of the cowboy is that he existed for so short a time. He was a product of a day when the grazing range of the West was open and free for the use of all; a day when the cattle of many outfits ran together over the hilly miles of sweet grass. The cattle industry did not begin to develop until well after the Civil War, when the steel fingers of the railroads probed the lonely stretches of the Middle West, making Eastern markets accessible. And by the turn of the century the free range had been fenced and controlled. Thus the cowboy of legend — the "American Cavalier" — strutted the dusty stage of Western history for only about three decades, roughly from 1870 to 1900.

There are cowboys still to be found out West, of course,



Behind the cloud of fictitious bravado and derringdo hovers the dim outline of a lean, dust-eating, suntanned figure who made the cattle industry possible.

whose daily work bears a resemblance to that done by the cowhand of old. But the similarity is fleeting. Today, the cattle industry operates under specific national laws, the grazing is controlled, and the breeding of cattle is selective. Ranchers have access to railroads practically at their back doors, and the packing houses themselves have edged as near as possible to the range. The man on horseback, with six-shooter handy and eyes peeled for sign of Comanche or Sioux, the man who ate the dust of a thousand longhorns as they moved slowly across virgin prairie, is no more.

But it was this same dust-eating, sun-tanned, leathery cowhand who really made the cattle industry possible. For, without the men in the saddle — enduring cold and heat, hunger and fatigue, the pressing loneliness and hidden dangers of a primitive country — the great herds of beef cattle could never have been developed.

Especially in the beginning, when the cattle business began to spread north from Texas to meet the population waves rolling from the East, was the cowboy indispensable. There was, for example, the exploit of a man named Nelson Story who, with forty range-hardened cowhands took a large herd from the Texas Panhandle all the way to the booming mining center of Virginia City, Montana. To accomplish the feat he had to move through unfamiliar country alive with hostile Indians. At one point, a war party of Sioux fell on them, killing two men and running off some cows. At Fort Kearney, Story was warned that the famous chief Red Cloud was waiting for him along the Wyoming Warpath. In defiance of orders from the military, Story continued on; he had his life savings invested in the herd. Daringly, he conceived a plan of attacking Red Cloud with his willing cowhands. The attack was successful because it was completely unexpected, the Indians were routed, and Story went on, unmolested, to rich profits in Virginia City.

The cowboy's main job, though, was not battling the Indians, or even the white desperadoes who occasionally preyed on the vast herds roaming so freely in open country. Basically, his task was the preservation, growth, and multiplication of his owner's herd; to perform it, he had to wage a constant battle against the treacherous terrain, the unpredictable and brutal elements, and the ever-present threat of disease.

For a good part of the year the cowboy was based at the ranch, riding out each day to work. Some of it was the simple drudgery of necessary chores, such as hauling firewood, cleaning out water-holes and, in winter, cutting the

ice that prevented the cattle from drinking. Sometimes, too, a ranch hand would take on the job of breaking horses, but more often this bone-crunching feat was left to a professional "bronc snapper."

Much of the time, in summer, the cowpuncher was "riding bog" – patrolling the water holes to rescue any cows that had gotten mired in the muck churned up by the threshing hooves of the cattle. In the every-cow-for-himself crowding that took place at waterholes, weak animals were often knocked down and left helpless. Whenever a man found such an animal in distress, he would loop his lariat around the horns, fasten the other end to his saddle and drag the protesting beast unto dry land flat on his back.

But it was when the round-up got under way that the cowboy began his toughest job, and when he came closest to being the uninhibited, romantic nomad of legend.

For weeks or months at a time, depending on the size of the outfit that hired him, he was out on the range, eating beside camp-fires, sleeping on a bed-roll under the starry, limitless skies, and working eighteen hours a day as he gathered the cows for shipment.

The round-up – almost as carefully planned as a military campaign – was usually conducted on a state-wide, cooperative basis. Organized by the State Cattlemen's Association, a series of general round-ups were mapped out, and on the appointed day, most often in early September, the first push would begin.

From a common starting point, riders would fan out left and right over the grazing lands, describing a huge circle. At intervals of about half a mile or so, a rider would turn and head in toward the approximate center of the circle, driving before him all the cows he chanced on. When the circle was complete, hundreds of bawling cows, calves and yearlings would be milling in a circumference of some twenty-five or thirty riders. After steadying the cows, the hands would change to fresh horses.

While the cowpuncher ordinarily had one favorite horse, he usually owned or rented two or three others. Riding the range, looking after cattle, was arduous work and horse needed rest as well as man. This was especially true during the grueling period of round-up, when a cowboy would have for his personal use a "string" of as many as ten horses.

This was demanding labor, and it went on until the entire range had been worked, week after week, rain or

The gunfighter—
symbol of our modern cowboy myth

A herd of longhorns arrives at Dodge City, Kansas — at the end of the long journey from Texas.

Remington print of a cowboy gentling a horse for duties as a cow pony.

Chow time. Cow hands gather around the chuck wagon.

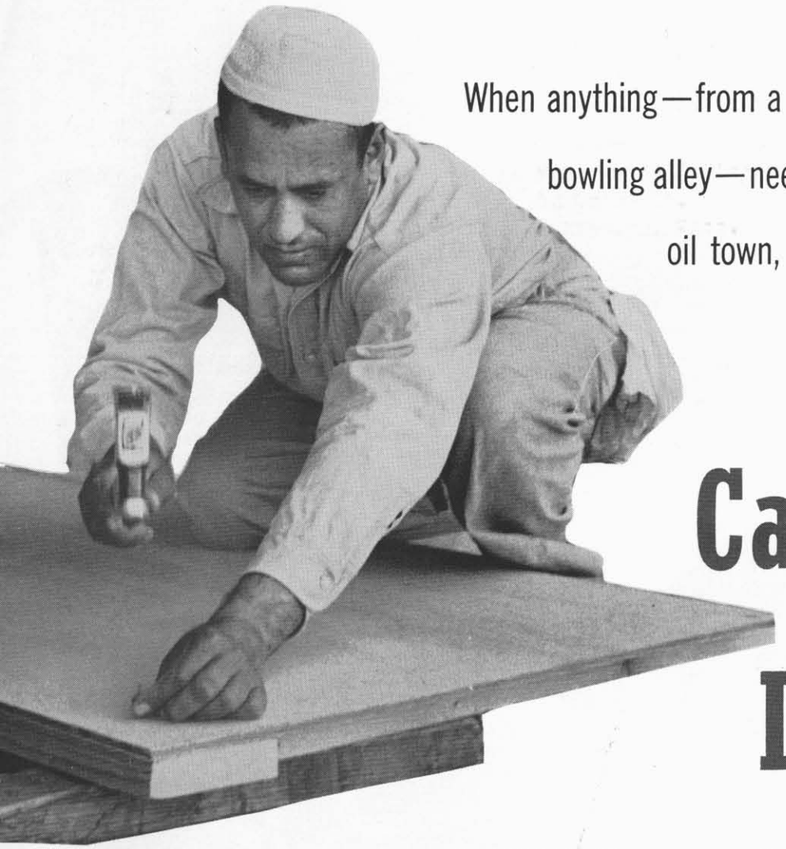
The hard-working, rough-living, real cowboy—forgotten hero of a lost legend

shine, unrelieved by anything save camp-fire talk and the plainest of food. For his beverage, the cowboy took coffee; he liked a lot of it and he liked it strong. (Recipe for cow-country coffee: "To a gallon of boiling water add a pound of coffee. Boil an hour, then throw a horse-shoe into the pot. If it sinks, the coffee ain't done.") When the hands did have time for entertainment on round-up, it usually took the form of rugged sport, such as hunting mountain lions or capturing wild horses. There are even tales of particularly adventurous cowhands who roped full-grown bears from horseback and dragged them, snarling murderously, into camp to exhibit.

When the cows had been shipped and wages paid, the cowhand looked forward to a good time in town. It was mostly during these "holiday" periods that the West became Wild. There was a largeness of spirit in the cowpuncher, an independence of thought and action, a self-sufficiency that grew in him as the natural heritage of frontier life. Such traits of character, in any sudden explosion of sociability, were bound to produce fireworks in the cowtowns. Sometimes, the trouble got out of hand and led to bloodshed.

The most famous of the cowtowns were Abilene and Dodge City, both in Kansas. They reached their lusty growth because of their positions as railroad centers, and, in a sense, they were the capitals of the cowboy world. No cowpuncher considered himself a full-fledged hand until he had savored the delights each had to offer. Together, Abilene and Dodge provided a large percentage of the West's reputation for wildness.

That wildness in the first place, of course, was the result of inadequate laws in coping with a mushrooming, exploding, fermenting civilization in a huge new country. There was even difficulty in enforcing whatever laws there were because of the prodigious distances, lack of transportation, and the unstable nature of the population. But time took care of these deficiencies and the West grew into civilized maturity – not, however, before it had provided America, and the world, with one of its most popular, and seemingly most enduring, folk-heroes.



When anything—from a sagging screen door to a warped bowling alley—needs repairing in this Saudi Arabian oil town, a call goes out for

The Carpenters of Dhahran

IT would be an understatement to say that Hillal bin Ali is a handy man around the house. He is, as a matter of fact, a handy man around a thousand houses and buildings.

Hillal is foreman of Aramco's carpentry shop in Dhahran. It's the only carpentry shop there; and, if you don't think he has his hands full – well, drop around some time.

You'll see Hillal's craftsmen making windows and doors, cabinets and book shelves, screens and shutters, molding, slats for sand fences – something all the time. As you look around, you get the impression that there's a man – and a machine – for doing almost any carpentry job you can imagine.

The crew at the shop ranges from 25 to 40 men, depending on the work load. Hillal has around 75 more on-the-site carpenters who take care of the housing units. Another 50 to 75 are assigned to the industrial installations, and their foreman is Khalil Younis Ali. Both foremen, and all their crew members, are Saudi Arabs.

These craftsmen – in the shop and on the site – are responsible for repairs and maintenance of some 1,000 housing units, plus the many other facilities that go to make up a community: dining places, office and recreation buildings, the Health Center, the movie theatre, industrial installations, and so on.

They do roofing, floor surfacing, glazing, wall insulation – even small construction jobs: as this was written, for example, they were adding an extra bedroom to each of several existing 2-bedroom houses. Larger construction jobs are done by local contractors.

In the States, the operators of bowling alleys usually call upon specialists for the necessary periodic renovation – smoothing or replacing badly dimpled boards and recoating the surface with a fresh, hard finish, polished to mirror-brightness. But not so in Dhahran: the carpentry unit does this, also – and very well. Then, just to show their versatility, they'll handle such diverse assignments as repairing the interior of an Exploration Department trailer, or doing special decorating jobs for community festivities.

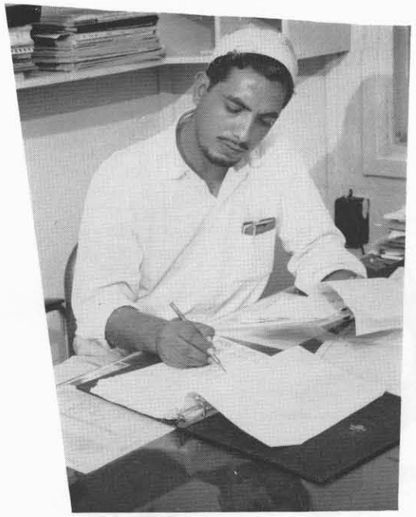
So . . . what about gripes? Hillal shrugs and smiles:

"Oh, sure – people do it everywhere, don't they? But we don't get very many."

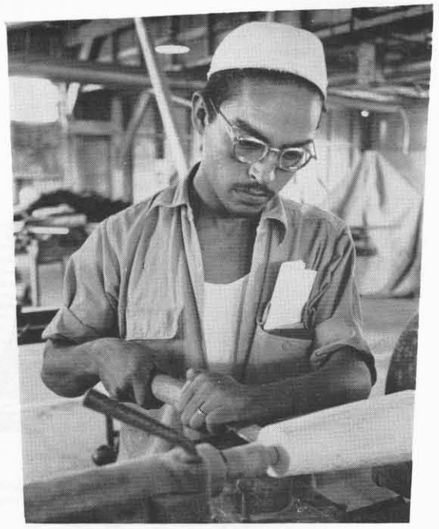
You could spend days in going around seeing the different kinds of jobs that are being done on the site, but Bin Ali can give you a pretty fair idea by showing you a sheaf of work orders.

You see, when a family moves from a house, it's renovated before the next family moves in. And, as you know from your own experiences, you can think of *more* things you want fixed up before you move into a place.

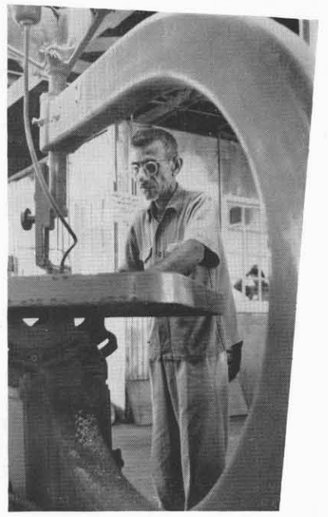
Hillal points out that *one* work order for *one* house had



Hillal bin Ali — "muraqib" or "the boss" — assigns work for the day.



A table leg takes shape under the steady hands of Saad bin Abdulhadi, lathe operator.



Abdulla bin Jaffer does fancy work on the giant jack saw.

47 different items calling for attention. Just to pick a few of them to show what it's like:

"Living room – replace screen door knob . . . repair screen door automatic closer . . . repair cabinet hinges and handles . . . repair hallway door to close properly . . ."

"Kitchen – repair or replace all cabinet doors, hinges and catches . . . repair floor linoleum . . ."

"Bathroom – replace missing toothbrush holder . . ."

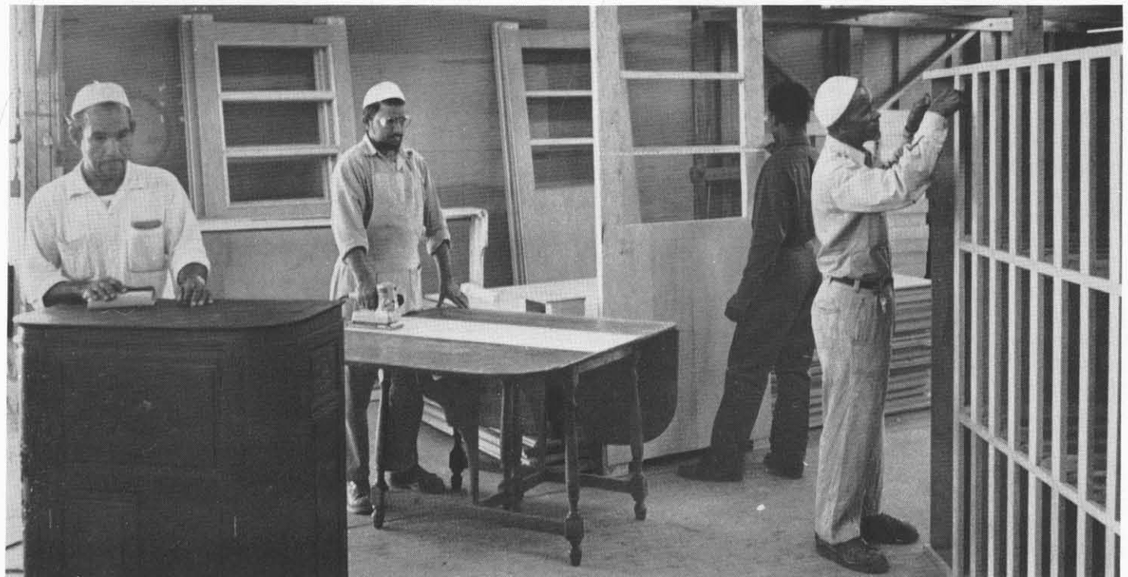
And so on, and so on, and so on – house after house.

The men in Aramco's Maintenance and Shops Division in Dhahran will assure you that Hillal bin Ali knows his stuff. He has been with the Company for eleven years; went through the usual period of progressive training; and qualified for advanced craft instruction at the Industrial Training Center.

He earned promotion to a job as assistant foreman; and, later, because of his demonstrated skill and leadership qualities, was selected as an instructor in carpentry and in the use of blueprints. He has been a foreman for the last four years.

Time doesn't hang heavy on the hands of Dhahran's carpenters – not with those work orders coming in: "sand and repair floors . . . install partition . . . build fence . . . repair roof . . . inspect job to verify completion . . ."

Partitions, tables, doors, cabinets — you name it, they can fix it.



A BEAN TAKES A BOW

Cocoa made its triumphant debut more than 500 years ago when the Aztecs hailed it as "food for the gods"

ON a really wintry winter day, when the snow drifts high and trees bow low, weighted with ice and snow, the perfect answer to a frost-nipped nose is a steaming mug of rich brown cocoa, topped with marshmallow or whipped cream. Warming, energizing, and delicious, hot cocoa is just one product of Nature's most romantic bean — the bean of the cocoa tree.

So highly was the cocoa bean regarded by its discoverers, the Indians of South and Central America, that they believed it was of divine origin. They told how Quetzalcoatl, the mythical gardener of Paradise, brought the seeds to earth to sow them at Talzitepec. This idea is perpetuated in its botanical name — *Theobroma cacao* — bestowed in the 18th Century by Linnaeus, the Swedish botanist. It means, literally, "food for the gods."

Hernando Cortez, the first European to taste chocolate, never knew it as it is prepared today in any of its varieties. As Montezuma's guest, Cortez was served a cocoa bean concoction mixed with a variety of spices, including even fiery chili, and whipped to a froth. It was sipped from golden goblets on spoons of finest tortoise shell.

The Aztecs used chocolate as both a food and a beverage, blending corn, herbs, and spices into it. Montezuma's household consumed 2,000 jars of it daily. The king, himself, is reported to have touched no liquids except this.

Spanish nobility, however, found the Aztec chocolate concoction too bitter when they tasted the samples that Cortez had brought back from his journeys. Cocoa was not popular until a Spanish confectioner tried lacing it with vanilla extract and sugar. This recipe was jealously guarded by the Spaniards for many years as chocolate drinking spread from the Spanish court to other parts of Europe.

The Spaniards, in fact, had a monopoly on the preparation of drinking chocolate for decades and although the beverage was almost instantly popular in France, only the wealthy could afford to drink it.

As Spain's grasp on the New World weakened, commercial production of chocolate spread to other nations. But it wasn't until the end of the 19th century that exploitation of the cocoa tree on a commercial basis was attempted outside the Western Hemisphere.

Hernando Cortez was the first European to taste chocolate. The conquistador of Mexico sampled it at Montezuma's court.

The trees grew originally in South America close to the Equator and probably were transplanted to other parts of South and Central America by the Indians. They were found in profusion in Mexico by the conquistadors. Today, the highest quality cocoa is grown in Venezuela, with Brazil the largest exporter of the bean in South America.

About 1880, cocoa beans were planted successfully on the Gold Coast of West Africa. Because the land was endowed with rich, well-drained soil and located close to the Equator with abundant rainfall evenly distributed throughout the year, cocoa cultivation prospered there. About 80 per cent of the world supply now comes from the newly formed nation of Ghana. It is the life-blood of the country, accounting for 60 per cent of its exports and employing 18 per cent of its male workers.

In the wild state, cocoa trees grow from 25 to 40 feet. Under cultivation, they are kept pruned to about 15 feet. They require a mean temperature of about 80 degrees and cannot stand direct sunlight, particularly when young. Usually they grow best in the shade of tall mango, banana, rubber, or breadfruit trees.

The trees bloom and grow pods throughout the year, although during two peak periods their yield is highest. The five-petal blossoms are waxy pink and the leaves range from pale rose to red and green. Even the silvery bark of the tree trunk adds color, as do clinging moss and rainbow lichens.

The pods take on a variety of hues, growing from green to gold or from maroon to scarlet, often flecked with gold, bronze, blood-red and green. Unlike most other plants, the pods do not grow on the ends of twigs but attach directly to the trunk of the tree and its main branches. They must be harvested only when completely ripe, and it is the keen eye of the experienced picker that determines this.

A single tree may bear several thousand pale blossoms each year, but less than one per cent ripen into pods. The yield of a tree runs between 20 and 40 pods a year. The pods resemble elongated canteloupes with thick-ridged rind. Most of the weight, approximately one pound, is in the rind. Inside the rind, rows of 20 to 50 seeds are embedded

Trinidad workers break open cocoa pods, each of which holds 20 to 50 seeds.