

VOLUME XCVIII

NUMBER SIX

# THE NATIONAL GEOGRAPHIC MAGAZINE

DECEMBER, 1950

Map of Western Europe

Home to the Holy Land

With 41 Illustrations and Map  
31 in Natural Colors

MAYNARD OWEN WILLIAMS

Mid-Century Holland Builds Her Future

With 33 Illustrations and Map  
24 in Natural Colors

SYDNEY CLARK

Exploring the World of Gems

With 34 Illustrations  
24 in Natural Colors

W. F. POSHAG

Large-scale Western Europe Map

*J. W. Westcott*, Postman for the Great Lakes

With 15 Illustrations

CY LA TOUR

Darius Carved History on Ageless Rock

With 14 Illustrations and Map

GEORGE G. CAMERON

Fifty-six Pages of Illustrations in Color

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NATIONAL GEOGRAPHIC SOCIETY  
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To carry out the purposes for which it was founded sixty-two years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than ten scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizon of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researchers solved secrets that had puzzled historians for three hundred years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1926, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,407 feet. Capt. Albert W. Stevens and Capt. Cyril A. Anderson took with in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

The National Geographic Society U. S. Army Air Force Expedition from a camp in southern Brazil, photographed and observed the solar eclipse of 1937. This was the seventh expedition of The Society to observe a total eclipse of the sun.

The Society cooperated with Dr. William Beebe in deep-sea explorations off Bermuda, during which a world record depth of 4,026 feet was attained.

The Society granted \$25,000, and in addition \$75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the forest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration, 1938.



To Jim

- for holding my hand tight the day we were married.
- for seldom remarking, "That's what I had for lunch."
- for sparing me those chilly trips to heat the 6 a.m. bottle.
- for never opening my mail (though I sometimes do yours!).
- for the things you don't say the time I ripped off the fender.
- for balancing my checkbook without grumbling or pitying.
- for not having to be defeated when I forgot to send your suit to be pressed.
- for treating my women friends as though you liked them.
- for the way your eyes light up when our glances happen to meet at a party.
- for being so eternally there for me to lean on!
- for wanting a good watch for years and years, but being too unselfish to go and spend the money on yourself.

Dearest, here's your Hamilton with all my love!

Peggy



SHOWN ABOVE: 1. Lady Hamilton K6—6 diamonds set in 14K white gold: \$150; 2. Gail—10K gold-filled: \$57.75; 3. Vicki—14K gold: \$110; 4. Fours—14K gold-filled, bracelet: \$71.50; 5. Penny—14K gold-filled: \$71.50; 6. Carter—stainless steel: \$52.25; 7. Purple Rock—14K gold: \$200. Prices incl. Fed. Tax—subject to change without notice. Better jewelers everywhere. Priced from \$49.50 to \$12,000. Each Hamilton watch is adjusted to temperature, isochronism and position. Send for FREE booklet "What Makes a Fine Watch Finer" Hamilton Watch Co., Dept. G9, Lancaster, Penna.

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*3 questions to ask  
when you plan  
your Christmas trip*



**1 "How safe?"** The weather is something you do not worry about—when you go Pullman over the Christmas holidays. Throughout your trip your peace of mind is as weather-proof as your Pullman accommodations. You know you're even safer in a Pullman crossing the country than you are in your own home.



**2 "How comfortable?"** Your mind is as carefree as a child's as you sleep deep and undisturbed on your Pullman bed. And in the morning you freshen up and dress at your leisure. You have complete toilet facilities, hot and cold running water, *everything* you need to prepare for a welcome Santa himself would envy.



**3 "How dependable?"** You get where you want to be *when you want to be there* . . . when you go Pullman. And you're the very spirit of Christmas as you arrive in the center of town—rested, relaxed, ready for fun. (Christmas season or any season, go Pullman—the safe, comfortable, dependable answer to all your travel questions.)



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*Go Pullman*

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. . . Also except this: It is one more example of the ingenious engineering inherent in our credo . . . You Can be SURE . . . If It's Westinghouse.



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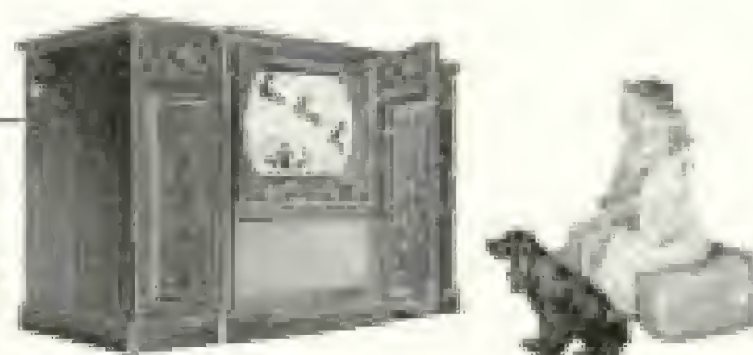
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**HOLLYWOOD STARS IN THE CONGO.**  
After the day's work, they listen to natives  
chant "Bwana Metro makes a picksha."

## A momentous motion picture event for the readers of The National Geographic

FOR 14,000 miles Deborah Kerr, Stewart Granger, Richard Carlson, the cameramen and others followed the greatest safari of modern times into the fabled heart of Africa to make "King Solomon's Mines". They sweated out scenes in the 150-degree heat of the Nile-Victoria valley. They scaled the peaks that overlooked the Congo. They travelled by ship, plane, safari, car, mule, and on their own aching feet.

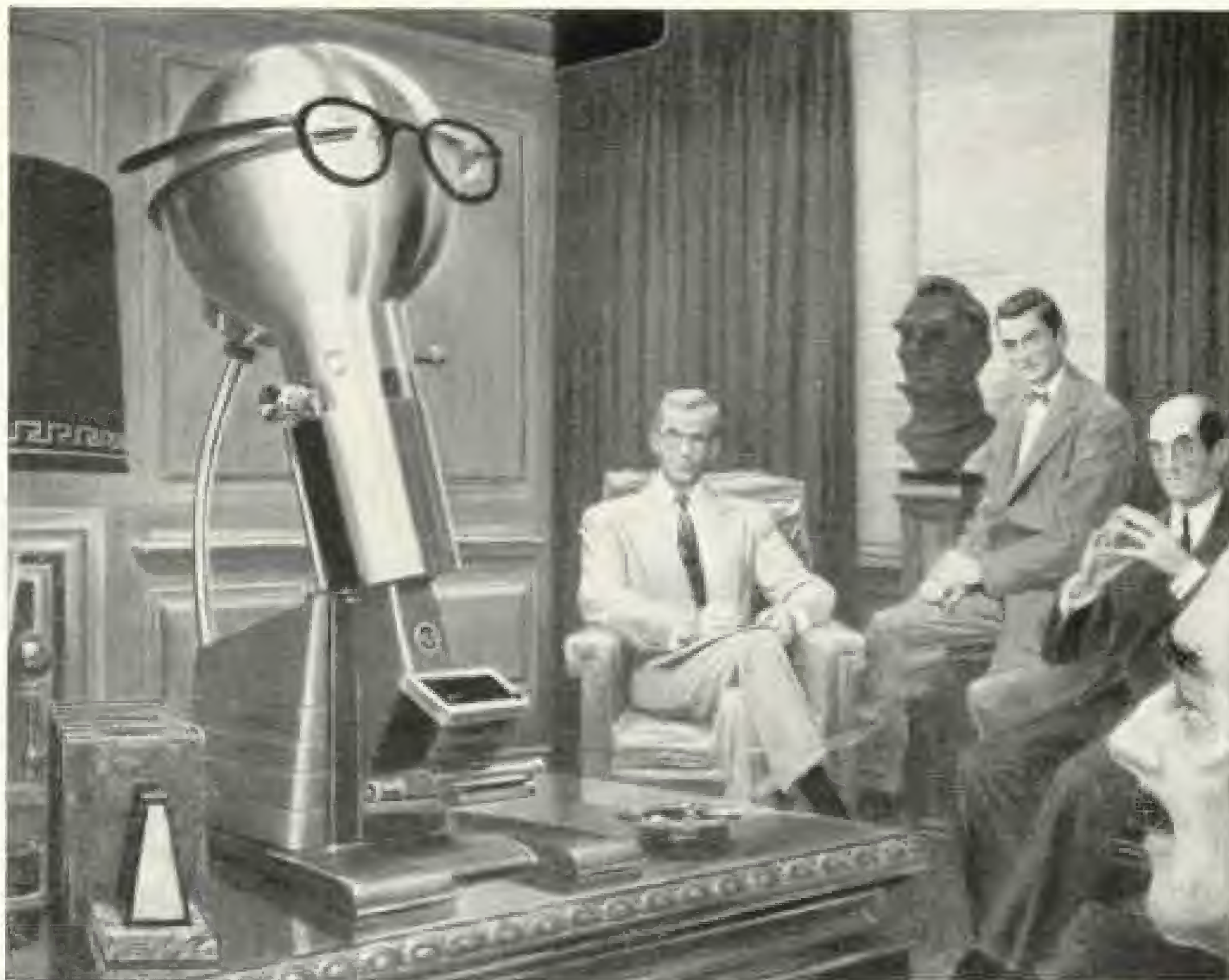
Why did M-G-M have to send a motion picture troupe so far, at such expense, to make "King Solomon's Mines"? The answer is authenticity. During the "shooting" of one scene, the massive Masai warriors were doing a tribal sex dance when suddenly they began to froth at the mouth and actually heaved their deadly eight-foot spears, shattering valuable cameras! When the script called for a fire to roar through the veldt sending thousands of animals crashing, leaping, struggling, clawing toward the cameras—the players had to fight down a terror that all but paralyzed them. The whole panic-hit herd headed in their direction—a storm of hooves, fangs,

claws. Zebras, impalas, gazelles, giraffes, bushbucks—then to add to the terror, a maddened pack of lions. It was awesome, but it was worth it.

The screen has captured something that could have come no easier way . . . the compelling beauty, the astonishing tribal ways, the fascination and majesty that is Africa.

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• • • • •  
"King Solomon's Mines", starring Deborah Kerr, Stewart Granger, with Richard Carlson. COLOR BY TECHNICOLOR. Screen play by Helen Deutsch. Based on the novel by H. Rider Haggard. Directed by Compton Bennett and Andrew Marton. Produced by Sam Zimbalist. A Metro-Goldwyn-Mayer picture.



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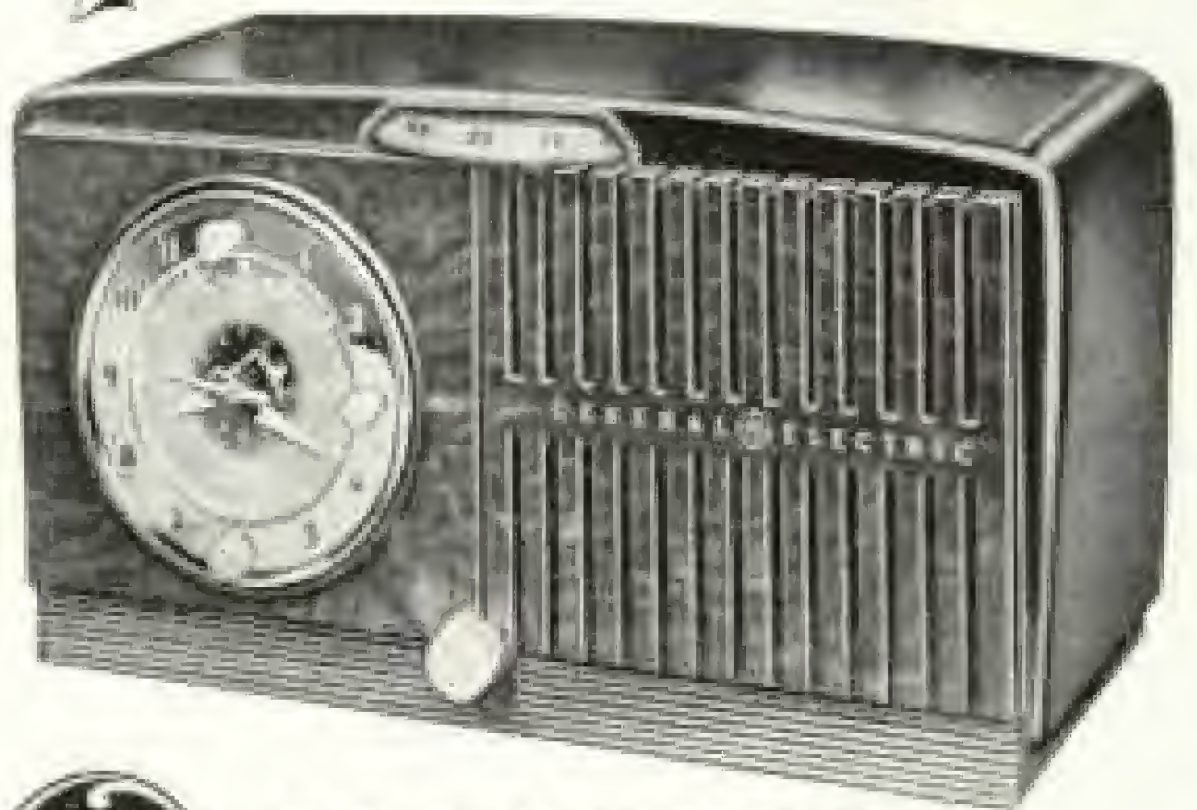


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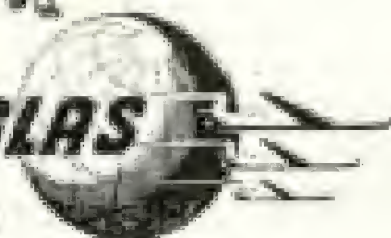
*DISTINGUISHED* motion picture producer, Mr. Samuel Goldwyn, whose latest film, "Our Very Own," is currently being shown throughout the nation. Also noted as an international traveler, Mr. Goldwyn has just returned to America from four months in England, France, Germany and Italy. "Flying," he says, "is a wonderful way to combine business with pleasure. You can do so much and see so much in such a short time."



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it completely all the way around! Alnico magnets will last the lifetime of your refrigerator!

You don't need to lift a hand to open the Alnico Magnetic Door to the fresh-food section! A touch of the new foot pedal swings the lower door open wide!

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See this new General Electric Refrigerator-Home Freezer Combination. You'll find your nearest G-E dealer listed in your classified telephone directory. General Electric Co., Bridgeport 2, Connecticut.



10-cu-ft model N1EX-106 illustrated

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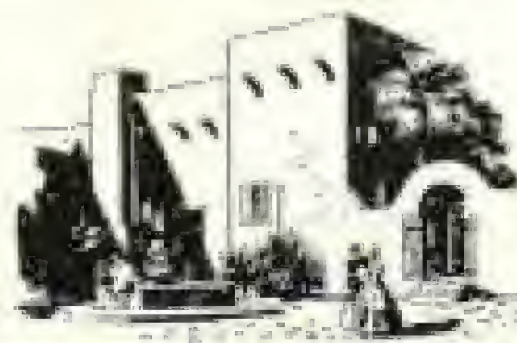
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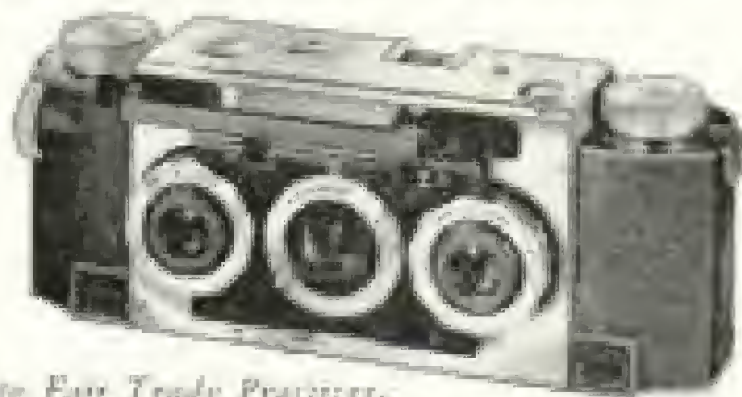
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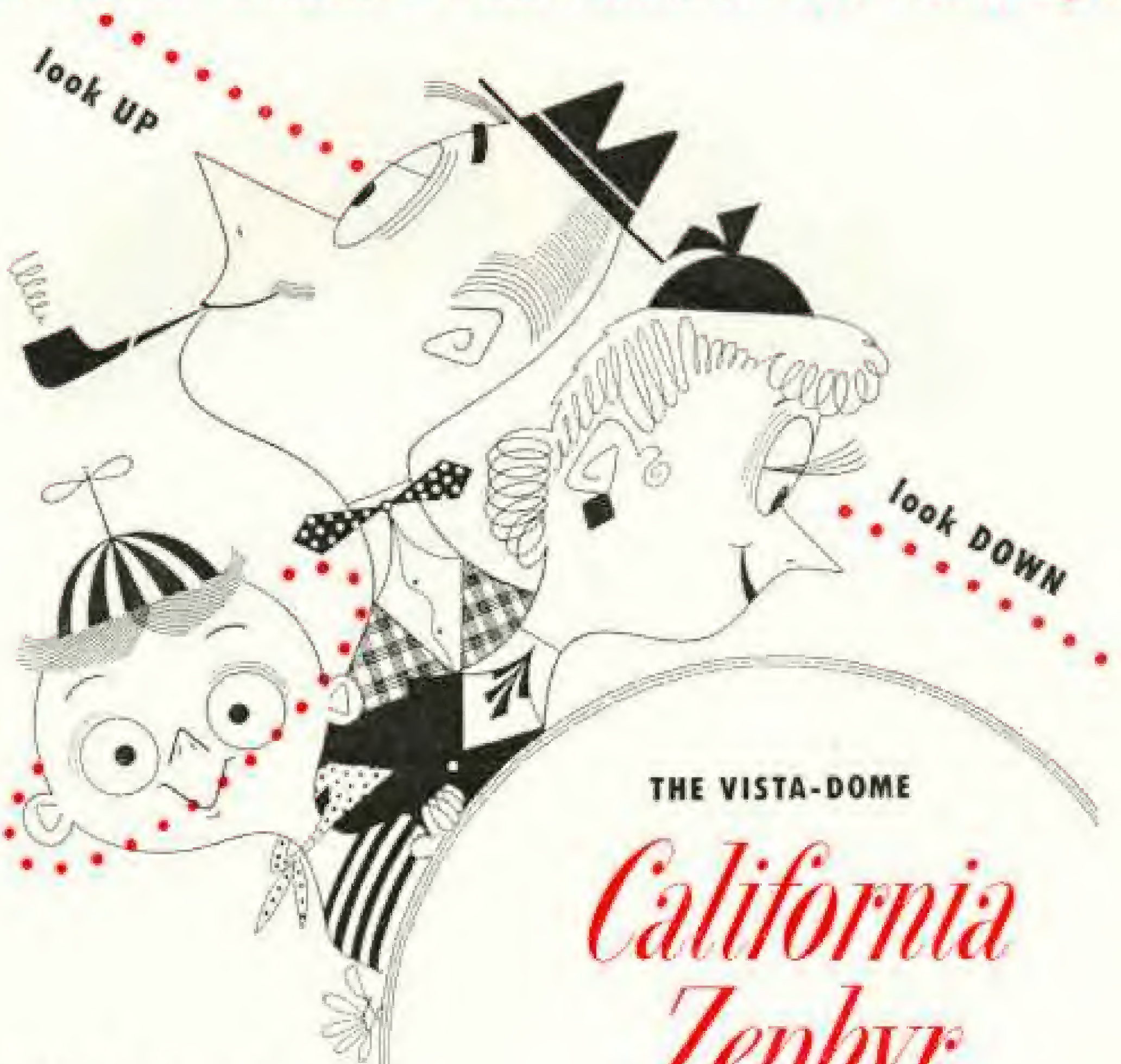
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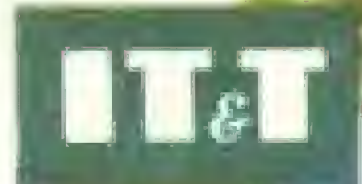


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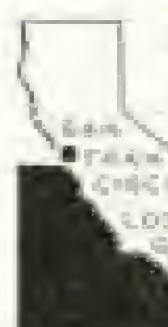
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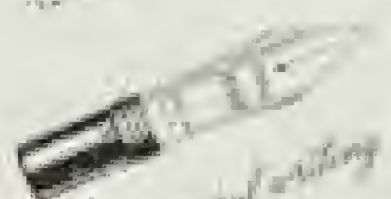
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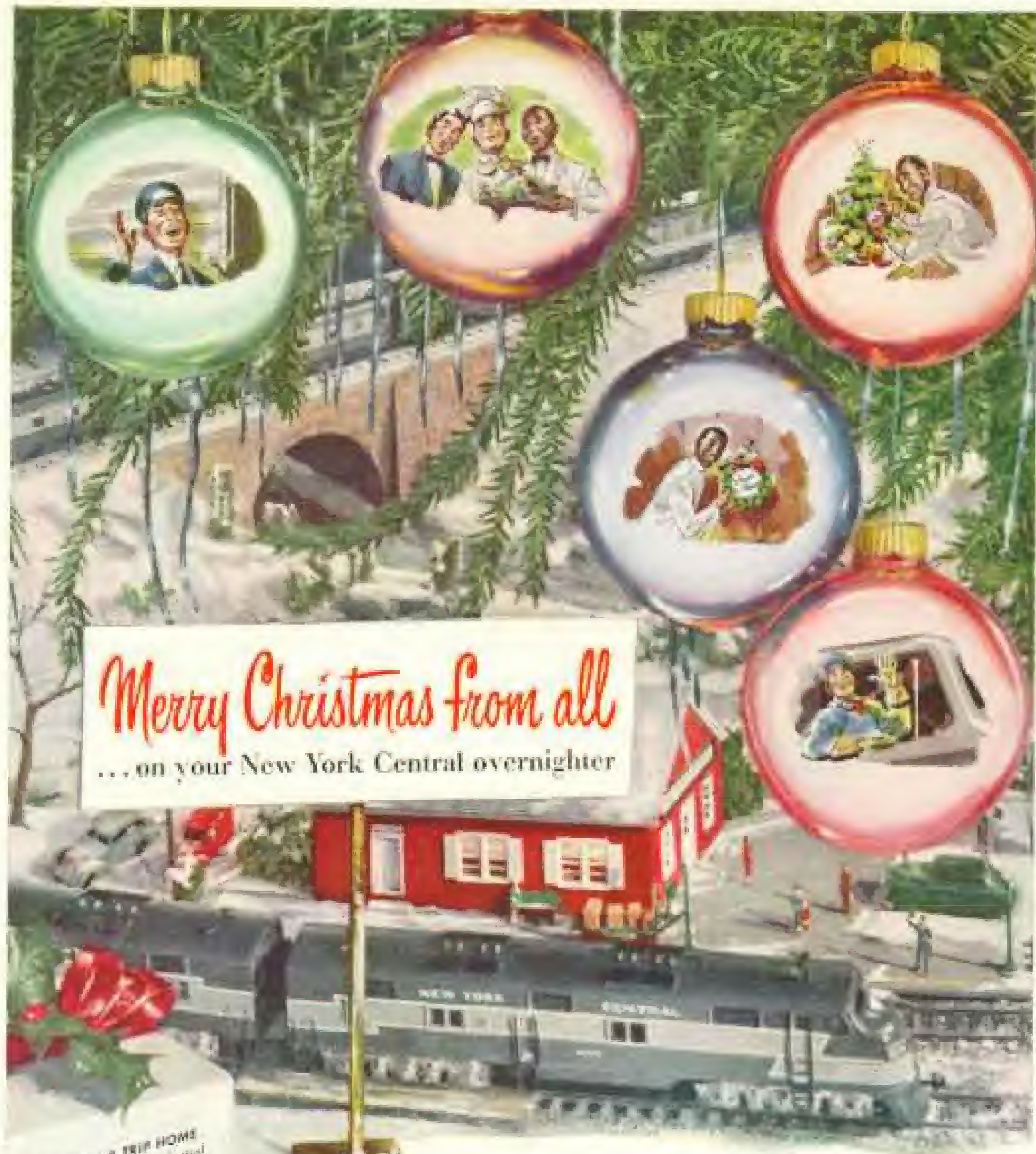
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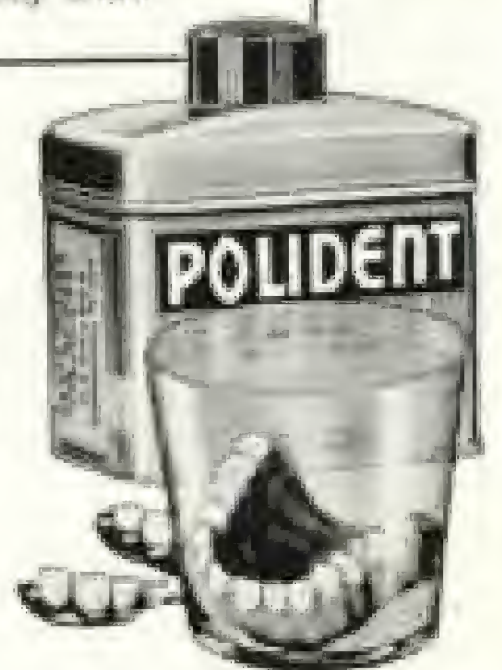
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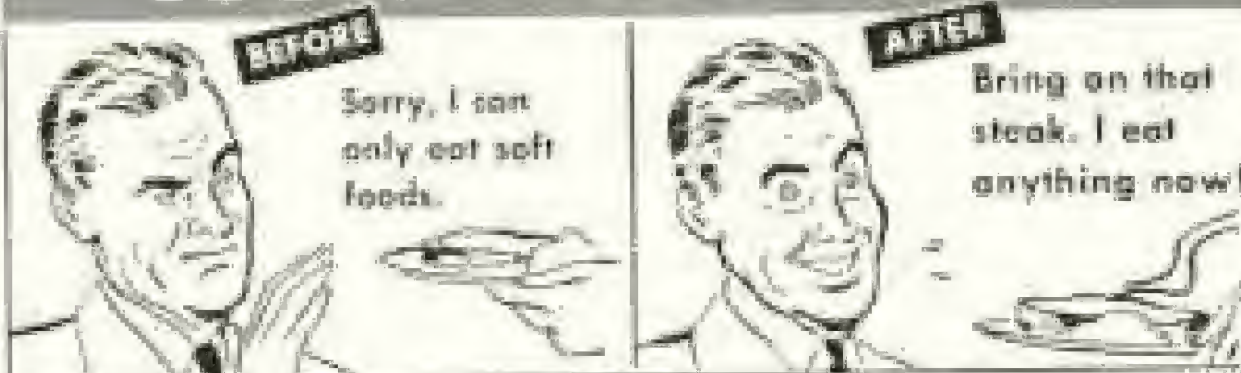
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# Three ways to fight TUBERCULOSIS

The mortality rate for tuberculosis has declined steadily over the years. According to the National Office of Vital Statistics, the death rate in 1900 was 194 per 100,000 population. Today, it is less than 28—the lowest on record.

Despite the decline in the death rate, tuberculosis has by no means been conquered. Nearly 40,000

people in the United States lost their lives last year from this disease, and over 130,000 new cases were reported.

Doctors urge continued efforts to advance the fight against tuberculosis. They suggest three ways to do this—*detect the disease early, treat it promptly, and prevent new cases.*



**1**

## 1 Detect the disease early

The surest way to find tuberculosis *early* is through an X-ray examination at the doctor's office or at a chest clinic. This is especially important if a persistent cough, fever, a "tired feeling" or loss of weight occur—for these may indicate early tuberculosis.

The disease may, however, be a "silent sickness" and show no signs at the beginning. That is why it is wise to have X-ray pictures made during an annual health examination, or whenever a chest X-ray program is sponsored in the community.



**2**

## 2 Treat it promptly

If tuberculosis should be detected in an active stage, prompt and thorough treatment is essential—preferably in a tuberculosis hospital. This usually calls for complete bed rest which helps the body heal the infection.

Other measures may be used including surgery and drug therapy. New drugs, used as an adjunct to

rest or surgery, have been especially beneficial in certain types of tuberculosis. There is hope that more effective ones may become available in the future.

Under proper hospital treatment, authorities say practically all persons with early tuberculosis have an excellent chance to get well.



**3**

## 3 Prevent new cases

To help prevent new cases of tuberculosis, specialists urge that those who have the disease remain in the hospital until their condition is under control.

In this way, families, friends, and associates are saved from the danger of infection, for tuberculosis is a "catching" disease spread through contact.

The likelihood of developing it may also be reduced if everyone guards against the disease by getting plenty of sleep, rest, proper exercise, and nourishing food.

Regular health examinations, including a chest X-ray, can usually detect tuberculosis before symptoms become apparent—and often before it becomes contagious.

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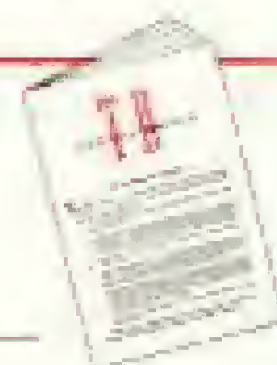


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## Home to the Holy Land

BY MAYNARD OWEN WILLIAMS

**T**HIS is a simple traveler's tale of one who, coming home to the Holy Land, found friendship there at Eastertime. Sitting below the hallowed walls of Jerusalem, I watched thousands of Christians, bearing banners and waving palms, going up to the Holy City.\*

A few rods away was a no man's land, outlined by barbed wire and bombed-out homes—grim reminders of the Palestine war. While Christians celebrated 20 centuries of Easters, an infant Israel danced in the streets to celebrate its second anniversary.

The places most significant and venerated in the life of Jesus Christ are now held by two new Middle East States, the Hashemite Kingdom of the Jordan and Israel (map, page 710).

Bethlehem, where the drama of the New Testament begins with the birth of Christ, and that part of Jerusalem where the last chapters end with His crucifixion are both in the hands of Arab Jordan. Nazareth, where Jesus spent His childhood and grew to manhood, is in Israel, as is Galilee, where He performed His many miracles.

Two Semitic nations, handcuffed by an uneasy armistice, guard sites revered by the followers of three great faiths (page 712).

### Harder Work for a Timeworn Land

What was Palestine is slowly but steadily recovering from the Arab-Jewish war. Bright spots dot the desert. But to attain a higher standard of living for more people, Arab and Jew must make fields grow more grain, cows produce more milk, hens more eggs, sheep more wool and meat, orchards more fruit, an agricultural land more industries, and industry more markets. A timeworn land must

work harder under the same sun and rain.

How can this be done, with more than 700,000 Arabs displaced by the war and huddled in refugee camps, in tents, and in caves? How can it be done, with a half-million Zionist immigrants, lured by the magic name of Israel, seeking a new and better life?

This remains a huge dark puzzle for a land rich in puzzles. Probably not for decades will anyone know the solution.†

The glorious paths that Christ trod remain, though marred through the centuries by tramping feet and pounding hoofs of hostile armies. Only two years ago His footsteps were again obscured by the tread of tank tracks and the furrows of jeep tires. But for hundreds of years Christian pilgrims have followed His course at Eastertime to commemorate His entry into the city of Jerusalem.

So at Christmastide they flock to the dimly lit Bethlehem grotto where He was born.

### A Boom Town in the Desert

These days it is a long road to Jerusalem. Steamers which serve Alexandria, Egypt, and Beirut, the booming capital of Lebanon, bypass Israel's ports of Jaffa and Haifa. Last spring, those travelers entering through Jewish ports could not cross into the Jordan-held Old City of Jerusalem.

I docked in Beirut and proceeded to the bustling Jordan capital of Amman (pages

\* See "Pageant of Jerusalem," by Maj. Edward Keith-Roach, NATIONAL GEOGRAPHIC MAGAZINE, December, 1927.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Palestine Today," by Francis Chase, Jr., October, 1946; "American Fighters Visit Bible Lands," by Maynard Owen Williams, March, 1946; "Change Comes to Bible Lands," by Frederick Simpich, December, 1938.



Herters &amp; Bousfield

### "They're Getting Bigger!" Israeli Orphans Appraise Poultry Dividends

Poultry farming is a science with the Jews, who boast that their hand-fed hens outproduce native scavengers four to one. Despite a fine laying record, the market goes unsatisfied. These Leghorns belong to a children's village in Ra'anana, north of Tel Aviv (page 731).

713, 739).<sup>\*</sup> Along with the air-conditioned communities built overnight in the oil fields of Arabia, 'Amman is a fast growing city. Five years ago it had 60,000 residents. Today it boasts more than 150,000 and in another five years hopes to attain the half-million mark.

#### Mud-walled Village to Modern City

To one who knew it 20 years ago as a mud-walled village, with wooden-wheeled oxcarts coursing through its narrow streets, modern 'Amman is a great surprise. On the heights fine homes and excellent schools have arisen.

New shops, offices, and apartments are going up all over the city. The stonemason's tireless hammer dings throughout the day. In spacious new stores, some owned by refugees from Haifa and Jaffa, one can buy shirts from Troy, toffee from Scotland, and corn flakes from Battle Creek, Michigan.

Against this modern backdrop strolls the ever-present Biblical shepherd in flowing robe and goat-hair crown, leading his sheep to market (page 716).

To Christians, these desert men who come to town with their flocks are the modern embodiment of the Good Shepherd. Without them, millions of acres of semibarren land would be waste.

Where rainfall is less than eight inches a year, pastoral life persists. The shepherd, for a thousand years, has proved that he, at least, can live off the land.

In the countryside I saw tractors displacing plowing camels and trucks speeding along the splendid new highways. In sharp contrast, a bus driver hanked to clear the road of a slow-moving caravan.

From flourishing 'Amman I rode down to

<sup>\*</sup> See "Arab Land Beyond the Jordan," 18 ills. in color, NATIONAL GEOGRAPHIC MAGAZINE, December, 1947.



National Geographic Photographer *Marward Owen Williams*

### Mother Clamps a Gentle Stranglehold on Two Objectors Taking Typhoid Shots

Trips to the Red Cross tent are not popular among Arab children in 'Ain es Sultan refugee camp near Jericho (pages 711, 727). This woman drags her offspring willy-nilly. Sister cries, "Ouch!" Brother, who's next, remains trapped in a female vise. Typhus and diphtheria injections also are given.

# HOLY LAND



Palestine Is Broken Up. Israel, Jordan, and Egypt Have Picked Up the Pieces

the River Jordan\* (which ceased being a frontier when Jordan annexed Arab Palestine in April this year), crossed over, and rolled into Jericho, five miles farther on.

Again, as when Mark Antony gave it to Cleopatra, Jericho is a winter resort. But last winter the town was covered with four inches of snow, the severest winter in 264 years. One of the lowest towns on the earth's surface, it lies 840 feet below sea level. Only 15 miles from Jerusalem, it is 3,500 feet below the Holy City.

#### Misery in the "Kingdoms of the World"

Above the town towers the Mount of Temptation, where the Devil led Jesus and "shewed unto Him all the kingdoms of the world" (Luke 4:5). Today Satan could show Him only human misery and suffering.

Below, the land is dotted with thousands of tents and thousands of ragged Arab refugees. These homeless men, women, and children, who fled Israel two years ago and cannot return to their homes until the issue is settled, huddle together in their despair and await their fate.

Their thirst is quenched from the same fountain which Elisha sweetened with salt (II Kings 2:19-22), but not their thirst for home.

The plight of these homeless souls is the saddest in all the Holy Land today. At 'Ain es Sultan camp (pages 709, 727), close to "where the walls came tumbling down" before Joshua's trumpets, I encountered the first of many Arab refugees I was to see. Most of them would starve if it weren't for UN and Red Cross relief.

"They talk of history," one of them said to me, "but what is history compared with a man's own home?" These restless, despairing Arabs are one of the world's touchiest problems today.

With a heavy heart I started my climb to the city of Jerusalem (page 735).

#### A Mosque for Omar's Deed

Upon arriving, I went first to the American Colony, where old friends greeted me warmly. That evening I strolled through the shadowy *souks* within the historic walls of the Old City to Christendom's holiest site, the Church of the Holy Sepulcher. The tiny gate to the courtyard was locked. Above me towered the minaret of the Mosque of Sidna (Caliph) Omar, to whom the Patriarch Sophronios surrendered Jerusalem A. D. 637.

When Sophronios invited Omar to join him in prayer in the Holy Sepulcher, then the Church of Constantine, the latter begged to be excused. Omar explained that, if he did,

his Moslem countrymen might claim the church. He said his prayers near by. The mosque which commemorates his good deed still shines down on Christian pilgrims.

As I stood there, a Sudanese policeman, in soft-spoken Arabic, asked Allah's blessing on my evening. I tramped home, listening to the sound of heelless slippers of the half-veiled East. The spell of Jerusalem was upon me.

In the Jerusalem souks the lights and shadows of oven and forge, the rich glow of oranges, eggplants, and tomatoes, the peddlers' street cries and the "oo-ah" warning of the muleteers, the smell of spices, new boiled coffee, and fresh-baked bread, all appeal more to sense than to soul. But this, too, is the Holy City.

One day, as I left the American Colony to take in some sights of postwar Jerusalem, a military convoy passed along Nablus Road. Arab forces were escorting Jewish guards to Hadassah Hospital inside the Arab lines. Once a month road traffic stops long enough to admit the Jews and change the skeleton guard at the closed-down hospital.

#### Victims of Holy Land War

Looking up to Mount Scopus from the north wall of the Old City, you can see the Rockefeller-endowed Palestine Archeological Museum, which is still open but has little hope of new finds (page 726). Since Palestine is broken up, new discoveries will go either to a Jewish or Arab museum, unless Arab, Christian, and Jew can unite to keep the splendid establishment alive.

Another great institution on Mount Scopus is closed. Because access to Hebrew University lies in Arab territory, the classrooms and laboratories of the modern campus are empty. Ironically enough, Arab College lies in the Jewish section of Jerusalem and no longer functions.

From the Mount of Olives I looked down on the walled city, bathed in morning light. Then I descended a steep path to where Jesus wept over Jerusalem. I passed Gethsemane, climbed to the Temple Area, sought out the Wailing Wall of the Jews and the other antiquities of the Walled City.

To me, few spots have the quiet dignity of the Haram esh Sharif—the Noble Sanctuary (page 728). It was here that Solomon built his Temple and Herod the one where Jesus taught. The peaceful mosques repeat the Christian promise: "Come unto me, all ye that

\* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Geography of the Jordan," by Nelson Glueck, December, 1944; and "Canoeing Down the River Jordan," by John D. Whiting, December, 1946.



### "Come and Dance the Hora!" Israeli Students Shout at a Jerusalem Festival

With bright blue-and-white Israeli flags flying in the background and the orchestra beating out a stirring rhythm, young people perform their national dance before an eager audience at a park in the New City. Most popular of all Hebrew folk dances, the hora is frequently danced at farm settlements.

labour and are heavy laden, and I will give you rest" (Matthew 11:28). If some tired believers fall asleep beside the prayer niche, it is Allah's will.

#### Jerusalem's "House of Prayer"

In the center of the Sanctuary stands the magnificent Dome of the Rock, whose large, dark-gray dome is probably the most graceful in the world (page 735). The beauty of this mosque is even more remarkable when one considers that the original Dome was built at the end of the 7th century.

The rock mass on which it stands is said to be the stone from which the Prophet Mohammed ascended to heaven on his winged steed, el Burak; but long before the 7th century it had been revered.

The mosque (also called Mosque of Omar) stands as a masterpiece of Moslem architecture. Next to Mecca's Kaaba and Medina's mosque, it is the edifice most revered by Moslems. Jordan's King Abdullah (page 745) often comes to it to pray. Indeed, as Isaiah prophesied and Jesus desired, the Temple area has become a "house of prayer for all people."

Visitors pay admission, but there is no commerce in the area from which Jesus "cast out all them that sold and bought in the temple" (Matthew 21:12). So I was surprised to see people coming from the Golden Gate carrying food. I went for a look.

What I found was a 20th-century echo of Isaiah's glad call: "Come ye . . . that hath no money"! Red Cross relief rations were being distributed.

Christmas activity in Jerusalem is rivaled only at Easter. Then the visitor could easily do nothing but go to church all day for nearly two weeks. When the Jewish Passover and the Easter of the Roman Catholics are finished, the Easter celebrations of the Greek Orthodox, Syrians, Copts, Armenians, and Abyssinians begin. In 1950 the Catholic and Orthodox Easters were celebrated on the same day.

#### Pilgrims Hail a Modern Saviour

The first big event of Holy Week is the Palm Sunday procession (page 715) from Bethphage to Jerusalem, along the route by which Jesus rode into Jerusalem and "a very great multitude spread their garments in the





### Homeless Arabs Take Refuge Where Roman Gladiators Dueled 1,800 Years Ago

Amman was called Philadelphia when this 4,000-seat theater was built. No spectacles take place in the ruin today, but new buildings go up all around. Refugees sleep in corridors through which wild beasts entered the arena.

way" and cried, "Hosanna . . . Blessed is He that cometh in the name of the Lord" (Matthew 21:8, 9).

Today, as in Crusader times, thousands of Christians retrace the route. I joined a group of Roman Catholics as they gathered in the garden of Bethphage. We marched over Olivet, descended past Gethsemane, and passed through St. Stephen's Gate (page 724) to St. Anne's Convent.

At the end of the hot, dusty walk we assembled in the courtyard of St. Anne's. Suddenly there was a rustling. Women began waving their palm fronds as other women, long ago, had saluted Jesus. A priest had just ridden in on a donkey. Those around me insisted he represented the Saviour.

Christ in horn-rimmed spectacles and carrying a camera! I refused to believe it. Then I learned the facts.

A Catholic priest from Wisconsin had fallen on the ice at home and broken his leg. Nevertheless, he refused to abandon his plans for a Holy Year pilgrimage. But his lameness would prevent him from marching in the long procession over the Mount of Olives. Quite sensibly, he rented a donkey and was more surprised at the greeting he received than anyone in the procession. Thus a short-lived legend was born.

On Maundy Thursday the Greek and Armenian clergymen don their most ornate vestments and put on the best show of Holy Week, the Washing-of-the-Feet ceremony, to commemorate the Last Supper. The Greeks hold their awe-inspiring service in the courtyard of the Church of the Holy Sepulcher in the morning (page 721).

#### Curtain Time in St. James

In the afternoon, crowds flock to the Cathedral of St. James to witness the colorful Armenian ritual. Against a backdrop of flickering candles, choirboys in gold-embroidered damask robes begin to chant in high voices.

Then the handsome blue satin curtain hiding the altar parts, and a carefully executed drama unfolds. Amid the dazzling glitter of silver, silk, and brocade, each of the priests, who represent Christ's Disciples, goes before the kneeling Patriarch to have his feet washed, wiped, and anointed with oil (page 717).

Consular flags at half-mast quietly announce Good Friday, when reverent pilgrims retrace the Way of the Cross from Pilate's judgment seat to Calvary.

Easter Saturday heralds one of the most spectacular ceremonies of Holy Week, that of the Holy Fire.

Under a high dome stands the little Chapel of the Holy Sepulcher. Within it a cracked marble slab hides the rough-stoned tomb of Christ. On two sides of it are small windows from which fire bursts out to send the crowds into wild ecstasy. The fire is symbolic, but some Greeks, Armenians, and Copts believe it comes from heaven.

Sturdy youths snatch the fire and fight their way to the various chapels with lighted candles. Thousands of spectators reach forth to receive the fire on their own candles. With the smell of burning wax and the excitement of the crowd, the ceremony ends in tumult, which some call bedlam, a shortened form of the word Bethlehem.

#### Tom-toms Herald Easter

That night, under a gaily decorated tent on the roof of St. Helena's Chapel, the Abyssinians parade to the beat of tom-toms. Bright-eyed boys proudly strut beside their bishop with his jeweled umbrella and glittering robe, in the traditional search for the body of Christ. Then the sound of drums dies away. The quiet of Easter Eve descends on the Holy City.

On Easter Sunday I climaxed the almost endless succession of Holy Week ceremonies by attending a Protestant service beneath purple Judas trees outside the Garden Tomb.

Somehow this spot retains the appearance of an ancient burial place and gives added meaning and simplicity to the memory of Christ's death.

One day, with the permission of an Arab Legionnaire, I looked down into Israel from the Old City walls near Zion Gate. Officials in Washington had promised me every help, except that of bridging this 50-yard gap of no man's land between Jordan and Israel. If the information I got had been correct, I would have had to detour to 'Amman, Damascus, Beirut, and Cyprus before reaching this spot in Israel, below my very eyes.

Jewish friends in New York had urged me to attend the second anniversary of Israel, celebrated this year on April 23. There was no certainty that I could get back into Arab territory. But a national holiday, for which the wandering Jew had waited nearly 1,900 years, could not be ignored.

I finally obtained permission to make the crossing. I carried my equipment from Jordan to Israel and later came back the same way. Thus a 600-mile trip was shortened to a brief walk from one taxi to another.

I found myself standing in the New City, which has grown up in the last 100 years outside Jerusalem's ancient walls. It is



### Roman Catholic Pilgrims on Palm Sunday March from the Mount of Olives

Cypress groves around the bulbous-spired Russian Church and olive trees near the Franciscan Basilica mark the site of the Jerusalem garden where the three Disciples fell asleep and Judas betrayed Jesus with a kiss (Matthew 26:49).



Tractors Replace Camels, Caravan Trails Become Highways, but the Shepherd and His Flock Endure as in David's Time

Jordan's capital city of 'Amman, here seen in its outskirts, is one of the world's fastest growing cities. Twenty years ago it was a mud-walled village. Today offices and apartments go up all over town (page 739).

## Silk and Silver Glitter by Candlelight. Armenians Hold Their Washing-of-the-Feet Pageant in Jerusalem

One of the oldest Christian sects in existence, the Armenian Church dates from the third century. Today it flourishes as splendid as ever in the Cathedral of St. James. Here monks in peaked silk *badmakhion* flank the mitred Patriarch before the ornate iconostasis (altar screen) on Maundy Thursday (page 721).

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Kulichovskaya by Margaret Owen Williams

♣ **Jordan's Arab Legion Soldiers Guard  
Jerusalem's Uneasy Peace**

These young Arabs are fascinated by a motorcycle courier. The flag belongs to the Legion's 3d Division headquarters in the Arab section of the Holy City.

♣ **"Down Another Block!" Shouts an Officer  
to Independence Parade Spectators**

Barbed wire, a holdover from the Palestine war, prevents celebrating Israelis from invading a military parade route in the Jewish section of Jerusalem.





### Humanity in Three Tiers Packs Walls Looking into Holy Sepulcher's Courtyard

Elsewhere eager spectators climb trees and rooftops to see a ball game or bullfight. But in Jerusalem they scale lofty heights to witness the Greek Orthodox foot-washing service (page 121).



**Soft-drink and Bread Vendors, Shouting in Arabic, Hawk Their Wares to Jerusalem's Outbound Bus Passengers**

This ancient market place, just outside the Old City, has become a bus terminal. Here gather riders to Ramallah, Hebron, Bethlehem, and Nablus. This section of wall, close to Damascus Gate, dates from the 16th century.



## Greek Priests Portray the 12 Disciples at the Last Supper

One of the most inspiring Holy Week rituals is the Greek Orthodox ceremony of the Washing of the Feet on Maundy Thursday. The spectacle commemorates the Last Supper. Jesus, knowing he would be betrayed by Judas Iscariot, laid aside his garments and washed the feet of his Disciples, saying, "Ye are not all clean" (John 13:11).

The Greek ceremony begins at 8 a. m. As the gong in the bellry sounds, brilliantly robed priests march out of Jerusalem's Church of the Holy Sepulcher to a platform in the courtyard. Twelve chairs facing both sides of the platform and another on the dais represent the seating at the table of the Last Supper.

Here the Archbishop of Philadelphia (Amman), substituting for the ailing Greek Patriarch, gives a blessing. Later he removes his jewel-encrusted crown. Then, with the humility of his Lord and Master, he stoops before each chair, washes and wipes the feet of the 12 priests.

As Jesus said, "The servant is not greater than his lord" (John 13:16).

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Illustration by Edmund Oscar Witham





**And Jesus Said unto the Blind Man, "Go, Wash in the Pool of Siloam"**

This Jerusalem pool echoes with the chatter of Arab washerwomen. A shepherd (right) struggles to clean a sheep for market. Some 1,900 years ago a man born blind, but cured by Christ's miracle, "came seeing" (John 9:7).



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Photographs by Maxwell from Wilton

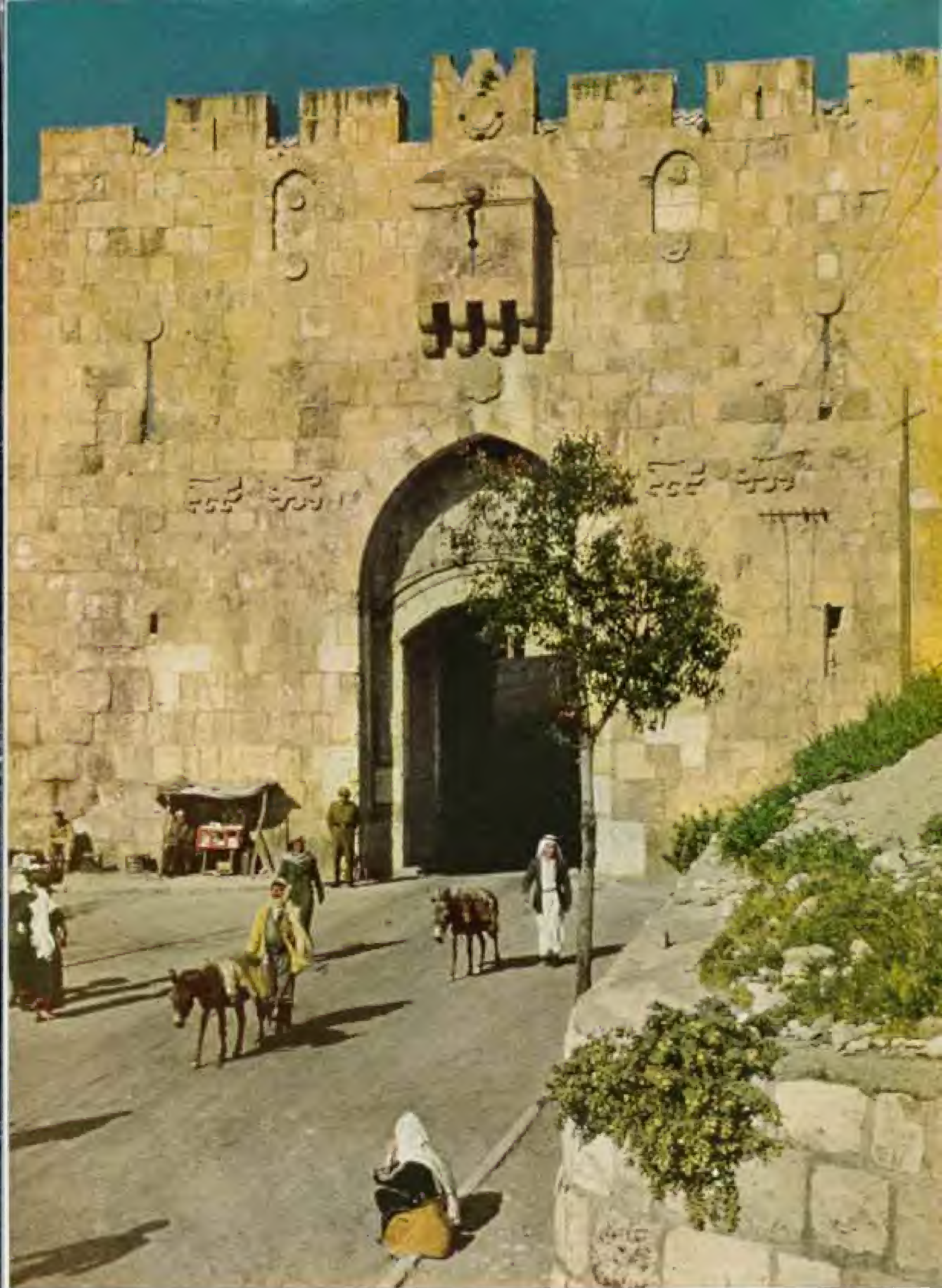
✧ **Jewish Orphans Eagerly Await a Picnic;  
No Concentration Camps for Them!**

Few, if any, nations take better care of their children than Israel. In children's villages (many of them orphans), youngsters get loving care. Some were born in slave-labor camps.

✧ **Less Fortunate Arab Children Find Food  
and Hope in UN Kitchens**

Arab refugees uprooted by the Palestine war present the saddest sight in the Holy Land. Their children are given meals by the United Nations. This boy and girl scrape platters clean in Jerusalem.





**Donkeys Emerge from the Jerusalem Which Christ Entered "on an Ass's Colt"**

St. Stephen's Gate's lions were ordered carved by Sultan Bibars, who stopped the invading Mongol horde in 1260. Paving has replaced the cobbles known to Christ, who came by the road from Jericho.



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Photographs by Raymond Owen Williams

#### ✦ Bethlehem Marks the Nativity with a Star; an Arab Policeman Stands Watch

Silver emblem beneath Basilica of the Nativity (below) supposedly points to Christ's birthplace in the grotto next to the ancient inn. Lamps, placed by Catholics, Greeks, and Armenians, light the site. Arabs guard the shrine, for Arabic Jordan controls Bethlehem.

#### ✧ A Greek Priest in Nativity Church Inspects Byzantine Paintings

Bethlehem's Basilica of the Nativity is the oldest Christian church in use. It was erected a. d. 330, restored and enlarged in the sixth century. The main door is so low that visitors stoop to enter. It was so built to prevent hostile armies stabling horses within.





**Jerusalem, Road Blocks Remain Grim Reminders of the War Which Divided Palestine Between Israel and Jordan**

Hebrew University (distant left) stands idle on Mount Scopus because its entrance road lies in Arab territory. Center: the Rockefeller-endowed Palestine Archaeological Museum is still open. The road enters Herod's Gate (right).

Illustration by Margaret Owen Williams

### Arab Refugees Camp in Jericho, Where Joshua Commanded the Sun to Stop

Over 700,000 Arabs fleeing the land which became Israel are homeless. Jordan, that part of the Holy Land to which most of them migrated, is dotted with refugee camps. The tent dwellers live out their futile lifeless dreaming, only of going back to their homes. As one man told the author, "They talk of history, but what is history compared with a man's own home?"

One of the largest of these camps is 'Ain es Sultan ('Pillar of the King') near Jericho, where 'the wall fell down flat' at Joshua's command (Joshua 6:10). Here thousands of Arabs await their fate.

'Ain es Sultan was sponsored by the Red Cross. Arabs run the camp and do most of the work. Children get good care,

Suggesting a young bird swallowing a worm, the girl at left takes her ration of cod-liver oil from the can held by a nurse.

Older girls, like the one at right, learn to use sewing machines. Remaking sugar sacks and bean bags, they turn out trousers and dresses.

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Contributors to  
Mount Zion, Wilkes





### Arab Refugees Assemble for Red Cross Rations near the Mosque of Omar

Jerusalem's famous mosque (page 735) houses the sacred rock from which Moslems believe Mohammed ascended to heaven on his winged steed. This open area, called the Noble Sanctuary, surrounds the shrine.





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Kobeleskus by Margaret Owen Williams

♣ **An Iron Soldier Digs Trenches  
in Israel's Battle for Water**

Thirsty land can produce little without irrigation. By digging wells and laying pipelines, Jews aim to reclaim the desert. This mechanical digger inches its way from Haifa along the coastal Plain of Sharon.

♣ **Prince and Pauper Kneel Side by Side;  
All Moslems Are Equal Before Allah**

Islam requires that heads be covered; custom dictates that women pray separately. These Arabs, in headcloths and feathery tarbooshes, pack the square before the Great Mosque in 'Ammun for Friday prayers.





**Hand Embroidery Is Workaday Attire in Ramallah, a Jordan Needlework Center**

Arabs call Ramallah "little New York" because so many residents have worked there. Many townspeople have adopted American customs, but town folk still wear bright native garb.

the de facto capital of Israel and is today as Jewish a city as any other in the country. There was a holiday air. A big military parade moved down Jaffa Road to celebrate Independence Day.

Legally, Israel is not at peace with any of the seven Arab countries it fought in 1948 and 1949 (page 737). Yet there has been no active warfare for over a year and a half. The government of the young nation is functioning smoothly, even though rationing and price controls are in effect.

Friends warned me of the austerity in Israel. But at the King David Hotel I found the rooms spotless, the service intelligent and polite, and the food as delicious as it was when I joined friends there in 1931.

During my stay in Israel, I seldom ate meat. The land is too limited and too expensive for large-scale grazing. So "tenderloin," as in old-time Manhattan, suggests graft.

With my delicious fillet of fish I usually drank orange juice.

During World War II I saw rotting oranges piled deep in the groves around Petah Tiqva, near Tel Aviv. Thirsty travelers drank synthetic pink or purple soda. Oranges were everywhere, but orange juice was expensive and warm. So today a cold, dewy bottle of orange juice, cheap and refreshing, seems one of Israel's triumphs.

#### Immigrants Crowd Valley of Elah

In one of the two cars New York columnist and showman Billy Rose donated to the Israel Public Information Office, I covered the new State from Beersheba to Dan with Joe Davis, a native of New Zealand and now an Israeli.

In the Valley of Elah, where David is said to have slain Goliath, is a new camp, crowded with immigrants from Cochin, Bombay, and Rangoon. I talked with a 60-year-old woman dressed in a Mother Hubbard and with her bare feet in wooden clogs. She was waiting her turn in line to draw water from the well. A lady in Rangoon, she is now a tent dweller in Israel.

"I'm so happy to be here," she said. "But I do miss my servants."

At another camp near by, Davis and I stopped for a drink of milk, served by a buxom girl with sparkling white teeth. "Nice girl, naïve and unspoiled," I thought to myself; "probably has led a sheltered life."

Actually, she had escaped from Russia, made her way through Poland and Czechoslovakia to Italy, embarked on an illegal ship, was captured and sent to Cyprus. Now she has a home.

Her story is typical of so many in Israel. After World War II they poured into what was then Palestine from Europe's ghettos, Hitler's horror camps, and the postwar displaced persons camps.

When the State of Israel was proclaimed, thousands more came from 52 countries in the four corners of the earth. They came from countries with large Jewish populations, like South Africa and the United States. They also came from places like Greenland, Java, and Afghanistan. Each has his own story to tell.

#### Israel's Most Precious Crop

The next day Davis and I set out for Galilee. Our first stop was at Onim, a children's village on the lush Plain of Sharon. There are scores of these settlements in Israel, most of them orphanages (pages 708, 723, 746).

At Onim a teacher proudly pointed to a group of youngsters enrolled in the nursery school. "You are looking at Israel's most precious crop," he said.

Like a new grove of orange trees, these youngsters are given the most thoughtful and loving care. They are cherished and protected with patient attention. They get special diets and the best of food. Several months ago, butter was dropped from adult rations so there would be more for the children.

Israel stakes its bright future on its youth. It was the young people who fought the war. And in the children's villages and settlement schools youngsters are being trained for the future and for peace.

I was reminded of what an old rabbi once said: "The world is saved only by the breath of school children."

At Onim the children grow up in a cheery atmosphere, feeling that they are loved and that they "belong." They learn to live together and do most of their own work in the shops and gardens, with a minimum of adult supervision.

As we left, we picked up two French-speaking orphans who were leaving Onim to "go home," unaware that no parents would greet them there. As we left the flowery children's village, their guardian cuddled them close, to hide her tears.

#### Expanding Orange Groves

Before World War I, in this area, I saw Arab and Jewish orange growers competing in friendship and on equal terms. Later, when Zionist funds poured in, Jewish groves pushed north on the fertile plain and down toward the southern desert.

This year, watered by elaborate spraying



### Up and Over. An Arab Vaulteur Leaps for His Rashidiya College Team

Soccer and basketball become increasingly popular with Jerusalem's Arab students. Football as Americans play it remains virtually unknown.

systems, the Plain of Sharon and the Plain of Esdraelon are flourishing as never before.

At present, Israel's adults are sacrificing personal comforts to welcome immigrants, to insure a fine crop of youngsters, and to promote the fertility of the fields.

World Jewry, largely centered in America, has poured in millions of dollars to develop the land. The Export-Import Bank in Washington loaned \$35,000,000 for the purchase of agricultural equipment and \$65,000,000 for public works and communications. The British Treasury also released the equivalent of \$20,000,000 for the purchase of British goods.

Since imports exceed exports by eight to one, continued assistance from abroad is necessary if the huge number of Jewish immigrants are to be housed and put to work.

But as Davis and I drove north in springtime, in face and field Israel was a smiling land.

In great shiny sheds hens cackled. Brown-eyed cattle had full udders. Heavy-headed grain bowed to the reapers, and machines dropped their heavy bales of fodder with a hearty thud. As we climbed toward Nazareth I saw how Zionist funds had added value to the fruitful plain.

We arrived in Nazareth, the largest Arab town in Israel, where Christian Arabs guide pilgrims through the town where Jesus grew up. Arab guides are organized under Israeli labor laws. I remembered one of the guides from five years ago. He said that things were going well. There are some 170,000 Arabs still in Israel, most of them Christians.

I visited the Church of the Annunciation, Joseph's carpenter shop, and the synagogue where Jesus had taught and where he sadly admitted, "No prophet is accepted in his own country" (Luke 4:24).

### Superhighway Underground

Night found us at Metulla, northernmost town in Israel, on the Lebanon frontier. Outside my window a section of the new 1,067-mile TAPLINE (trans-Arabia pipe line) from Arabia to Sidon climbed a steep slope.

In one spot was the empty trench. Close by was the 31-inch pipe, coated with tar and ready for burial. A few days later only a long heap of earth indicated that here oil would soon flow along a hidden highway.

We skirted the Lebanon border and at one spot could see both the Mediterranean and the Sea of Galilee, so small is the land. We called on the members of a new community in



### In Laboratory and in Field, Israel's Major Problem Is How to Get More Water

Israel, like New York, Athens, and Istanbul, feels the pinch; hence it devotes great effort to purifying brackish water and tapping sources of fresh water. Haifa Institute students here test water's flow through an experimental channel.

Sa'sa'. Seeing this new settlement rising from nothing on a bleak hillside, I remembered the remark of one Zionist several years ago. I asked how things were going.

"Well," he replied, "little by little and they built the Woolworth Building."

We motored down to Nahariya, with its vast unspoiled stretch of white Mediterranean sand. Here the Jews are building a big beach resort (page 746).

Heading south, we entered Haifa, its glistening white architecture in sharp contrast with the blue sea. The city is one of the largest and most important ports on the Mediterranean. Some Israelis regard Tel Aviv as the city of the present. Jerusalem, despite its choice as capital, is best known for its past. But Haifa is the city of the future, and its people look forward to the day when it will outshine both its predecessors.

At 'Athlit, an ancient Phoenician port, we inspected the impressive ruins of the 13th-century Castle of the Pilgrims, but were rudely shaken back into modern times. A near-by gorge was converted into a burial ground for British war matériel. Vehicles were pushed off the road until they clogged the valley. A tire, tossed into the air by an

explosion, still hung, like a burned doughnut, on a fire-singed Christmas tree.

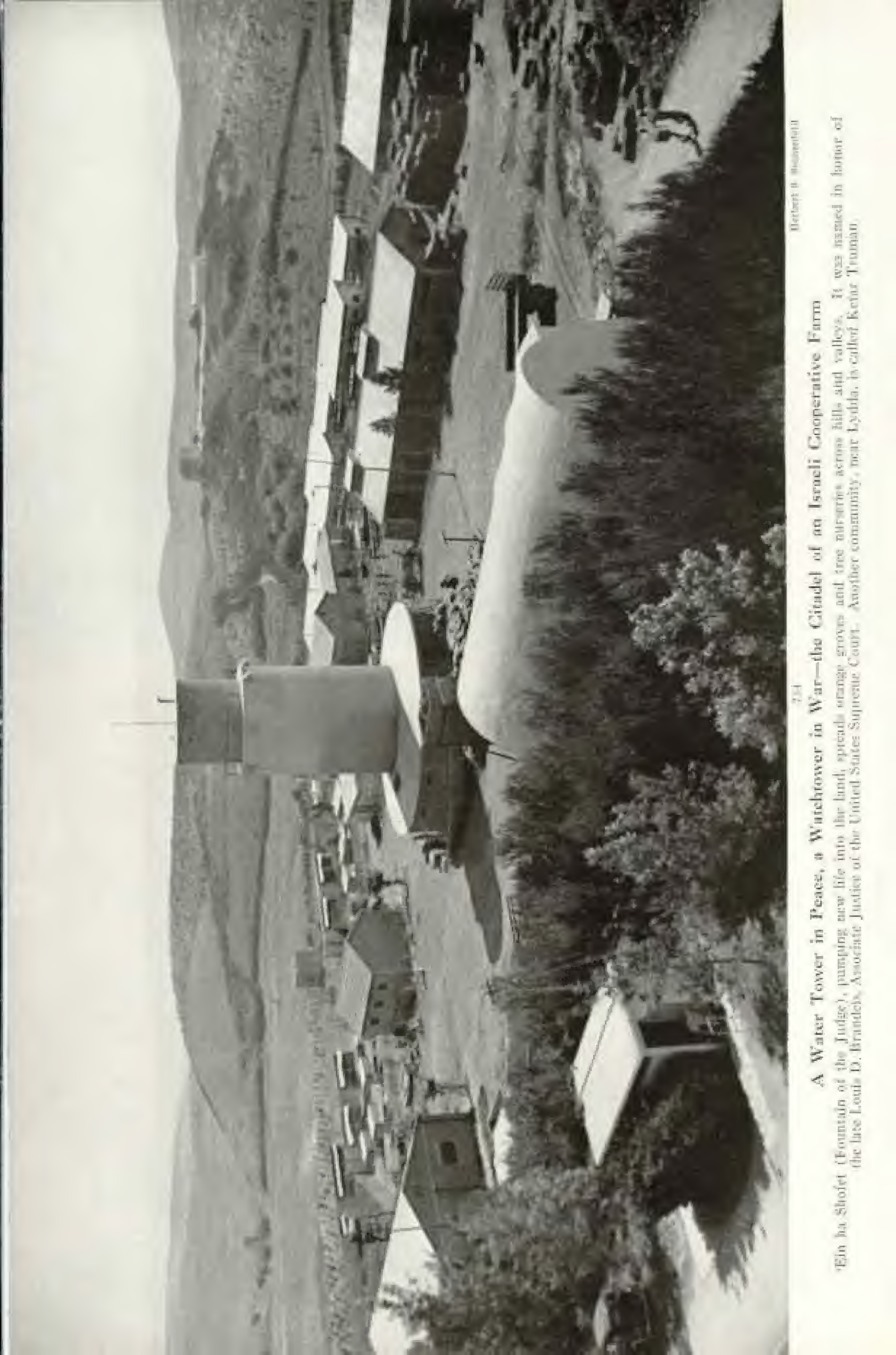
### From Suburb to Metropolis

Noisy and energetic Tel Aviv, Israel's first capital, came into being about 40 years ago when some Jews started building a garden settlement on the sands of the Mediterranean just outside the Arab city of Jaffa.

Today it sprawls with offices and apartment houses representing all kinds of architecture. Its streets bustle in a Chicagolike atmosphere. The sidewalks and beautiful seaside promenade swarm with gay, carefree people (page 741). They are surprisingly confident. They feel that the fighting is over, that they have arrived, and that their little nation is secure.

Tel Aviv is a cosmopolitan center. People from all over the world, speaking many tongues, pour into its confines ready to make a home of their own. Tel Aviv is doing a remarkable job of turning them into citizens almost overnight. (In Israel one becomes a citizen as soon as he announces his intention of staying there.)

This crowded city of 300,000, still growing day by day, is the pride of the Jews and the despair of many Zionists. During my travels



**A Water Tower in Peace, a Watchtower in War—the Citadel of an Israeli Cooperative Farm**

Ein ha Shofet (Fountain of the Judge), pumping new life into the land, spreads orange groves and valleys. It was named in honor of the late Louis D. Brandeis, Associate Justice of the United States Supreme Court. Another community, near Lydda, is called Kfar Tsunan.

## Ancient Jerusalem, "City of Peace," Has Known Little of It

Jerusalem goes back to the Stone Age. It gained historical importance when David, King of Israel, captured it from the Jebusites some 3,000 years ago. His son, King Solomon, built the Temple and brought the city to its golden age.

Nebuchadnezzar, Alexander, Hadrian, Omar, Saladin—hundreds of kings and generals have claimed Jerusalem as their own.

The city has seen more than 20 sieges; its streets have run red with blood, its people have been driven into exile. Assyrians, Persians, Macedonians, Arabs, Turks, Crusaders, and the British (1917) have beaten against its walls. Conquering Babylonians and Romans left utter desolation; Mongols burned the Church of the Holy Sepulcher; but after every disaster Jerusalem has risen from its ruins.

Jerusalem witnessed Christendom's most momentous event, the Crucifixion. For centuries Christians, Muslims, and Jews have made it their Holy City. Today it is divided between Arab and Jew, although only the extreme upper left-hand corner is in Israel and the area around the synagogues (left center) lies in ruins.

This aerial view shows the Old City packed within its walls. Jews outside the walls started building the New City (upper left) in 1860. Straight-walled area at right, former site of Solomon's Temple, surrounds Moslems' Dome of the Rock, commonly called Mosque of Omar (p. 712).

ARON, OROUD





### Sailing Time in 'Ein Gev: Jewish Farmers Ship Tomatoes Across the Sea of Galilee

This isolated cooperative farm lies on a thin strip of Israel on the Syrian side of the lake. Its 450 members combine fishing and agriculture. They can leave and return only by water until they complete a new road.

in Israel, instead of guidebooks I carried the Bible and the outstanding autobiography, *Trial and Error*, of President Chaim Weizmann. He believes that "the backbone of our work is and must always be agricultural colonization."

Israel's citizens have a home, after nearly 1,900 years. But more than half of them now live in three cities: Haifa, Jerusalem, and Jaffa-Tel Aviv. Many Tel Avivians, trained in the best civilizations of Europe, find in this Jewish city those amenities to which they were accustomed in Paris, Berlin, Budapest, or Vienna.

#### Everything Rolled into One City

There is an excellent opera and several theaters, usually sold out. The Israel Philharmonic Orchestra has won high praise from Serge Koussevitsky, former conductor of the Boston Symphony Orchestra, and Maestro Arturo Toscanini, who was its first conductor in 1937. The season for the Israel Philharmonic is probably the longest of any orchestra in the world—the entire year, with as many as five concerts a week.

Tel Aviv bookstores indicate a high taste in reading matter and do brisk business. Cafes,

in the European manner, offer newspapers and magazines as well as refreshments, potato chips, and pretzels.

When I first arrived, my taxi driver said, "Tel Aviv has everything. It's Times Square and Coney Island all in one."

I ran into a friend of mine, Asher Polishuk. He studied in Beirut before he went to the United States to complete his education. Today he is happy in Israel, although he can't find a suitable place to live and dislikes the "key money"—part legal, part clandestine—which one must pay to rent an apartment.

To lease an apartment, one must pay up to \$4,000 in key money. To buy an apartment in a modern, cooperative building costs about \$4,000 a room.

"You know what makes me glad to be here?" Asher asked. "We've got a Yemenite servant girl who thinks Israel is heaven. That makes it look good to me."

When the Jews declared their independence on May 14-15, 1948, they numbered perhaps 650,000 in all Palestine. Today there are well over a million in Israel, and new immigrants are arriving faster than the land is being tamed.





### An Israeli Tends His Sheep and Doubles as Lookout along the Syrian Border

This war veteran is a member of the Maayan Baruch settlement in north Galilee. Syria (hill in background) was one of seven Arab States arrayed against Israel in the Palestine war. Since the Jewish and Arab nations have not yet signed a peace treaty, frontier residents remain on the alert.

Still there is a manpower shortage, although new areas are constantly being developed. More than 700,000 Arabs left the land and only 500,000 Jews have come in. Of these, 239,000 arrived in 1949. Half of them were from Europe, a third from Asia, a sixth from Africa, and 1,358 from the Americas. Immigration in 1949 was three times what Chaim Weizmann had hoped for in 1947.

#### "Operation Magic Carpet"

Though Israel's population is over the million mark, only 520,000 acres were under cultivation on January 1, 1950. So how big a population can Israel absorb?

Dr. I. Wolfsberg, writing in *WIZO in Israel*, argues that a majority of the world's Jews should settle in Israel—an average of 10 to each acre now cultivated.

But one Zionist expert had a better idea of immigration that would help the new nation. Said he: "I just wish that one percent of the Jews in the United States—a mere 50,000 of them—devoted to their people and willing to work for its ideals, would come to Israel. I think they'd be happy here."

Most spectacular of mass immigrations was "Operation Magic Carpet," which winged in 60,000 Jews from Yemen, the tiny kingdom in the southwest portion of the Arabian Peninsula, and from southern Saudi Arabia. At the beginning of the operation, 140 Yemenite Jews, dehydrated from their overland trek from Sana'a to Aden, weighed in to fill a 70-passenger plane.

Others have criticized little Israel for her unlimited immigration policy when the nation is still so young and not ready to receive newcomers. But some officials stoutly defend the "come one, come all" ruling.

#### "To Build Up a Wasteland"

"Israel was established," they say, "as a Jewish homeland. As long as a single Jew anywhere wants or needs to come here, the door must be open. If one person is refused admittance, we shall have failed in our purpose."

President Weizmann says in his book: "The Jewish people would never produce either the money or the energy required in order to build up a wasteland and make it habitable, unless that land were Palestine."

In 1950 that land is the Jewish Republic of Israel. Jewish money and energy have reclaimed swamp and desert, and the nation's long-range plans show imaginative foresight.

In Rehovot the Weizmann Institute of Science, one of the finest research centers in the Middle East, is attacking two basic problems of world-wide importance—protein substitutes for meat and the purifying of salt water.

#### Vegetable Proteins Serve as Meat

Scientists have demonstrated on an industrial-commercial scale that vegetable proteins can be so transformed as to serve in place of meat. And a pilot plant in Rehovot is already desalting brackish water by chemical means.

My driver to Rehovot was a black-eyed Jewess wearing a shapely sweater, a checked skirt, and mannish boots. As we charged through traffic in the narrow streets of Tel Aviv and then hit the open road, she sang, first in a soft, crooning soprano, then in a full alto. From a pleading "Last Rose of Summer" she picked up momentum and roared out with the "Torenfor" song.

She was only 19 and a half years old. She escaped from Russia to Afghanistan, Bombay, Tehran, and then to Israel. She spent almost three years in the Israel Army, and in the Arab-Jewish war she doubled in jeep and machine gun.

"I'd drive to where the fighting was hot and then pop, pop, pop!"

She had seven wounds in her right arm and a bullet in her right knee. She hopes to study music in New York. She speaks Arabic, Persian, Russian, French, English, and Hebrew. And when I took a seat in her cab, I wondered whether we would have to talk in sign language! Her name is Scheherazade. What a story she could tell!

#### Poor but Loyal Hearts

As I left Israel and rode past two frontier shacks beside a blocked road into Jordan, I still thought of her. If age were told by experience, she would be an old lady.

In Old Jerusalem I met Dr. Munir Musa, a Christian Arab refugee. He was trained in Texas and now directs health work in Jordan. He brought me up to date on the health situation.

Under the British mandate, medicine in Palestine was pretty well socialized, since few patients could afford to pay anything. Doctors served for a salary, and the poorest mother

could have her baby as a mother should. Contagious diseases were isolated and epidemics controlled.

When the British withdrew, mandate salaries were discontinued, but the Health Department carried on with loyal hearts—and flat pocketbooks. Salaries now are a mere fraction of what foreign doctors and relief workers get. Arab doctors and nurses are pulling in their belts and sticking to their jobs. Without them the health standards of the thousands of refugees and citizens would be lowered considerably.

With Dr. Musa I drove down to the hill town of Bethlehem, where birth is hallowed. People all over the world will turn their thoughts at Christmastime toward the Church of the Nativity (page 725), built over the traditional site where Jesus was born and laid in a manger.\*

From this scene of perennial pilgrimage, we motored south to Hebron. At the city's health center underfed Arab infants were being weighed. The mothers, lacking nourishment themselves, have little milk for their babies. But they look like Madonnas, their faces lit with mother love. They smiled tenderly on their newborn babes, just as Mary did nearly 2,000 years ago.

#### Wise Men Still Follow the Star

As I got my camera ready to take some photographs, one woman dropped her veil. There was whispering among her companions, and again she showed her face.

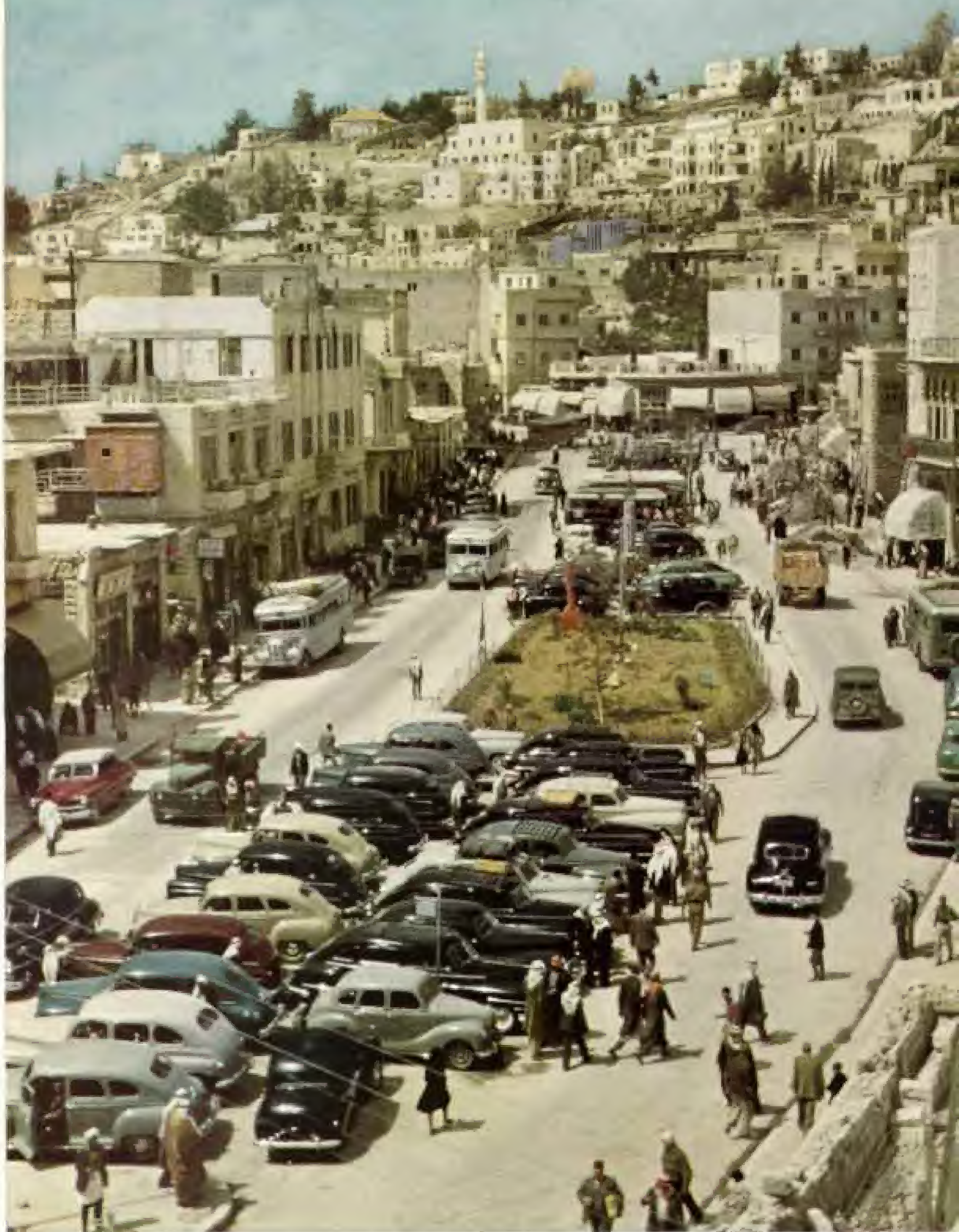
"You know what she said?" asked a nurse. "That if a friend of the doctor wants a picture, any mother should be proud."

So in Hebron, where the wives of Jewish patriarchs lie buried, Moslem women braved my lens out of gratitude to Christian doctors who give their lives to serving their fellow men in this land of three faiths.

As we turned back to Jerusalem, long shadows darkened the fields. From Bethlehem on, the new road is hilly and long. But it passes close to the field where shepherds watched their flocks at Christmastime, where angels sang of peace on earth and good will toward men, and where Three Wise Men—as wise men still do—followed the Star.

\* See "Bethlehem and the Christmas Story," by John D. Whiting, NATIONAL GEOGRAPHIC MAGAZINE, December, 1929.

For additional articles on Jerusalem, Palestine, and other Bible lands, see "NATIONAL GEOGRAPHIC MAGAZINE Cumulative Index, 1899-1949."



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Reprinted by Margaret Owen Williams

**"Where Can I Park?" Is the Problem. 'Amman Enjoys a Houston-style Boom**

Five years ago 'Amman had 60,000 residents. Today it boasts more than 150,000. In another five years it hopes to have half a million. Clock Square, named for clock on column (center), is the heart of Jordan's capital.



**Scarcely Tilled for Centuries, the Slopes of Galilee Bloom Again as in the Time of Christ**

Nineteen hundred years ago Jesus calmed Galilee's waters (Mark 4:39) and multiplied its fish (John 21:6). Today Israelis, having reclaimed its desolate slopes, call the lake Yarn Kinneret (Lake Tiberias). Across the lake lies Syria. Cattle belong to a Jewish cooperative farm settlement.

**Sabbath Promenaders Swarm London Square, Tel Aviv's Show Place. Mediterranean Freighters Wait to Lighter Cargoes Ashore**

Like Island Americans who point out that New York is not Israel, Israelis often say that noisy, energetic Tel Aviv is not Israel. But it is the young nation's No. 1 boom town. Once it was the world's only all-Jewish city; now Haifa and Acre are two others. Tel Aviv, though only 40 years old, has grown to 300,000.

© Sabbath promenader meeting

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Photographs by Marshall Brown Wallace





### Devout Pilgrims, Restless Children Await a Service in St. James Cathedral

Many visitors consider the Armenian Cathedral Jerusalem's handsomest church. The porch's vaulted ceiling and Biblical murals suggest the Italian Renaissance. Door curtain and windows show Oriental flavor.



**Last Supper, Fashioned in Pearl Shell, Is a Masterpiece of the Bethlehem Carvers**

Other souvenirs exhibited in this Jerusalem shop include a shell plaque, amber-bead necklace, cross of Jerusalem (extreme right), and rosary. Most popular is the Bible bound in olive wood.



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Kodachrome by Margaret Owen Williams

✦ **Arab Butchers Sell Big-tail Sheep,  
Which Store Fat for Famine Times**

One breed of Eastern sheep has a tail bone flanked with a rich fat prized as a delicacy in making pastries. Tails weighing up to 30 pounds became such impediments that shepherds used to fasten curts to the tails to relieve their flocks of the burdens.

✦ **Scribes, Jordan's Public Stenographers,  
Do a Brisk Business in 'Amman**

Licensed letter writers line the walls outside Government offices. In addition to helping illiterates, they aid the educated by filling out tax returns and job and permit applications. Supplied with forms and revenue stamps, they save their customers time and bother.







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Photograph by Bernard Owen Williams

### Jordan's Turbaned King Abdullah Interviews an Officer of His Arab Legion

Abdullah descends from the house of Hashem, which traces its male line to Mohammed's daughter Fatima. Abdullah's father, the late King Hussein, led the Arab revolt against Turks and Germans in World War I.



© National Geographic Society

Exercises by Elizabeth Drew Williams

★ **Teamwork Is the Theme for Youth in Peace as in War**

Israel owes its independence to youth who fought the war against the Arab world. Men and women together shouldered arms in the front lines. Now demobilized, many are members of various sports societies. These gymnasts exercise in Jaffa-Tel Aviv.

✧ **Israel Gives Everything to Children; No Sacrifice Is Too Great**

Communal farm settlements reduce family life to a minimum. A child born to working parents goes into an infants' home and until he grows up sees his family only a few hours in the evening. These children play under supervision at Nahariya, a new beach resort.



# Mid-Century Holland Builds Her Future

BY SYDNEY CLARK

AS THE big air liner circled to land on Amsterdam's Schiphol field, where I had previously come to earth several times before and since the war, I peered below, trying to glimpse the condition of this field which had been utterly devastated by the ravages of war.

When I stepped from the plane, I promptly saw how energetic is this country, the Netherlands, which we inaccurately call "Holland."

In the spring of 1945, when the war ended, Schiphol was a ruin, seemingly lost to the world of transportation. Literally nothing was left of it except a fantastic mass of rubble and bomb craters.

Within two months the Port Authority of Amsterdam and the KLM (Royal Dutch Airlines) had cleared the area, established a few temporary runways, and erected on the field a wooden town of offices and workshops around a central stem called Liberty Street.

## From Shanty Town to Modern Airport

At the time of my first postwar landing, in the spring of 1948, Schiphol still seemed a shanty town, though roaring with activity. Then began the flow of Marshall Plan funds and materials to back the country's own enormous energies.

Courage, drive, resourcefulness, vision—by any word the spirit of the Netherlands is a force in the Western World. To see that spirit in action is an experience. And nowhere is it better exemplified than here on Schiphol field.

Today the wooden town is largely replaced by a gleaming one of steel, concrete, and glass. There are 11 large hangars (one named "Wilbur and Orville Wright"); workshops where 6,000 skilled mechanics and technicians service the air fleets of Holland and of foreign operators; a nearly-million-dollar engine test stand; and a station building with a handsome restaurant and a roof café.

A thousand persons can eat, and very well, in Schiphol at one time, but these facilities are already too small, for on big days there are sometimes 10,000 visitors, besides 2,000 passengers coming and going.

"Schiphol is my window to the world," says Albert Plesman, KLM's founder and president. But a window is a two-way thing, and this one has been *my* window to the Dutch spirit.

Ten million persons now live behind this window, within the small house of Holland

(map, page 752), and therein lies an almost frightening challenge to the nation. The 10,000,000 mark was passed late in 1949, though before the war the nation numbered only about nine million, and a century ago three million.

In the decade of the 1930's it was fashionable to worry about the probable early decline of the population. Now the worry, real and acute, is quite the other way around, for it is feared that in 15 to 20 years there will be 12 million in this congested dwelling place.

By enormous labor and expense the nation is adding a bit of land here and there, taken from the resentful sea, but these small additions cannot solve the problem.

Holland is scarcely larger than Maryland; yet it has about five times the population, though Maryland is one of our more densely populated States. The country's birth rate is three times its death rate. Statistical life expectancy is just under seventy years, among the highest in the world.

At Kinderdijk in South Holland I entered an old windmill. Its wings are now stilled, as are many others in Holland, because of the far greater effectiveness of electric pumps.

A stout woman greeted me in stoutest Dutch, and I could catch scarcely a word of what she was saying; but I caught her smile of welcome, a warm one.

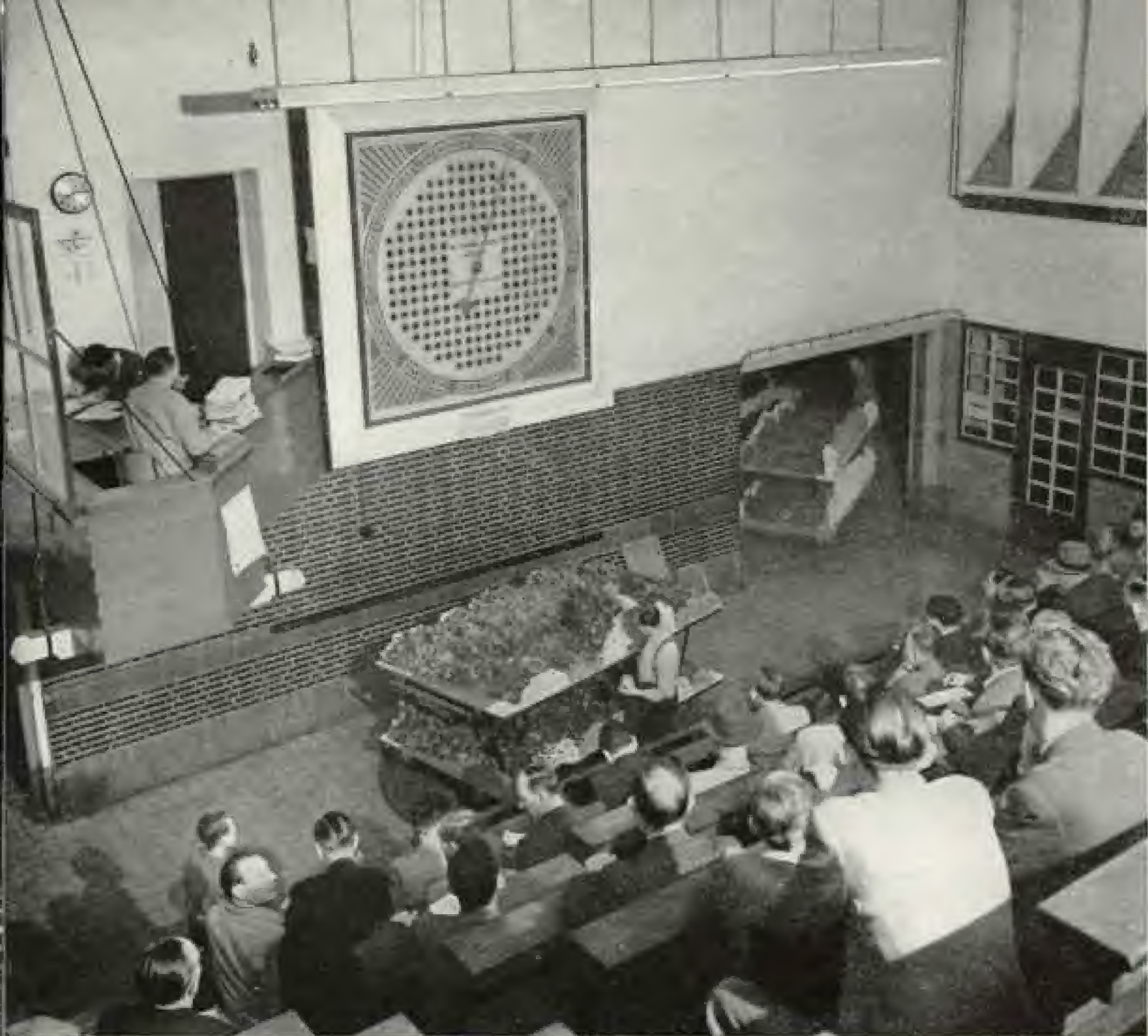
## Old Windmill Houses Family of 12

Children and more children, all from the same mold, with blue eyes and unruly straw-colored hair, swarmed about her. There were 10 of these youngsters; with the mother and the laborer-father they were living in the mill by government arrangement.

Members of the family took me to every part of their novel windmill home, showing me the odd dwelling contrivances, such as recessed beds, crescent shelves, improvised chairs, and ladder-stairs. They showed me, too, that the mill could still work if war should come again and shut off electric power.

This Kinderdijk home was an illustrated lecture on Holland's desperate housing shortage.

Holland has two obvious ways to attack her chronic problem of congestion, cruelly increased by the dwelling casualties of war. One is industrial advancement, with new thousands of city flats (page 749). The other is land—land and more land—for farming families.



### Aalsmeer Flower Buyers, Bidding with Push Buttons, Light Up a "Punchboard" Dial

This auction disposes of 12 million potted plants and cut flowers annually. Each gallery seat has a control to the dial. As the sale opens, flowers are carted in. Then the auctioneer (left) starts the "clock's" hand descending from an above-market figure. When it reaches a buyer's price, he pushes his button, stopping the indicator, and his seat number lights up. Such a light here shines in a circle; the sale is complete.

But how to get this last? Planners have thought of many ways, and, knowing that Heaven helps those who help themselves, they have helped themselves to Neptune's land, though not without incessant opposition from the sea, which even now sometimes wins back a bit by clever strategy.

Holland's water-war to gain and retain the soil of the sea is one of the sustained dramas of Europe;\* and since the world insists upon a hero for every war, one was long ago obligingly furnished by the American authoress Mary Mapes Dodge. He was and is, of course, the little Dutch boy, a lockkeeper's son, described in *Hans Brinker; or the Silver Skates*.

The boy noticed that sea water was trickling through a tiny hole in a dike. At this sign of

an impending break which might flood whole villages and their *polders* (lands reclaimed from the waters), he held his finger in the dike all night until he was finally seen and relieved.

The boy who held back the sea and saved his people, though entirely fictional, is at last being honored with a statue.

### War Against the Waters

This work of art, created by the Dutch sculptress Grada Rueb, was unveiled June 7, 1950, at Spaarndam, outside Haarlem (page 751). "Dedicated to our youth," reads the inscription, "to honor the boy who sym-

\* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Behind Netherlands Sea Ramparts," by McFall Kerbey, February, 1940; and "Holland's War with the Sea," by James Howard Gore, March, 1925.



### Wall by Wall, Row upon Row, New Homes Take Shape at Eindhoven

Each year Netherlanders require 45,000 new dwelling units to house their expanding population. Lack of wood compels them to search for new materials. These houses use concrete blocks.

bolizes the perpetual struggle of Holland against the water."

The story of Holland's water war starts with an old and worthy cliché—"God made the earth, except Holland, which the Dutchmen made for themselves."

If you doubt the literal truth of this, look at the map and the record (map, page 752). Almost all of the Provinces of North and South Holland, two of 11 that now compose the Kingdom of the Netherlands, is below sea level, some of it about 17 feet below. In addition to this, large portions of Zeeland, of Friesland, of Groningen, and lesser parts of several other Provinces are below the mean water level.

Cut off from sea water by the huge 20-mile dike, and fed by fresh streams, the Zuider Zee has become a fresh-water lake, the IJsel Meer, and is being robbed of nearly two-thirds

of its area to form new polderland below lake level.\*

Two of four vast developments, which are to total 550,000 acres, are virtually completed (page 766). Another, to every traveler's regret, is later to swallow up the costume island of Marken (page 759), making it a mere rise on extensive farmlands.

A publication sponsored by the Dutch Government states that "30 percent, at least, of the surface area of the country has been reclaimed from the sea."

More than half of the nation's 10,000,000 people now live below sea level. These areas include the great cities of Amsterdam and Rotterdam, where every building of any size rests on massive piles. It takes nearly 14,000

\* See "New Country Awaits Discovery," by J. C. M. Krusinga, NATIONAL GEOGRAPHIC MAGAZINE, September, 1933.



*Netherlands Information Service*

### Holland Strikes It Rich. Oil Pours from Wells

Schoonebeek field, developed after the war, yields four million barrels a year, a quarter of the nation's needs. American capital holds a big stake. This driller reads a gauge showing pressure on the drill bit.

of them to support the Royal Palace in Amsterdam.

Hitler's war abetted the sea in its efforts to recoup some of its losses. Much of the lovely island of Walcheren, whose dikes tragically had to be bombed by the Allies in October, 1944, to flood out the German defenses of the Schelde, was continuously scoured, a Zeeland authority told me, by 16,000,000 cubic yards of salt water. Twice every 24 hours the sea water rushed in and out, neatly removing farm and grazing lands.\*

It was thought that a quarter of a century would be needed to restore this blighted island, but most of the farming area is now back in production. This achievement was due in no small measure to Marshall Plan aid, which has powerfully advanced all of Holland's postwar reclamation projects.

### Flooded Lands Restored

Prodigies of Dutch engineering closed the dikes, and new methods of eliminating the salt from the soil surprised even the most optimistic. But the beautiful woods of Walcheren are gone, to the very last tree, in the flooded sections, which totaled 38,000 acres. Nature must have time to rebuild them.

Most Dutchmen, even most Zeelanders, who bore the awful brunt of it, were quick to accept the Allied destruction of Walcheren as a necessary part of the liberation campaign. Few Dutchmen, however, can yet muster charity enough to forgive the Nazis their major work of land destruction, the wanton flooding on April 17, 1945, of the Wieringermeer Polder, reclaimed from the IJssel Meer.

Eyes still grow hard at the mention of it, for this was an act of forthright frightfulness.

\* See in the NATIONAL GEOGRAPHIC MAGAZINE: "Holland Rises from War and Water," by Thomas R. Henry, February, 1946; and "Mending Dikes in the Netherlands," 20 Ills., December, 1946.



### Princess Margriet Unveils a Statue to a Hero Who Never Existed

For years American travelers embarrassed Spuarndam elders with the question, "Where did the little boy stick his finger in the dike?" To satisfy their curiosity, Netherlanders unveiled this bronze June 7, 1950. It honors the "boy who symbolizes the perpetual struggle of Holland against the water." He was described by Mary Mapes Dodge, an American, in *Hans Brinker; or the Silver Skates* (page 748).

serving no military purpose. It took place less than three weeks before the official capitulation and while negotiations leading to the cessation of hostilities were under way.

Fifty thousand acres were flooded by the blasting of the polder dikes in two places, and the Nazis openly boasted that they had it in their power to "return Holland to the 13th century."

#### American Pumps Aid Reclamation

But one thing they overlooked. To keep its waters fresh, the IJsel Meer, formerly the Zuider Zee, was and is maintained by giant locks at a level about seven inches higher than the sea. So it was only slightly brackish water which poured in such volume over the adjacent farmlands.

Frogs croaked cheerfully in it, a blessed sound to the Dutch, for frogs do not like salt water. The willows did not die, for their roots,

in this case, fortunately drank a palatable beverage.

Immediately upon the German retirement in May, determined Hollanders undertook the huge task of bailing out the Wieringermeer.

In three months the dikes were sealed and pumping could begin, partly by means of pumps purchased from America during the war by the Dutch government in exile.

Just before Christmas Day of 1945 the whole reclaimable area was dry again, and in the spring of 1946, one year after Germany returned this part of Holland "to the 13th century," fair crops were growing. This was a miracle of achievement.

The nightmare of the past yields to eager dreams for Holland's future. I watched two mid-century developments in the endless water war. Both are typical of Dutch engineering strategy.

A portion of the River Schelde, south



# THE NETHERLANDS



## More than Half the Netherlands' Ten Million People Live Below Sea Level

Here the Rhine, lost in its mucky delta, divides into several diked arms. Zuider Zee, prominent salt-water landmark on older maps, has gone to make new land. Its place is taken by IJssel Meer, a smaller, fresh-water lake, dike-protected from the sea. Holland, the kingdom's popular name, properly applies only to North and South Holland, two of 11 Provinces. Shaded area of the map indicates below-sea-level portion of the Netherlands.



of the Walcheren causeway, is being cut off by a dike that will create 1,200 acres of new polderland.

Fascinated, I watched the process. Willow fagots are knitted into big rafts, or sink mats, which are floated into position, filled with stones, and sunk. Then "press quays" of clay are raised on either side and the middle portion filled with sand. The press quay on the sea side is heavily buttressed by a sloping wall of rock, neatly fitted but not cemented.

Thus a portion of the sea is contained, as diplomats would say, and the water within this new bit of Holland is pumped out. A local polder committee is formed to administer the land, under the supervision of the national government department called Waterstaat.

Those who benefit from the dike are taxed, as on the polderlands throughout Holland, according to the proportion of their property to the whole. A friend of mine in Veere, owning about half an acre, tells me that his local dike tax is about \$2 a year—not much for protection against the sea's revenge.

The pumps of Holland, by the way, are an increasingly potent company. In the earliest days men bailed out their land with buckets, carrying the water to the rude dikes they had built and emptying it on the outside. Then came hand-worked mills, with buckets fastened to big wooden wheels. The windmill followed and became the symbol of Holland, as it is, in romance, to this day (page 761).

#### Electric Pumps Replace Windmills

A few of these beautiful four-winged mills still operate regularly, and all are considered a sort of pumping insurance in case of war. But most have given way to electrically driven pumps. Some of these are of enormous capacity. The largest pumping station in the Noordoost Polder can pump more than 574 million gallons of water a day.

My other example of how Holland now wages her war with the sea comes from Groningen Province.

Throughout this Province, and Friesland as well, many villages center about a hillock, often man-made, called a *terp*. In olden times a *terp* was the refuge of its region. If the sea restrained its passions for a few decades, grazing lands, called *kwelders*, developed around these mounds, and dikes could be built in expanding, concentric circles; but one never knew when some frightful storm might come to undo perhaps a century of such encroachments.

Now the whole Province, where there are no dunes to do the job, is rimmed by massive dikes, built with a long gradual outer slope

that brakes the wildest waves. And man, ever reaching for new land, is actually harnessing the sea to work its own loss!

It is this way. At a distance of perhaps 200 yards from the high-tide line, a modest clay dike is built in the shallow sea, parallel to the beach. Every tide washes a little new silt over and within this barrier and leaves it there. Every storm of any size destroys the clay barrier, but it is easily rebuilt and again the sea brings in fresh sand.

Kwelder lands creep outward from the main dike, and sheep placidly crop the grass almost from the lapping waves. The grass is hardy, and gradually, almost surreptitiously, it manages to anchor the newly made strip.

The process is repeated over and over, and at long last—this harnessing may take a century—man builds an indestructible dike well out in what was the sea. This assumes the role of *waker dijk* (watcher dike), and the old inner one is called the *slaper dijk* (sleeper dike).

#### How Hollanders "Stretch" Their Land

Holland has thus made for herself a few more square miles of sorely needed land. The row of West Frisian Islands, ages ago part of the mainland, may, ages hence, again be mainland soil, for the gap is narrowing.

The taking of new land from sea and lake is by no means the sum of Holland's strategy in her struggle for space. She tries by every means to improve and even ingeniously to "stretch" the land she already has. Modern machinery and enlightened methods of education in farming are a part of the program; but there is more.

For example, the innumerable ditches of the country are being replaced wherever possible by a system of drains, laid four feet deep in the earth. This is a triple advantage. Drained land yields considerably more than soggy land. The ex-ditches themselves become arable land.

And, finally, the size of single farms tends to increase to a point where the use of tractors and other mechanical implements is practical. Separate fields in Holland's north used to measure one or two acres apiece. Now in many sections they average five acres.

How Netherlanders build roads through peat bogs is an interesting oddity still unknown to many of the Dutch themselves.

A firm road cannot be built through Holland's squashy, below-sea-level bogs by any ordinary method; so an extraordinary one has been devised. Along the projected line a new canal is first dug by dredges that float in the canal they dig.

When several miles are completed, thousands of tons of sand are brought from old inland dunes, and huge electrically operated blowers fill the canal solidly with sand.

Then the canal moves ahead and more sand is blown into the new stretch.

Looking on, I marveled as a main traffic artery thus advanced from Amsterdam to Utrecht through soggy lands south of the capital. Dutch engineers find that the Scriptural advice about building a house on sand doesn't apply to roads. The motorcars will come and beat upon that road and it will fall not, though it is founded upon sand!

"Happy is the land where the child burns his mother," is a seasoned Dutch proverb. It involves a neat pun on the word *moer*, a short form of *moeder* (mother) which also means "moor."

Fewer and fewer areas of Holland can now burn the peat of their mother moor: but the burning of mother earth's oil is an increasing boon, and it is only since the war that Holland's earth has yielded oil in quantity.

#### Oil Flows from New-found Fields.

The rich region of Schoonebeek, in Drente Province, barely within the eastern marches of the Kingdom, now produces more than 4,000,000 barrels a year, about a fourth of the national consumption. This oil stimulates the national economy, and for that reason it is treasured like liquid gold (page 750).

The Royal Dutch-Shell Group took the initiative in this geologically "likely" land as long ago as 1933, and in 1939 production seemed near. But when war loomed, and long before it struck Holland, explorations were sharply halted lest these fields tempt the Nazis unduly to aggression.

Not until 1945, after the liberation, was work resumed in earnest, and the advance has been spectacular. Two oil trains of approximately 6,000 barrels each roll daily out of Schoonebeek.

Standard Oil Company (New Jersey) now participates with Shell on a fifty-fifty basis in the development of the Schoonebeek field and in exploration work in the Netherlands.

Americans in general still think of Holland chiefly in terms of tulips and hyacinths; of windmills and wooden shoes and Alkmaar cheeses (pages 758 and 759); of the undeniable charms of costume villages such as Volendam, Staphorst (page 765), Spakenburg, and others in Zeeland Province.

This annoys some Dutchmen almost beyond bearing, though the country sorely needs the dollars that such beguiling things attract.

"Must we go on forever being quaint?" one

irascible businessman asked me. "Must we sash about only in our tulip fields for 1,000 years more, wearing wide, short trousers and wooden *klompen*?" Then, in more practical vein, "Can't you tell your fellow Americans what we really are, and what we are doing?"

"That's a tall order," I said, "but I can and will tell some Americans some things your country is doing."

#### Marshall Plan Gave New Hope

The subject is, after all, of pocketbook interest, since every American, directly or indirectly, is contributing to *De Marshall-Hulp*, or Marshall Help, so vital to everything Holland is doing. This is woven into the entire fabric of Dutch economy and recovery. Some understanding of how it works is essential to an understanding of mid-century Holland.

On April 26, 1948, the first Marshall Plan ship, the *Noordam*, arrived in the Netherlands carrying 4,000 tons of grain. It was greeted with emotions like those of a castaway sighting a sail.

For the first 15 months of Marshall Plan operations Holland's allotment was 507 million dollars. For the second year it was nearly halved, down to 258 million. It is supposed to taper down to zero by 1952, and every Hollander hopes as ardently as does every American that it can actually terminate then.

At first, food and medicines were the most desperate needs. Good nourishment saved thousands of lives, and notably included food for cattle, so that they would give milk for the children. Medicines, especially streptomycin to combat the scourges of meningitis, saved other thousands.

Some of the things Holland is now doing with Marshall Help are too little known by Americans.

American tin plate, for instance, makes possible the packaging and vastly profitable exporting of Dutch dairy products.

American copper aids in carrying light and power to every part of Holland, and also enables the railways, now nearly 50 percent electrified, to operate fully. American motors are used in many locomotives.

American coal has helped sustain the gas services of Holland. American carbon black is used in the manufacture of rubber tires.

American pigments and oils put color into Dutch industry, making various valuable exports possible, and into Dutch homes and Dutch life as well. Even the daily clothes used in the Kingdom would be of a drab neutral shade without Marshall Help pigments.

The flow of American industrial aid, furnished for the most part free, is funneled



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Illustrated by Emma Jureta from Black Star

### Urk Stubbornly Clings to Baggy Pants and Wooden Shoes, Its Symbols of the Good Old Days

For centuries Urk lived as a world apart, a Netherlands fishermen's island in the Zuider Zee. Then dikes and pumps took the island from the sea and gave it to the mainland. Today Urkers, mourning their former isolation, try to shut out the world. A sign warns approaching strangers: "No motorcars allowed; park here."

This elderly fisherman, as solid as his wooden *klompen*, scowls at the cable drums as portents of telephones and electric lights. His female relatives' old-fashioned attire, billowing in the breeze, flouts fashion's decrees. No tricky gadgets such as clothespins! Garments are clinched among the rope's strands.



Amsterdam Sight-seers Board a Glass-topped Launch for a *Rondvaart* (Round-trip) Tour Through Tree-lined Canals

### Mr. and Mrs. Winston Churchill Admire the Netherlands in Tulip Time

Britain's wartime Prime Minister visited the country in May, 1948, to address backers of a United States of Europe. In flag-docked Voorthout, near The Hague, he inspected this flower bed.

Left: Hyacinth growers near Hillegom sacrifice blooms to produce bigger, stronger bulbs, their stock in trade. Each spring, as fields blossom, they snip off the flowers to conserve strength of the bulbs, which require five to six years to mature (page 764).

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Illustrations by Peter Jacobs from *Britain after*



## Alkmaar Stacks Cheeses Like Cannon Balls in the Market Place

On Fridays, April to October, buyers and sight-seers gather by the hundreds for Alkmaar's colorful auction, where the cheese guilds, dressing their porters in uniforms, do business by centuries-old methods.

Knots of buyers here await the 10 a.m. starting signal, when the cheeses are unveiled. Then the dealer, hefting the cheeses, slaps them, as boys thump water-melons for ripeness. After "outputting," the buyer plunges a tiny scoop into a globe and removes a long stick of cheese. This he crumbles between his fingers, smells or tastes, and then neatly replaces what is left of the sample.

As buyer and seller name a price, they strike each other's palms so emphatically that echoes of slapping resound across the cobbled square. A final hand-clasp seals each transaction.

At 1 p.m. the market closes and everyone goes home. By the following Monday pigs, cows, and sheep replace cheeses in the ancient market place.

These are golden Edam cheeses. Bought in bulk lots, they are weighed, inspected, stamped, and shipped on trucks or canal barges. If for export, they get a coat of red wax, a familiar sight in American delicatessens.

Until September, 1940, cheese was tightly rationed in the Netherlands; almost all was exported.

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### Porters, Dressed According to Tradition, Carry Edible Gold

To the weigh-house go Aikmar's melon-shaped cheeses. Later they will roll down troughs into barges. Sledge-carrying porters work in teams.

© Stewart Greenough/Photo



### A Marken Baker, His Picture "Stolen," Frowns at the Camera

Delivering bread by pushcart, he wears wooden shoes and tummy-knee breeches. Marken, his old-fashioned island, is destined to join the mainland.

Illustration from Houghton Mifflin



## Hucksters in Giethoorn, a Netherlands Venice, Peddle Wares by Boat

Giethoorn, not far from the famous Zuider Zee, is a beauty spot of Overijssel Province. A network of narrow, tree-arched canals crisscrosses the small, scattered village.

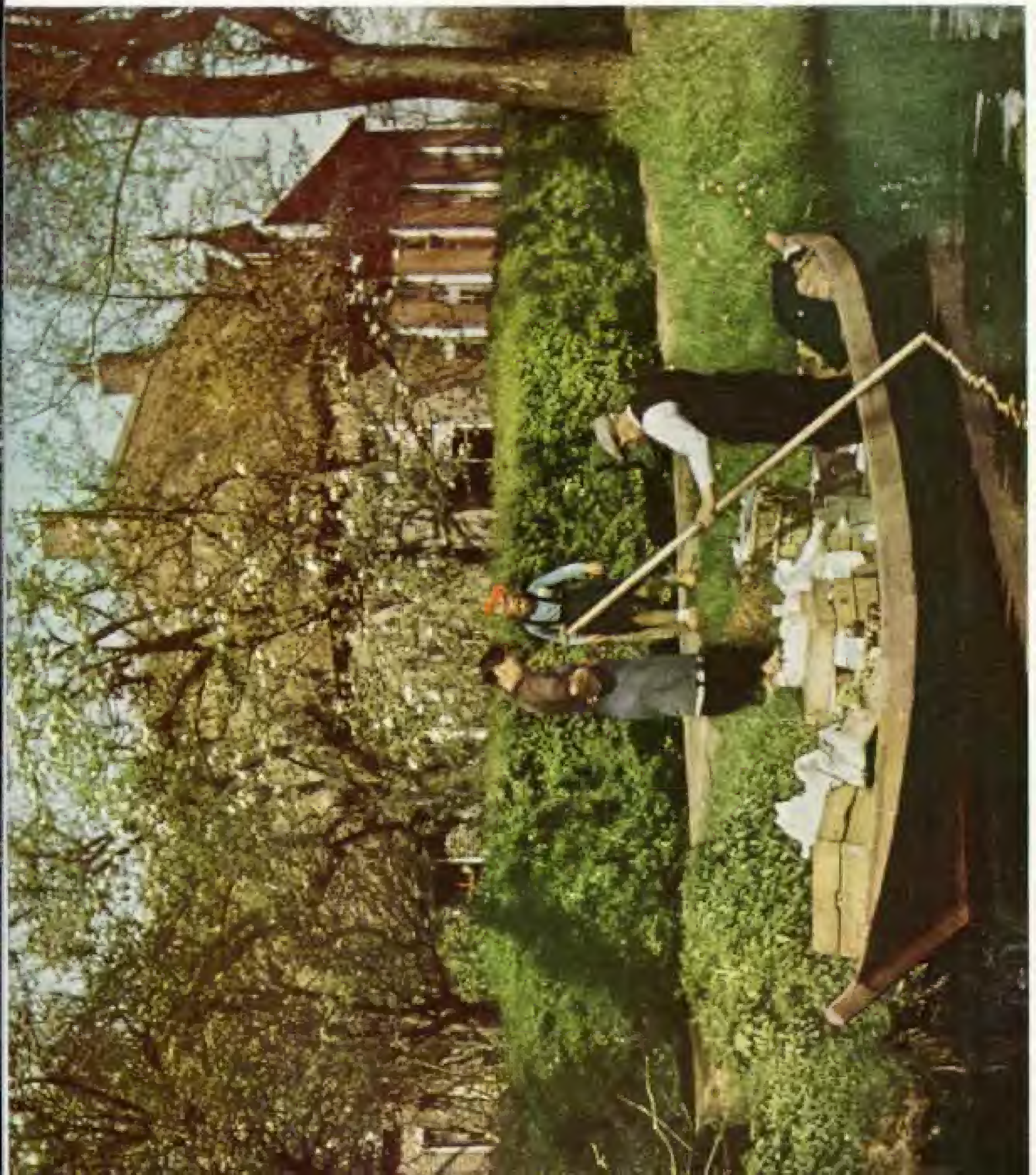
Houses seem to rise from the water; almost every one stands on its own island. The latches of each tidy beam gleams with china, earthen jugs, and polished pans; the air is redolent with Dutch cooking.

Roads are lacking. Giethoorn-ers go about their business poling double-ended punts, or walking tompaths linked by rustic bridges wide enough for just one person. Farmers ferry cows to and from pastures. Marriage parties, gay in colorful costumes, and funeral processions, tarbed in mourning black, likewise move by boat.

Here, in blossom time, a shirt-sleeved merchant displays his produce to a housewife and her daughter. In winter, when the canals freeze, he will make his rounds on skates, pushing a sled.

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Giethoorn in Friesland  
from Black Star





## Oceans of Milk Build Sturdy Datchmen, Pay for Imports

Netherlands farmers give some 40 percent of their land to dairy herds. In return, their cows yield nearly 11,000,000,000 pounds of milk a year. Two-thirds stays at home; the rest goes abroad as butter and cheese.

Normally, the country imports a vast amount of grain feeds. When World War II cut off the supply, thousands of cattle were slaughtered and milk production was halved. Now, with Marshall Plan aid and five years of peace, herds approach prewar size.

Dairy men prefer Dutch-Friesians (left), whose American cousins are known as Holsteins. The Netherlands' milder climate suits the herds.

Old-time windmills (left) still drain some Dutch lowlands, but power now drives 90 percent of the mills. If war should shut off electricity, Netherlanders are prepared to revert to sails.

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Restoration by Pieter Zaaijns from Mark Star

**De Rijp's Houses Express Individuality; One (Center) Tipsily Leans Toward the Street**

Some Netherlanders say such sloping fronts facilitated the hoisting of goods by rope from street to attic.



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✧ **Winged and Spiraled Caps Proclaim  
Their Wearers' Home Towns**

Goes's headresses (left) and Armemuiden's gold ornaments never change. The bread buyer saw Walcheren, her island, flooded by the Allies to dislodge a stubborn German garrison near the close of the war.



Illustration from Hamilton Wright

✧ **A Culinary Art Exhibit Is Spread  
for Foreign Guests in Warmond**

The waiter displays a goose-liver pâté; the waitress, in Walcheren costume, holds tomatoes stuffed with tiny shrimp. Second plate from right has a Middelburg lobster, born off Norway but matured on Walcheren.

Illustration from Hamilton Wright





**Bulb Growers, Warring on Insect Pests, Shower Hillegom's Table-flat Beds with Poison**

Dutch bulb growers on 16,000 below-sea-level acres between Leiden and Haarlem. In 1948 they earned the Netherlands \$21,770,526 in foreign trade and accounted for 29 percent of its exports to the United States. These men, working from a canal barge, spray hyacinths and tulips with Bordeaux mixture.

### Staphorst Women Paint and Scrub Outside as Well as In

Clamish Staphorst shares the world; even more doggedly than other towns around the former Zuider Zee, it holds to the past. But for tidy homes its women yield to no others. Whether cleaning house or going to church, villagers wear a distinctive costume unchanged a century or more. Embroidered caps and bodices brighten somber dresses. When their work to do, coverall aprons give protection (right).

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Illustration by Funn Jacobs from Black Star



## A New Town Goes Up; the Dutch Grab Living Space from the Sea

Rising births and declining deaths found the Netherlands to wage peaceful war against the sea for more land. Ten million Dutchmen double the 1900 census figure. They are packed some 700 to the square mile; 50 Amsterdams occupy similar space.

Since land-hungry Netherlandsers eschew conquest from their neighbors, they take acreage from the sea. Reclamation projects have added 11 percent to the country's area in the last 50 years.

So far the gigantic Zuider Zee project has added 170,000 acres. Two other works will raise the total to 550,000 acres. Such drained lands are known as polders.

This flat area is part of the new Noordoost Polder. Diked and drained, it was recovered from the Zuider Zee by 1941, but war stopped development. Liberated, the Netherlands turned to this fresh land for more food. Presently farms bloomed, villages mushroomed.

Finished homes here are what Netherlandsers call "American houses." The government bought 800 of them in Austria, knocked them down, and reassembled them in such places as Emmeloort. Temporary poles hoist materials for new dwellings. Workers lay concrete foundations.

Given a few years of time-growing, Emmeloort will take on the neat, thrifty look of Holland's older villages.

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Shown here by Tomm Jacoby from Black Star



## Soil Scientists Analyze Land Won in the War Against the Sea

Over the centuries the Netherlands has reclaimed from sea, lake, and marsh about 30 percent of its total land area. More than half its people live below sea level; they are protected by 1,800 miles of dikes and 3,000 pumping units.

In Kampen, near Noordost Polder, the soil of each new farm is tested before the government leases it. For every farm created, there are three to four hundred applicants. A national department called Waterstaal supervises polder-land administration through local committees.

Here in the map room the research laboratory's findings become graphic. A wall map (left) shows the clay content of the entire polder, which was reclaimed from the Zuider Zee. Behind the desk lamp hangs a map, drawn from underwater samples, showing soil content of land still covered by IJsselmeer, fresh-water successor to the Zuider Zee. A draftsman works on a map of the polder.

Researchers develop complicated formulas for laws governing currents, tides, sand, and silt. Calculations for a single project, employing 15 calculators and modern machines, may take 10 to 15 years.

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from Frank's





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Hothouses from Hesterm Strijde

### Westland, the Netherlands' Hothouse near The Hague, Ships Fruit and Vegetables by Canal Barges

The Westland district covers many of its 49,000 fertile acres with glass. Farmers harvest top-quality, out-of-season vegetables; their hothouse grapes are famous throughout Europe. The Netherlands, only slightly larger than Maryland, has more than 4,500 miles of navigable rivers and canals.



### Zuider Zee Is Gone, but Its Fishermen Still Find Catches

When reclamation changed the salty Zuider Zee into fresh-water IJssel Meer, its old fishing villages faced disaster.

Hard hit was the island town of Urk, home of those fishermen (page 755). Almost all its men sailed in Zuider Zee's fleet, catching herring, flounder, and shrimp.

Only flounder survived the sea change. As catches dwindled, some fishermen took shore jobs or moved to North Sea grounds. Others, from habit, continued fishing where their ancestors had cast lines 600 years or more.

Then young flounder, admitted through the great sea wall's gates, replenished the fishing grounds, and oaks by the millions made the lake their homes. New life came to the fleet; catches became as large as ever.

Urk is no longer an island, but its water front, crowded with small craft, bustles as it did in salt-water days.

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Kochshuus by Frans Jacobs  
from *Black Star*





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Illustrations from Hamilton Wright

✦ **In from a Sail on Windy Sneeker Meer, a Dutch "Rainbow" Ties Up**

Broad Sneek Lake, seldom without a spanking breeze, is one of many that dot Friesland Province, a sailing skipper's paradise. In "Sneek Week" each August the lake sees a big regatta. Only larger lakes can accommodate Rainbows, the deep-keeled Dutch sailboats.

✦ **Scheveningen Wives, Mending Nets in a Pasture, Take Time for Tea**

Scheveningen, once a quiet North Sea village, has been engulfed by The Hague. Vacationists have made it a fashionable watering place. Their fine fashions make no impression on the fishermen's wives, who cling to their grandmothers' styles.



through a so-called Counterpart Fund into which Dutch firms and the normal importers pay in Dutch guilders for what they need.

The Counterpart Fund, operated by the Netherlands Bank under the joint direction of the Economic Cooperation Administration and the Netherlands Government, thus builds up a pool of hundreds of millions of guilders which are used for recovery and reconstruction. Marshall dollars serve a twofold purpose: the prompt purchase of essential dollar goods, and the rehabilitation of the nation.

The projects financed by the fund offer irrefutable proof to offset the continuous attacks upon the Marshall Plan by Europe's Communist organs. All Marshall Plan products (and likewise the U. S. trucks carrying them) bear the United States shield, with stars and stripes, and the words: *For European Recovery. Supplied by the United States of America.*

Holland's trade fairs also publicize in a big and heartening way what America's Marshall Help is accomplishing.

Holland's contribution to her own recovery is immense and in some ways remarkable. Consider one little-known fact. This small country, contrary to our thought of it, is highly industrialized. Thirty percent of the people live in large cities; the Utrecht Fair is a magnet for the businessmen of 70 countries.

Yet since the war there have been very few strikes. Why? Have management and labor suddenly sprouted wings? The answer, a revelation to me when I first heard it, lies in the war itself.

#### Lessons of War Useful in Peace

Close cooperation was a thing both sides learned in that time of daily danger. It was literally a matter of life and death that they should work together, for they considered that they were carrying on a continuous rear-guard action—through sabotage, slowing up, "mistakes"—against the enemy within their gates. And when the war was over, both sides said, "If we could work together in war, we can do it in peace."

Parents receive what is called a Children Allowance for all children up to 16 years of age and to 20 years for those still in school.

"You need about 15 children, assuming you're an average earner, to double your wages," said a statistician to me. "And this supplement applies to everybody in industry, without exception."

"To the president of the Philips concern?" I asked.

"To him, too. He certainly is in industry!"

This concern, called in Dutch *N. V. Philips'*

*Gloeilampenfabrieken*, maker of numerous modern things besides its basic incandescent lights, is one of the world's giants, with some 80,000 employees in many countries, including America. More than a fourth of them work in Eindhoven, the concern's home city (page 749). The huge plant there was repeatedly bombed by the Allies during the war when it was operating under German control.

The care of old people is a remarkable part of Holland's social program, made still more remarkable by the fact that longevity is seriously increasing the problem of national overcrowding. Everywhere in the cities are beautiful developments where old people may live in their own houses, almost or entirely free of rent, looking out upon a central patio or park which the tenants themselves keep up.

#### Tegelen's Passion Play Draws Thousands

The traveler's Holland, in the unknown portions of the country as well as in the well-known, tourist-trodden parts, is, so to speak, in the hands of a firmly knit organization called for short ANVV and for long *Algemene Nederlandse Vereniging voor Vreemdelingenverkeer*. It is the Netherlands National Tourist Office to you and me. One finds its representatives in every part of Holland.

Activities of this organization are as numerous as its offices. One of them is to publicize a village Passion play of real excellence, produced every five years (1950, 1955, etc.) by the village of Tegelen, on the right bank of the River Maas in Limburg Province.

About 30 performances are given in the quinquennial years in an open-air theater seating 6,000. Performances rival the more famous ones of Oberammergau.

The worthy sights of Holland, traditionally seen by swinging clockwise around the circle of its towns and Provinces, starting with Rotterdam, are far more varied and interesting than even ambitious folders can reveal.

Rotterdam is a city of starkest tragedy, as the whole world knows, for it was the scene of Hitler's savage "warning" to those who opposed him. The story of its present resurgence is a classic. The city is coming back, despite an ironical situation; for Rotterdam lacks and must have, for her abundant life, normal trade with that country, Germany, which almost destroyed her.

Despite this lack, the port of Rotterdam, home of the Holland-America Line, is again one of the stimulating sights of Europe.

"How is this recovery possible after such a fearful beating?" I asked myself over and over as I rode the port's complex waterways for hours in a launch (page 774).

The spirit of Holland gives the only answer. This seaport simply refused to roll over, gurgle, and die. The Nazis systematically looted it and finally blew up practically all the port equipment; yet already forests of huge cranes are seen against the sky, and there is a vast floating drydock, named *Prins Bernhard*, with a lifting capacity of 30,000 tons.

Here are shipyards of every sort—still others are at Amsterdam, Dordrecht, Schiedam, Vlaardingen. I noticed an odd product of one, a fancy white ferry ready to set out for the Bosphorus. On its gleaming paint I read: *Anadoluhisari—Istanbul*.

Before the war nearly 15,000 ships a year entered this port, an average of one every 35 minutes. In 1949 there were 11,604, eloquent of a major marvel of recovery.

From Delishaven, today a mere creek in the Rotterdam port area, the Pilgrim ship *Speedwell* sailed on July 22, 1620, bearing a remarkable cargo of ideas "made in Holland." When the *Speedwell* later proved unseaworthy, some of her passengers made the voyage to the New World in the *Mayflower*.

#### Ideas "Made in Holland"

To the sojourn in Holland of this group of Pilgrims, and to Dutch settlements in America, we owe in part some of our most cherished institutions. It is worth listing some of these ideas "made in Holland," since few Americans are aware of the debt our way of life owes that country:

A written constitution (rather than a collection of precedents).

The organization of the United States Senate (a fixed number to be elected from each State).

The written (printed) ballot.

The requirement, binding upon the Chief Executive, that he shall not declare war without the consent of Congress.

Free schools.

Freedom of religion.

Assignment of counsel to defendants unable, through poverty, to hire their own counsel.

Recording of title deeds.

Equal division of estates among surviving children.

Leiden, with its mellow but vigorous intellectualism centered in its University, is still an incubator of ideas. Most of them proved intolerable to the Nazis, who closed the University in exasperation early in the war, even while they were making a great show of benevolent friendliness to the Dutch people.

The Hague ('s Gravenhage), with its beach satellite Scheveningen (page 770), is affectionately, if not quite accurately, called a "village" of over half a million inhabitants.

It is not the Capital of the country—Amsterdam has that rather hollow title—but

it is the seat of government and the well-spring of law. Centuries of jealousy made both cities unacceptable until finally the interloper Louis Bonaparte, Napoleon's brother, in 1806 called Amsterdam his royal Capital.

The House of Orange, after Napoleon's downfall, continued to call Amsterdam the Capital, but The Hague was still the royal residence and the meeting place of Parliament.

So it is to this day, though Queen Juliana has let it be known that she will continue to live, as she does now, in her country palace at Soestdijk, near Hilversum. Her inauguration took place, by law, in Amsterdam, but she opens her Parliament in a glittering annual September ceremony in The Hague.

Beauty is an absolute essential, like food and drink, to virtually every Dutch householder, and not least in the war-battered but still dignified residential city of The Hague.

This statement is not merely pleasant flattery, but an obvious fact of Holland's life. One sees endless evidences of it, but let flowers in the windows be our witnesses. In every part of the country, from Brabant in the south to Groningen in the north, they stand in literal millions to give their testimony.

The revived Hague, no less than lucky un-bombed Amsterdam, has music in its soul as well as flowers. It boasts within its Municipal Museum one of the world's greatest collections of musical instruments.

The commercial flower fields of Holland lie mostly in the low, rich lands between The Hague and Amsterdam, especially north of Leiden.

They have often been glowingly described, along with the tulip's strange, romantic history, and still more often photographed; yet nothing can match the reality of the April brilliance of their endless acres of color (pages 757 and 764).

To growers these fields are a serious, worrisome thing, for their livelihood depends upon the successful large-scale international marketing of this beauty (page 748). To further this business, growers have established at Lisse, in the heart of the flower sector, a Laboratory for Bulb Research. This pioneer institution is chiefly concerned with combating plant diseases, so that other countries may have no reason to quarantine such products.

At the Lisse laboratory I was told that quarantine troubles are now sharply declining, and that international cooperation in control of pests is increasing greatly.

It is a curious thing that "broken tulips," with their wonderfully fancy colorings, the type which commanded the most fabulous



*Netherlands Information Service*

**The Bike Brigade Charges to Work. Nearly Everybody Pedals in The Hague**

Polizemen, clerics, officers, members of Parliament, and even Queen Juliana use bicycles. Movies advertise free parking space for cycling patrons. "P" sign permits parking, slashed-P forbids it.



### Rotterdam's Ruined Harbor, Rebuilt with Marshall Plan Steel, Makes Swift Recovery

Hitler's Nazis resented the fact that Dutch-owned Rotterdam was the commercial outlet of their "Father Rhine," whose source is Swiss and part of whose banks are French. In 1944, knowing they were about to lose the port, the Germans sank ships, blew up piers, and razed warehouses (as in the fire-blackened foreground). American funds having restored installations, shipping appears thicker than ever.

prices during Europe's tulip mania of the 17th century,\* have now been discovered to be merely diseased, victims of a virus infection.

Their varicolored beauty is an unhealthy sign. However, some blooms displaying two or more colors may be safe because they are not carriers of the disease.

It takes an expert to be sure. An authority at Lisse showed me several of this type, for instance the "American flag."

I asked then about black tulips, which are entrancingly presented in at least one tourist booklet as an attraction of Holland.

"A black tulip, or black flower of any kind,

is impossible," he said promptly, "for black is not a color and flowers *must* have color. We have some very dark purple ones, but never a true black."

So the search for *la tulipe noire* is doomed to perpetual failure.

Amsterdam is the metropolis of the Netherlands, the banker, the world trader, the prince of industry—in short, the New York of its country, though not the least like it in form or appearance. The Hague, on the other hand,

\* See "Some Odd Pages from the Annals of the Tulip," by Leo A. Borah, *NATURAL GEOGRAPHIC MAGAZINE*, September, 1933.

is a sort of Washington. The colors of this metropolis are infinite. Some of them come from the concentric canals (page 786), rimmed by tree-shaded streets of splendid 17th-century buildings; some come from paint on canvas; some from the music of the city's world-famous Concertgebouw orchestra; some from the inner fire of diamonds.

In the summer of 1949 a wonderful Diamond Exhibition was held in the Diamond Bourse of Amsterdam. With throngs of jewel merchants and the merely curious, I wandered about amid millions of dollars' worth of gems, for this exhibition was of impressive proportions and displayed many real gems, as well as models of all the world's best-known diamonds.

Rows of cutters were busily at work fashioning new jewels for trade. Only a few policemen and presumably some plain-clothes men mixed with the crowds.

The work of the cutters is a wonder of human concentration and skill, for a single false blow with the jeweler's hammer can cost hundreds or thousands of dollars. The largest and the smallest diamonds attracted perhaps the most attention. A model of the celebrated Cullinan, largest ever found, showed exactly how its 3,106 carats of splendor had been cut in 1908 by Joseph Asscher and Company of Amsterdam.

#### Groningen a Versatile Province

The outer circle of Holland, the Netherlands few people know, is full of evidences of the country's pioneering spirit, its capacity for development.

Consider Groningen Province. In this northern outpost all sorts of manufacturing enterprises are making industrial history.

Near Noordbroek mountains of home-grown straw are being worked and pressed into wall-board for prefabricated home interiors.

At Hoogezand a company with a branch in Passaic, New Jersey, is making potato starch that it claims is of use in "every industry except banking."

At Bedum I saw an enormous plant for dairy products, one receiving more than 132,000,000 pounds of milk a year from 2,300 farmers, who share in the enterprise on a co-operative basis.

Few Americans have heard of Almelo, Hengelo, Enschede, in a far corner of Overijssel Province. But they are big, busy, industrial centers. Throughout this region, as in many parts of Holland, so-called home-building unions are receiving from the Government 90 percent loans for erecting good, low-rent workers' dwellings.

The unions pay 7 percent a year, of which 2 percent is for upkeep, 5 percent for interest and return of principal. The needed sums are collected from the modest rents. In about 30 years the unions own the houses free and clear.

In Almelo I first came upon an interesting experiment in two-way international relations. Almelo and Hutchinson, Kansas, have adopted each other as "contact towns," to the social and business benefit of each. Similarly, Enschede and Memphis, Tennessee, have adopted each other; Nijmegen and Albany, New York; Breukelen and its namesake Brooklyn.

There are many other examples of this mutual-adoption principle. Though at first the practical aids have flowed chiefly from west to east, some advantages are seeping from the Old World to the New.

Apeldoorn is a lovely garden city which has captured a special service and made it big business. Profiting from the remarkably soft water in this whole region, Apeldoorn's 60 public laundries take in a large part of the washing of Holland, serving especially hotels, clubs, and public institutions.

Consider lacerated Arnhem and Nijmegen, towns that "live in heroism," with acres of white crosses and stars of David—British, Canadian, Polish—all around. The sole American cemetery, from which many of the bodies have now been brought home, is at Margraten, near Maastricht.

These martyred towns are coming back. They too are building their futures. The wrecked Rhine bridge at Arnhem, a symbol of British valor, was completely rebuilt by 1949.

The Nijmegen bridge across the Waal was never destroyed, thanks to luck and swift action.

Both of the above towns and this whole battle sector form an enduring symbol also of the Dutch underground, which had a valor all its own. Some of these heroes were executed by the Nazis, even as Germany surrendered, in a last shameful gesture of hatred.

#### The Business of Making Bells

Consider finally, in more cheerful vein, the bell founders of Holland. These makers of carillon bells should not be considered quaint or unimportant. They are contributing to the future of Holland, for chimes are almost as essential as flowers to the spirit of her people.\*

In November, 1949, a Heiligerlee foundry

\* See "Singing Towers of Holland and Belgium," by William Gorham Rice, NATIONAL GEOGRAPHIC MAGAZINE, March, 1925.

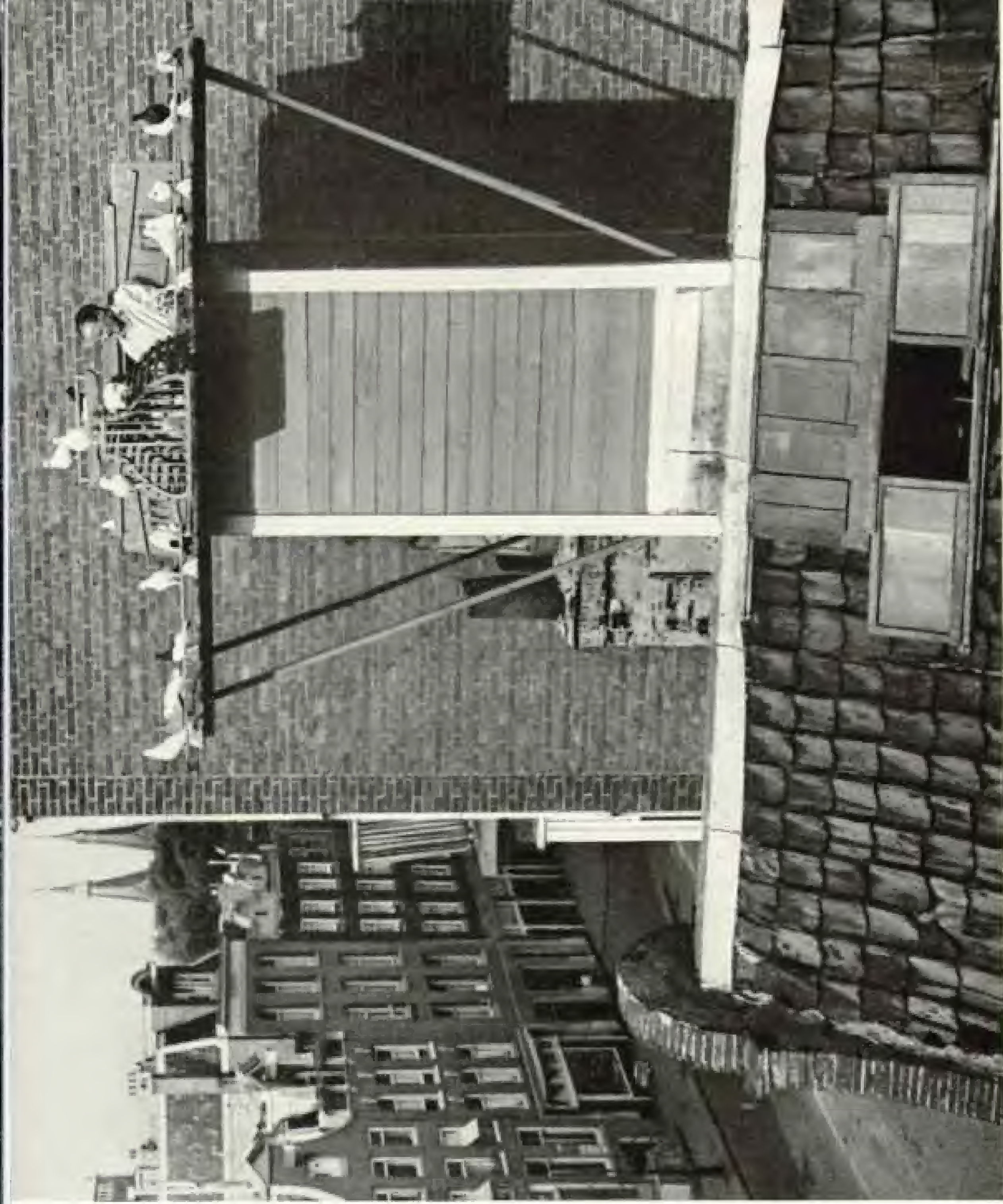
## Amsterdam Pigeons Land on a Lofty Bird Port in a Cramped Field

Four-story dwellings across the street have remained virtually without change for centuries. All rest on piles driven into the sandy ground. Such expensive foundations require that space be utilized to the utmost; hence the vertical, narrow construction.

Tenants tread steep stairways, some mere stepadders. Furniture too bulky for the narrow steps goes through windows. Beams jutting from the gables indicate how hobbit-log ropes are used. Central rooms are dark.

Hounds, horses, and falcons do not fit these confining bricks. Tenants choose sports suitable to the environment. One of these is pigeon breeding, and its devotees are as zealous as golfers, yachtsmen, and fly fishermen. Daily the owners exercise their flocks. The birds wheel over Amsterdam even as their brothers fly over New York's East Side.

Suburban fanciers have little trouble erecting pigeon lofts, but this man had to contend with peaked roof and surrounding walls, and his birds sometimes faced almost vertical landings. He lessened these handicaps by building a high, chimneylike loft topped by a landing board. The cage, known as a trap, admits the birds but contains them until the owner gives the command.





Star-shaped Naarden, Island City Within a Moat, Derives Its Bristling Form from a Medieval Fortress

Fifteenth-century Naarden was a fishing village. When sand sealed off its port from the Zuider Zee, the townspeople turned to farming.

777

Notwithstanding Information Bureau





JAMES

#### An Outdoor Automat in Zandvoort Dispenses Eat-and-run Lunches

Even automat-minded New Yorkers express wonder at this streamlined shop. A *kwartje* (10 cents), dropped in a slot, opens a glass window and delivers hot dish or sandwich. "Fried potatoes," says the sign on the roof. Zandvoort is Amsterdam's popular beach.

shipped to New York City, at the order of St. Martin's Episcopal Church, Lenox Avenue and 122d Street, a carillon of 40 bells weighing more than 13 tons. These are the first large bells to be sent overseas from Holland since World War II.

Many famous carillons have come from Aarle Rixtel, in the Catholic south.

"To make a good bell," the master founder there told me, "you simply have to be a good cook. I am a good cook. There's no magic formula. I have the feeling for it. I know when the measurements and mixture are right."

He showed me his main kiln, with a big neon cross over it, and said that he always called in the village priest to bless a "born-ing" bell.

"That's as important as the cooking," he added earnestly.

He told me of the German war on bells. The Nazis stole hundreds of bells from Hol-

land and many, too, from Belgium. After the war an enormous cache of them was found and retrieved at Hamburg. Many had been broken to pieces for the furnaces, though the Nazis had never found time to melt all of them down. Many, however, were still intact, including numerous thefts from Aarle Rixtel.

One of the looted bells bore the prophetic lines:

Remove me at thy cost;  
When I come down, the war is lost.

"But never mind the war," said the bell master briskly. "Look at these new bells, and listen. Listen to this one. It weighs about 15,000 pounds, and the clapper about 600."

With a mighty heave he smote the behemoth of melody, using a hammer in place of the unwieldy clapper.

"You'll hear it for three full minutes," he said, holding his watch before me to prove it. "But Holland will hear it for centuries!"

# Exploring the World of Gems

By W. F. FOSHAG

*Head Curator of Geology, U. S. National Museum*

**C**ONSIDER the diamond. Undisputed king of gems is this hard carbon, glittering expensively in settings of gold and platinum. Yet it is a close relative of humble graphite, the black "lead" in a pencil!

But while graphite is so soft and greasy that it is used as a lubricant, its tough, aristocratic cousin can be cut only with another diamond. Through such whims has Nature, during eons of slow alchemy, created the mineral crystals which yield diamonds, emeralds, sapphires, rubies, and a host of other precious and semiprecious stones.

So lavishly has Nature endowed gems with color, luster, elusive lights, and fiery sparkles that men have toiled and struggled to possess them almost since the beginning of recorded time. Gems have figured prominently in famous crimes, romances, and wars.

Rare stones were cut, carved, and polished in Babylonia several thousand years before the birth of Christ. Emeralds are mentioned in the *Prisse Papyrus*. In it a royal councilor of Egypt's Fifth Dynasty (about 2450 B. C.) described the sea-green jewels as less difficult to find than good words. In ancient China the origin of jade carving is lost in antiquity.

Today, as in centuries past, precious stones still are used mainly for personal adornment. In some parts of the world people continue to wear them as amulets and talismans, to ward off evil and bring good luck. Over the years a formidable body of lore has grown about the bits of mineral, globes of shellfish concretion (pearls), and lumps of fossilized resin (amber) which make up the colorful world of gems.

An early Persian legend has it that God, when He created the world, made no "useless" things such as precious stones. But Satan, ever eager to cause trouble and noting that Eve loved the gay flowers in the Garden of Eden, undertook to imitate their brightness and color out of earth. In this way, says the legend, were produced precious stones to excite man's avarice.

## Some Jewels Linked with Misfortune

Violent death and ill luck are associated, through superstitious belief, with India's Koh-i-noor Diamond, now among the British crown jewels, and the famous Hope Diamond (pages 781, 784, and 791), now owned by a New York dealer.

Since early times man has endowed gems with curative and supernatural powers. Cer-

tain stones, he believed, would preserve him from demons, vampires, and kindred terrors. Others would render him immune to sorcery or confer the powers of witchcraft. With still others, such as a polished sphere of rock crystal, he could foretell the future, review the past, or evoke pictures of events taking place at a distance. Protected by mystic influences of gems, he feared neither plague nor poison.

## Virtues in Gems

An almost inexhaustible list of virtues was attributed to gems. Some were supposed to procure the favor of the great; others made their owner amiable, wise, strong, and brave. Some protected him from fire, lightning, and tempests; others from danger and disease.

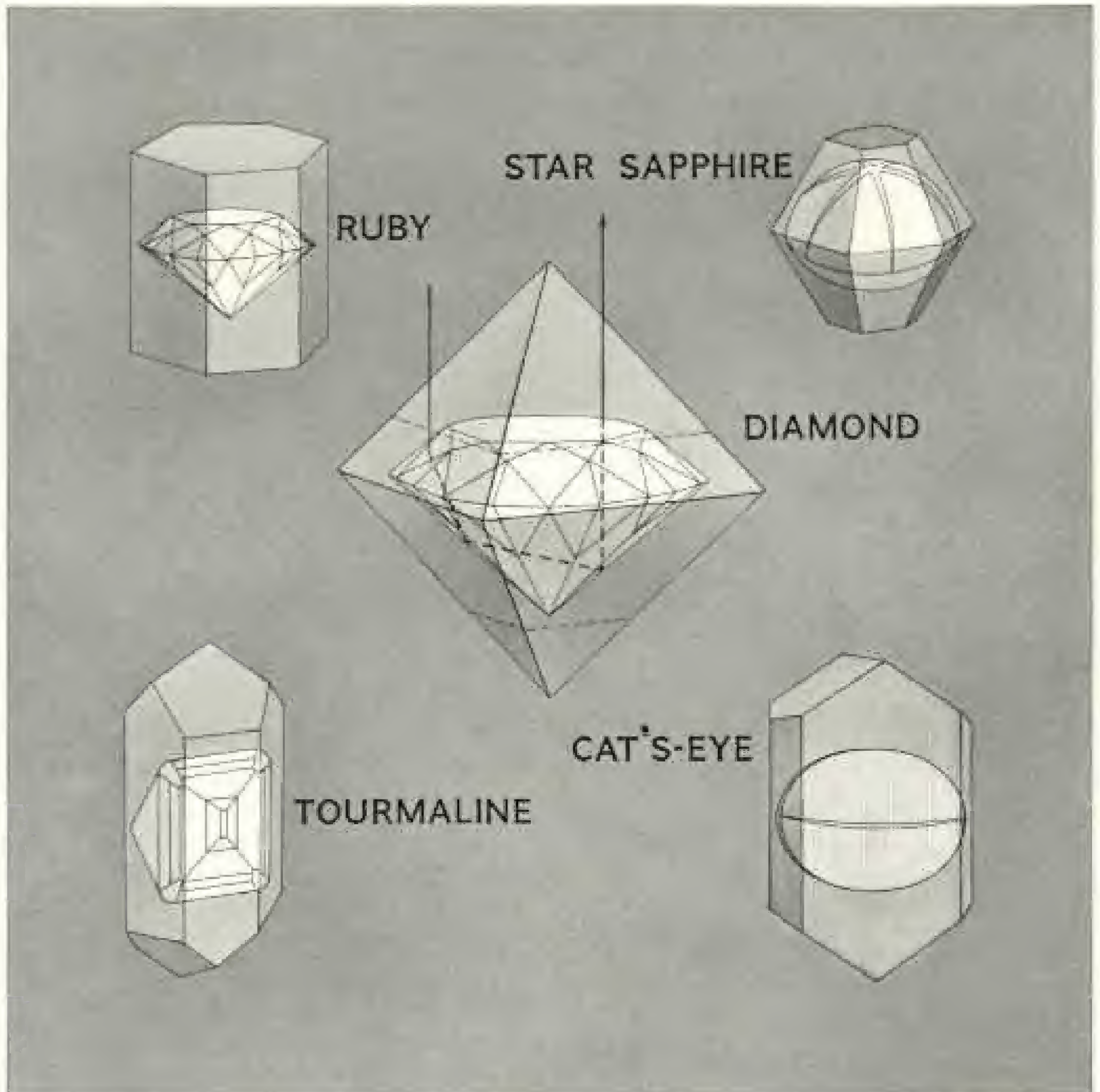
Good or evil supposedly inherent in gems were also linked with the planetary influence of days of the week. Yellow gems were appropriate for Sunday wear. Monday was the moon day, when all white stones except the diamond were to be worn. Tuesday, the day of Mars, was the time to wear red stones such as garnets and rubies. Thor's day, or Thursday, called for amethysts. The emerald was the gem for Friday, the day of Venus. The diamond was reserved for Saturn's day.

A particular stone was regarded as especially potent if worn in relation to the owner's natal month or sign of the zodiac. This belief survives in the still fashionable custom of wearing birthstones, ranging from garnet for January to turquoise for December.

The Apostles were represented symbolically by precious stones: jasper, St. Peter; sapphire, St. Andrew; chalcedony, St. James; emerald, St. John; sardonyx, St. Philip; carnelian, St. Matthew; beryl, St. Thomas; chrysoprase, St. Thaddeus; topaz, St. James the Less; hyacinth (essouife), St. Simeon; amethyst, St. Matthias.

Mystics saw meanings in gem colors as well as in gems themselves. White was the emblem of light, purity, faith, innocence, joy, and life. Worn by women, white was symbolic of charity; by a ruler, of humility and integrity. Red signified pure love and wisdom; in another sense it stood for passion, love of evil, and hatred. Blue indicated truth, constancy, and fidelity; yellow could stand for either fidelity or inconstancy, to say nothing of jealousy and deceit.

Gems were also supposed to indicate the



Drawn by Irvia H. Allen

### Dull Mineral Crystals, When Cut into Geometrical Figures, Yield Glowing Gems

To bring out utmost brilliance, lapidaries fashion precious stones to take full advantage of light's effects. In a typical cut, diamond's octahedral crystal is sawed along planes indicated by dotted lines. Facets of the finished stone will give off myriad sparkles from light ray following path shown by arrow. Ruby, cut vertically, will be pigeon-blood red; a transverse cut would yield a brownish-red hue. Multitudes of tiny needles produce a star-patterned sheen when sapphire is cut *en cabochon*, or rounded, without facets. Tourmaline and chrysoberyl, the latter producing cat's-eye, also call for special techniques.

wearer's state of health. If a stone turned dull, opaque, or colorless, watch out for danger or death! Dreaming of gems was a good omen. So was seeing or handling them on the eve of a journey or at certain phases of the moon.

Since no other mineral equals the diamond in hardness, range of color, or luster, ancients also regarded it as most powerful in spiritual influence. As a symbol of constancy, purity, and innocence, it still flashes from engagement rings.

Mary Queen of Scots owned three diamonds

which were believed to be talismans against danger, poison, and "collicke." Unfortunately, none of her gems had the power to ward off the headsman's ax!

In Burma the diamond and arsenic are called by the same name, *choin*, on the ground that both are fatal poisons. A similar belief once existed in Europe. Benvenuto Cellini, the swashbuckling 16th-century goldsmith, relates how an enemy hired an apothecary to pulverize a diamond in a salad intended to poison Cellini. With an eye to economy, the apothecary

cary substituted a beryl and thus saved Cellini's life.

As with all true gems, a diamond's color, brilliance, and luster—the qualities which make it valuable—are determined by the atomic structure of the host crystal. Often such characteristics are hidden in the heart of the crystal.

History's largest diamond, the Cullinan, 3,106 carats before cutting, was so unimpressive in the rough that Edward VII remarked, as he held it up to the light, "I should have kicked it aside as a lump of glass if I had seen it in the road."

#### Cutters Form a Select Group

To bring out hidden beauties is the job of the expert lapidary. With diamonds and similar stones he does this by grinding and polishing facets, arranged with mathematical precision so as to take full advantage of light's effects. Some stones, such as opals, rubies, and sapphires, usually are cut and polished *en cabochon*, or rounded, without facets (opposite).

The men who cut and polish diamonds form a small, lordly aristocracy among those who work with precious stones (page 782). Diamond cutters insist upon being called just that; those who work with lesser stones are gem cutters or lapidaries.

Antwerp and Amsterdam have long been the leading diamond-cutting centers. Some stones of high quality are now cut in the United States.

A trade fair in Amsterdam recently exhibited a masterpiece of diamond cutting. The stone was smaller than the head of a pin, and was described as the world's tiniest diamond—but it was cut with 58 facets!



Walter West

#### Famous Gems Grace a Belle of the Ball

By drawing lots, Mrs. Thomas Phipps won the privilege of wearing the deep-blue Hope Diamond at a New York charity affair. She displays it above the larger Jonker Diamond. Black feathers sprout from a hat especially designed to set off the gems. A \$2,500,000 price tag has been put on the two necklaces (page 791).

Pliny remarks that the diamond was known only to kings and princes, and even to few of them. The stones of the ancients came from India—the Grand Mogul, the Koh-i-noor, the Moon of the Mountains, and others of long and bloody history. A few important ancient stones also came from Borneo.

#### Diamonds in Brazil and South Africa

In 1727 a priest who had become familiar with rough diamonds in India recognized these stones in the washings for gold in Brazil; and the State of Minas Gerais became an important source during that early period. It has produced the Southern Star, the Patrochino,



U. Newman—Times Index

### Aiming at Perfection, the Cutter Risks Disaster

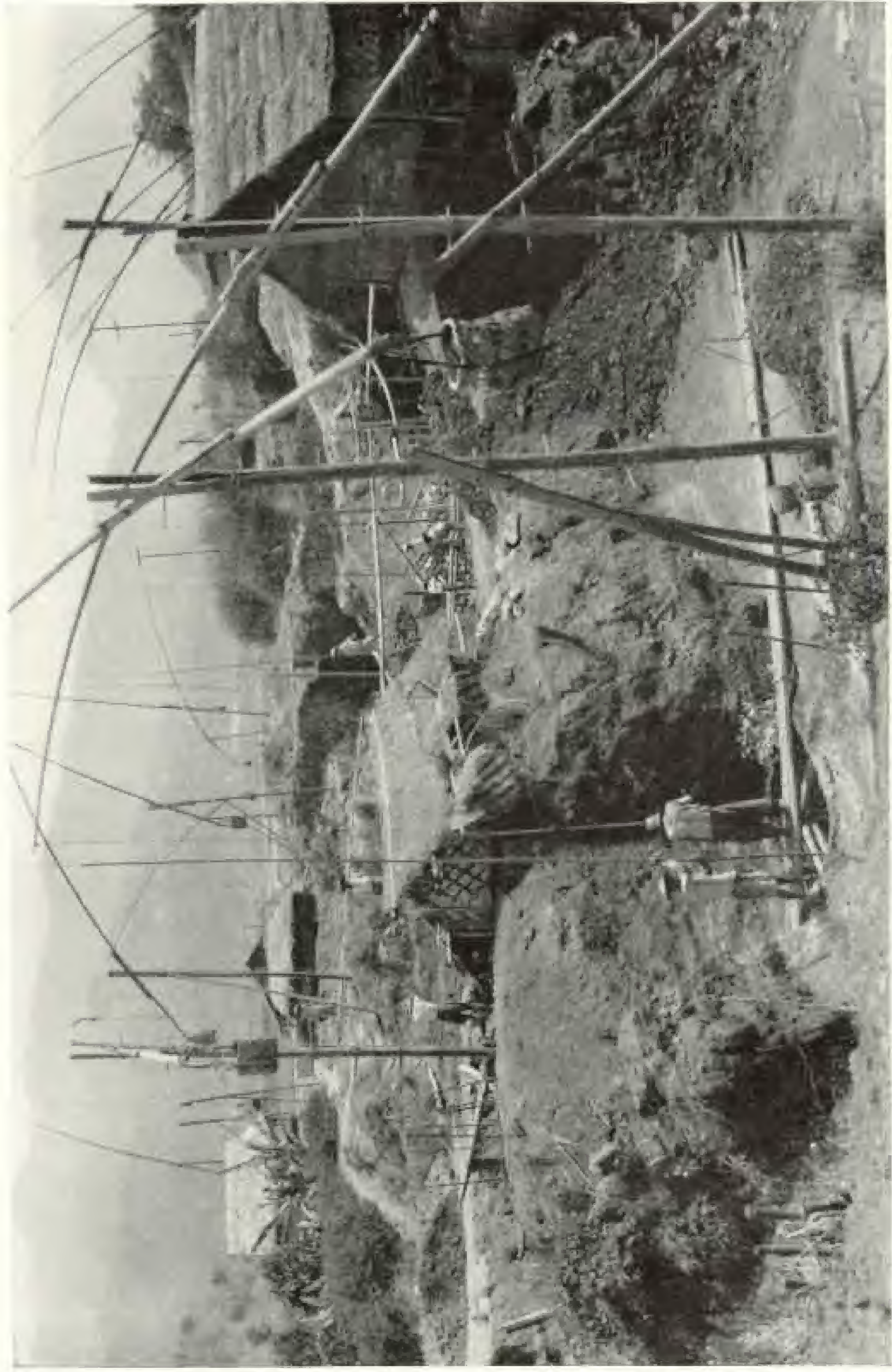
Pen and ink trace lines of cleavage on the surface of a rough alliamond. After weeks of study, the stone is grooved to receive a mallet tap at the likeliest spot (page 780). A slight mistake may cause the gem to fly into a hundred bits. An unsuspected flaw will do the same.



National Geographic Photographer Winford D. Carter

### Upon a Mallet Tap Hangs a Diamond's Future

Cleavage of this 100-carat South African stone yielded three fine gems. Lazare Kaplan, a New York diamond cutter, struck the critical blow while his son Leo held the blade. The two gained recognition several years ago for cleaving the 726-carat Jumbo Diamond, part of which is shown on page 781.



**Bamboo Sweeps Lift Gravel from Burma's Mines, Source of Fine Rubies Since the Time of Christ**

Years ago a British company tried mining with machinery, but when the venture proved unprofitable, it restored the primitive method. These miners, working in Mogok district, guide wicker baskets into narrow wells for loads of ore. Other baskets, loaded with rocks, counterbalance the hauling arms (page 786).

the Rio de Velhas, and other famous stones.\*

The most significant discovery of a diamond occurred in 1866 when a Boer farm lad picked up a curiously glittering pebble on the veld near Kimberley. From that find sprang a South African industry that has produced more than a billion dollars' worth of diamonds.†

When Nature scattered diamonds over the earth, she did not overlook the United States. Near Murfreesboro, Arkansas, they have been recovered from rock similar to kimberlite, the mother rock of diamonds in South Africa (page 804). More than 200 diamonds have been recovered from gold-mine sluice boxes in California. Other States yielding a few are Virginia, North Carolina, Kentucky, Indiana, Texas, Idaho, and Oregon.

Curious finds of diamonds are those in the glacial drift of the Great Lakes region, particularly in Wisconsin. This leaves little doubt that diamonds were brought south by the glaciers. By following the known glacier paths, the region between the Great Lakes and Hudson Bay is indicated as a potentially rich diamond field.

The most unusual occurrence of diamonds is from a celestial source; small diamonds are sometimes found in meteorites, particularly in the iron from Meteor Crater in Arizona.

During 1949 the world produced two-and-three-quarter tons of diamonds. Not all were fine gems. Those not suitable for cutting serve in drilling and abrasive tools, wire-drawing dies, and in many other industrial uses where extreme hardness is desirable.

Of the diamonds produced in the Belgian Congo, the world's largest source, only about two percent are suitable for gems. The yield of Tanganyika's mines is 80 percent gem-quality stones. Fine, flawless diamonds constitute a small proportion of the gem stones recovered.‡

#### Colorless Diamonds Most Desirable

Colorless diamonds, sometimes called "blue white," are generally considered most desirable, but colored diamonds, usually pale yellow or smoky brown, are far more common.

Generally, color detracts from a diamond's beauty and lowers its value. But some diamonds are so beautifully colored that they command high prices. These are called "fancy stones." Fine golden yellow, orange, rose and lavender pink, aquamarine to pale sapphire blue, green of various tints, and other desirable shades are included.

Most famous colored stone is the deep-blue 44½-carat Hope Diamond. Finer, and more valuable, is the rich green Dresden Diamond. The Tiffany Diamond (page 791) is a rich

orange yellow. Recently Princess Elizabeth was presented with a deep-pink stone of 54 carats, which was cut into an exquisite brilliant of 23.6 carats.

Before the discovery of America and the exploration of Africa, the principal source of precious stones was the Orient. Many traders, lured by the possibility of rich traffic in these objects, hazarded the dangers of the journey east to obtain them; some have left behind accounts of their adventures. Best known is Marco Polo, who left Venice about 1271 and made his way to the court of Kublai Khan.§

Jean Baptiste Tavernier, a French geographer who went to India in 1638 to traffic in precious stones, brought back a huge blue diamond, which he sold, together with 24 others, to Louis XIV, le Grand Monarque, in 1668. The Tavernier Blue was recut and made part of the French crown jewels. They were stolen in 1792, but the Tavernier was not among the few gems subsequently restored. Later it reappeared, much reduced in size, as the Hope Diamond.

Many of the ancient Indian diamonds, such as the Koh-i-noor, have had strange histories. According to legend, the Koh-i-noor was discovered some 5,000 years ago in the Godavari River, but the first authentic record is in the memoirs of Sultan Baber, who wrote in 1526: "Bikermajit, a Hindu, who was Raja of Gwalior, had governed that country for upward of a hundred years.

"In the battle in which Ibrahim was defeated, Bikermajit was sent to hell. When Humaium arrived, Bikermajit's people attempted to escape, but were taken by the parties which Humaium had placed upon the watch and put into custody.

"Of their own free will they presented to Humaium a tribute consisting of a quantity of jewels and precious stones. Among these was one famous diamond, which had been acquired by Sultan Ala-ed-din. It is so valuable that a judge of diamonds valued it at half the daily expenses of the whole world."

\* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Brazil's Land of Minerals," October, 1943; and "Brazil's Potent Weapons," January, 1944, both by W. Robert Moore.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Cities That Gold and Diamonds Built," by W. Robert Moore, December, 1942; "Under the South African Union," by Melville Chater, April, 1931; and "Diamond Mines of South Africa," by Gardner F. Williams, June, 1906.

‡ See "Britain Tackles the East African Bush," by W. Robert Moore, NATIONAL GEOGRAPHIC MAGAZINE, March, 1950.

§ See "World's Greatest Overland Explorer," by J. R. Hildebrand, NATIONAL GEOGRAPHIC MAGAZINE, November, 1918.





National Geographic Photographer Wilfred R. Culver

### Indians a Thousand Years Ago Hand Polished and Flint Drilled These 2,500 Turquoise Beads

Prehistory's Pueblo Indians, like today's Navajos, prized turquoise above all other stones. This priceless string was discovered (1924) in Pueblo Bonito, New Mexico, by a National Geographic Society expedition led by Neil M. Judd. It is inspected yearly by thousands of visitors to The Society's headquarters.

The stone remained in the possession of the Mogul dynasty until Nadir's invasion of India in 1739; and Nadir gave it its name. When Nadir seized the Delhi treasury, this stone was not among the treasure, but he soon learned that the defeated emperor, Mohammed, had concealed it in his turban.

Invoking an old Hindu custom, Nadir suddenly proposed to Mohammed an exchange of turbans, in token of reconciliation. When Nadir unfolded the turban in the secrecy of his tent, he hailed the sudden revelation of the sparkling gem with the exclamation "Koh-i-noor!" This means "Mountain of Light."

#### Two Gems from Same Mineral

Then followed a series of owners, many of whom lost the gem after horrible torture.

After the Sikh rebellion and annexation of the Punjab, the Koh-i-noor passed to the East India Company with the stipulation that it be presented to the Queen of England.

Rubies and sapphires come from the mineral corundum, an oxide of aluminum. The common abrasive, emery, is an impure form of corundum. In a few regions of the world, however, this ordinarily dull material is found pure and flawless. When red it is known as ruby; when colorless, pink, yellow, green, or violet it is called sapphire.

A rare but beautiful orange or salmon sapphire is known as *paparadscha*.

Ruby and sapphire colors vary in shade when viewed in different directions in the crystal. The lapidary must understand this, for, if the ruby is cut in one direction, its color is

a pure and fiery red; but if cut in the opposite direction, a brownish or purplish red may result.

Frequently the corundum crystal contains many minute inclusions that have arranged themselves in the hexagonal pattern of the host crystal. These inclusions will sometimes reflect light to yield a six-rayed star. The stone is fashioned by the lapidary to bring out and intensify this pattern. The result is a star sapphire or star ruby (page 799).

A 12-rayed star ruby from Ceylon recently was exhibited in the Morgan Gem Hall of the American Museum of Natural History, New York.

Pure-red rubies weighing 10 carats or more are rare indeed; sapphires may exceed 100 carats or more in weight. Some found in Ceylon were reported to have weighed one and two pounds.

Almost since the dawn of history, Burma has been the principal source of fine rubies. The producing area is about Mogok (page 783).

The Burmese mines produce other gems as well, particularly spinels, or balas rubies (page 790), and sapphires. The rubies are of the finest quality, rich pigeon-blood red in color, while the sapphires are somewhat inferior. In the mines of Thailand, however, the reverse is true.

#### Star Sapphires from Ceylon

Ceylon is rich in sapphires and other precious stones. It is the only source of the rare orange *paparadscha*, and it also yields an abundance of pink, yellow, brown, and violet stones, as well as large star sapphires.

In the United States, Montana has produced small, fine, steel-blue stones from mines at Yogo Gulch in Judith Basin County, and pale stones of many colors from gravel bars in the Missouri River.

Many a large "ruby" mentioned by early writers has proved, on later examination, to be a balas ruby, a form of the mineral spinel. Such is the Black Prince Ruby now in the front of the British Crown of State. It was given to the Black Prince by Pedro the Cruel in 1367, and was subsequently worn by Henry V upon his helmet-crown at the Battle of Agincourt.

The famous "ruby" which Gustavus III of Sweden gave to Catherine the Great once was considered the finest in Europe. Now it is known to be rubellite, a red variety of tourmaline.

Another large balas ruby, which masqueraded as true ruby and is now among the British crown jewels, once adorned the saddle of

Runjit Singh. It weighs 352 carats and bears the inscriptions of the famous Moguls Jahangir, Shah Jahan, Aurangzeb, and Mohammed Shah.

Few indeed are the true rubies of fine quality exceeding 25 carats in weight.

Large sapphires, on the other hand, are not uncommon. A stone weighing 951 carats is said to have belonged to the kings of Burma. Another, of 260 carats, is included in the Russian state treasure. Among the finest star stones are the Star of India, a 563-carat star sapphire, and the De Long star ruby of 100 carats, now in the American Museum of Natural History (page 799).

Rubies and sapphires are won entirely from gravel deposits or from the residual soil, where they have been released from their mother rock by weathering. The earth or gravel is brought to the surface through pits sunk to the gem-bearing layers, the material washed by hand, and gems picked from the concentrate. Months of labor may pass before an important stone is found.

#### Science Produces Synthetic Gems

For centuries man has imitated the precious stones in cheaper materials. With the advent of modern science he has attempted to reproduce the natural stone artificially. In the case of the ruby and sapphire he has been eminently successful. Synthetic rubies and sapphires, indistinguishable from the natural stones except by means of their minute flaws, are now being produced by the millions of carats annually (page 810).

Much of the synthetic material finds its way into industry, but large quantities are used in jewelry. Strangely enough, this enormous production of artificial gems has not influenced the value of the natural gem.

Even the striking effect of the star stones can be reproduced to startling perfection. A buyer of gems need not be unduly concerned about this invasion of the gem market by the artificial product, however, for a competent jeweler can distinguish the natural from the man-made gem.

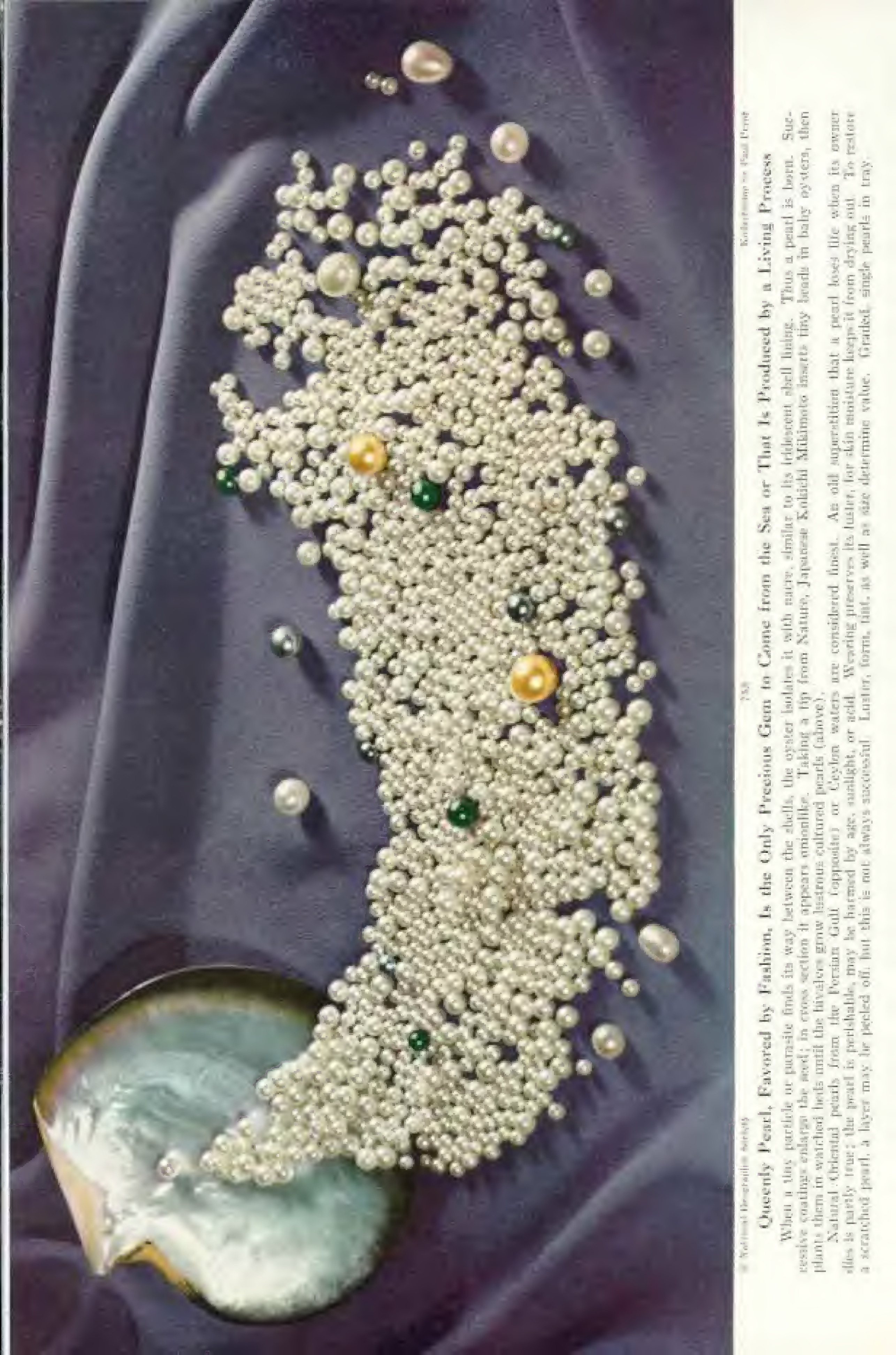
Beryl, a silicate of beryllium and aluminum, is not an uncommon stone, but is rarely found in the color and clarity requisite for a precious gem. The ordinary mineral is the important ore of the metal beryllium. Almost always it is found in crystals, sometimes weighing 10 tons or more. The common form is that of a six-sided prism.

Like corundum, the color variations of this mineral have received distinct gem names. Fine green stones, colored by chromium, are emeralds. Sea-green or blue varieties are



### Looking Through a Refractometer, the Mineralogist Identifies a Gem by the Light It Bends

Since every known gem has its own index of refraction, Dr. G. S. Switzer, Associate Curator of Mineralogy at the Smithsonian Institution, can tell that the stone on the instrument is a kunzite. By means of reflecting mirrors, lenses, and a graduated scale, the refractometer measures the stone's index, thus identifying it accurately. Another clue is its specific gravity, or the stone's weight compared with that of an equal volume of water, determined with the balance in the background. Gems' value depends on beauty, durability, rarity. Of 1,500 minerals, 75 more or less qualify as gems.



**Queenly Pearl, Favored by Fashion, Is the Only Precious Gem to Come from the Sea or That Is Produced by a Living Process**

When a tiny particle or parasite finds its way between the shells, the oyster isolates it with nacre, similar to its iridescent shell lining. Thus a pearl is born. successive coatings enlarge the seed; in cross section it appears onionlike. Taking a tip from Nature, Japanese Kokichi Mikimoto inserts tiny beads in baby oysters, then plants them in wretched beds until the bivalves grow lustrous cultured pearls (above).

Natural Oriental pearls from the Persian Gulf (opposite) or Ceylon waters are considered finest. An old superstition that a pearl loses luster when its owner dies is partly true; the pearl is perishable, may be harmed by age, sunlight, or acid. Wearing preserves its luster, for skin moisture keeps it from drying out. To restore a scratched pearl, a layer may be peeled off, but this is not always successful. Luster, form, tint, as well as size determine value. Graded, single pearls in tray.





✧ **Flashing Yellow Sphenes Surround  
a Green Peridot; Red Spinel to Right**

Sparkling sphenes unfortunately are too soft for rings, split too easily in pendants. Sometimes called "evening emeralds," peridots have been treasured by Europe's cathedrals ever since Crusaders brought them from shores of the Red Sea. So much does the spinel resemble the ruby the two are often confused.

✧ **Topaz, Shimmering with Reflected Light,  
Looks Like Sherry Solidified**

It is one of the hardest minerals. Slow, careful heating of usual golden shade may produce an attractive pink (right). Reddish topaz (left) is extremely rare. Larger bluish stone was found in Siberia; smaller one in Maine. Brazil yields finest topaz: yellow (lower left), orange (center), and squarish amber stone.





♣ **Tragic Tales Enfold World-famous Star of the East and Hope Diamonds.**

Tradition associates the 44½-carat blue diamond with eleven violent deaths, tragedy in two royal houses. Named for its London owner, Hope Diamond is presumed part of Tavernier Blue, stolen with French crown jewels in 1797. Harry Winston, New York, purchased it and Star of East from McLean estate.

♣ **90-facet Tiffany Diamond Glitters Beside Rare Emerald Brooch**

Tiffany acquired the 128-carat canary diamond in Paris in 1879, a year after its discovery in South Africa's famed Kimberley mines. Diamond-studded brooch contains a 75-carat emerald, said to have adorned Sultan Abdul Hamid's belt buckle! The emerald-cut solitaire would delight any bride-to-be.



### Do They Read the Future, Gazing into World's Largest, Most Perfect Crystal Ball?

Soothsayers peer into crystal balls to foretell coming events. Perhaps these "magical" qualities are influenced by eye fatigue or hypnotism.

From a half-ton piece of Borneo quartz came this flawless 166-pound crystal sphere, presented to the U. S. National Museum in Washington, D. C., in memory of Worcester Reed Warner, by his widow. It was carved in China and polished in Japan.

Quartz, when transparent and colorless or silky, is popularly called rock crystal. The name came from the Greek word *krytallon* for "clear ice." It glitters in crystal vases, goblets, and figurines, or as beads and rondels (spacers between other beads).

When quartz is put under pressure, as by sound waves, it exerts an electrical charge. "Pulse" of every broadcasting station is a quartz waflet, no bigger than a postage stamp. Ground to a precise thickness, the waflet permits waves of only one frequency to pass and assures the station uniform transmission. Quartz crystals can carry many long-distance telephonic conversations on the same wire without mixing them. Crystals serve also in radar, sonar, astronomical clocks, telegraphy,





## Which Rainbow Hue to Choose Puzzles a Tourmaline Fancier

With the widest range of tints among semi-precious stones, tourmaline lends delicate charm to pendants, beads, and brooches. When viewed from different directions, this mineral reveals varying colors. Large California crystal shown across green to red. John Ruskin, English author and art critic, wrote, "The chemistry of [tourmaline] is more like a medieval doctor's prescription than the making of a respectable mineral."

This newcomer among gems has been known only since the early 18th century. In the United States tourmaline was first found in 1870 in Maine. A 900-carat elephant such as the one lent by Wedderlen, Inc., of New York, may be carved from as large a rough crystal as that shown above. This great tourmaline, embedded in a quartz matrix, came from a site in California, where Indians and cowboys picked up the brightly colored pebbles around 1872. The mineral is now found widely—in Madagascar, Brazil, Elba, Ceylon, United States, and Burma.

Jewelers say tourmaline gets dustier than other gems in window displays. During temperature changes it becomes electrically charged, attracts tiny particles to its surface.

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Illustration by H. Arthur Rickert  
and John E. Fisher





♣ **World's Costliest Unguent Jar Was Cut from a Single Huge Emerald**

Fashioned for the Hapsburgs in 17th century by Dionysio Miseroni, this 4-inch box for ointment now belongs to the Austrian Government. Thousands of Americans viewed the Milanese jeweler's masterpiece on its nationwide tour with other displaced art treasures.

♣ **Colors of the Spectrum Dance in Opal's Radiant Depths**

Like sunlit bubble or oil film on water, opal scintillates in bright light. Opal is brittle, easily shattered, a fact which may explain its unlucky fame. Black opal from Nevada, Mexican fire opals (left), others Australian. One (top and center) has many small cracks.

Illustrations by H. Ambrose Bennett and John E. Fischer





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Illustration by Paul Pryor

♠ **Ever Hear of a Green Garnet?  
Many Tints Grow on This Family Tree**

Commonly known garnet is the blood-red pyrope (upper left), seen also in old-fashioned rose-cut Bohemian necklace. Others shown are yellow and orange spessartites (upper left), green demantoids, white grossularite, purplish rhodolite, and orange essonite (right).

♣ **Of All Gems, Colorless Zircon  
Best Rivals Diamond's Brilliance**

Its light refraction is second only to that of the fiery diamond. Although it comes in many hues, the popular blue shade is produced by heating. Siamese warm the stones from 400° to 600° C. in charcoal furnaces. Most zircons are found in Ceylon or Indochina.

Illustration by R. Arthur Ross and John E. Thayer



### "Jewel of Heaven," Highly Esteemed Jade Thought by Chinese to Charm and Cure

Prized possession of Washington, D. C., dealer, S. Kriger, is this necklace of imperial jade. Intricate carving graces the chocolate pot of waxlike nephrite, jade's most common variety. The two fisherwomen, holding strings of dab and bamboo poles, were fashioned from a single block of nephrite, cut through the grain so that each figure has matching wavy lines of color.

Chinese believe jade embodies 5 cardinal virtues: charity, modesty, courage, justice, wisdom. A talisman against injury, it also has supposed curative qualities. Aztecs in southern Mexico valued it highly; conquistadors hoping to better its power, spread its law as a remedy for kidney disease. Its name derives from the Spanish  *piedra de toro*, meaning "stone of the side."

Though people picture jade as leafy green, it ranges from white to spinach. There is even a black variety, chloromelanite. Occasionally yellow, blood-red, or mauve pieces are found. Jade may be translucent or opaque, plain or mottled.

Though found in several places, principally China, Turkistan, Upper Burma, most jade is cut in China. It is carved into beads and pendants, but more often into decorative or religious pieces, as vases, statuettes, vessels, and screens. Many are full of symbolism, interwoven with Taoist and Buddhist myth.

A Chinese bridegroom may present a jade butterfly, symbol of love, to his bride.

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Illustration by G. Anthony Stewart



### From a Basket Tumble Silica Gems, Striped, Plain, Mottled

Some marbles, small boys' "aggies," are true agates: bull's-eye and jasper-banded (in basket); moss or landscape (integrated). Striped black circle is tiger's-eye. Silica's love goes back to the book of Revelation (21: 10-20): "Foundations of the wall [of new Jerusalem] were garnished with all manner of precious stones. The first foundation was jasper [brown stone in basket, many-colored ones] . . . the third, a chalcedony [brings, yellow square] . . . the fifth, sardonyx [red-and-white oval] . . . the tenth, a chrysoprase [green oval]"

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### Beryls' Limpid Beauty. Shines in Linear Aquamarine Prism

Golden beryl sparkles at top, above violet-pink morganite, named for gem-loving financier J. P. Morgan, who gave a large collection to the American Museum of Natural History. Aquamarines adorn a lady's watch, shown by courtesy of Grape & Co. of Washington, D. C. Emeralds, too, are beryls of another base. Largest ever found was a 270-pound aquamarine, size of a rail keg. It was so clear that the Brazilian native who discovered it could see through it end to end. Cut in Germany, it yielded 200,000 carats of gem stones!

Reproduction by R. Anthony Stewart and John E. Pridmore





♣ **Raspberry Red in Artificial Light,  
Alexandrite Glows Green by Day**

This yellow-absorbing variety of chrysoberyl was discovered in the Ural Mountains about 1833 and named for Tsar Alexander II, then heir apparent. Alexandrite soon grew popular because red and green were colors of Imperial Russia. U. S. National Museum treasures this largest-known stone from Ceylon.

♣ **Pussy Eyes Her Namesake,  
the Oriental Cat's-eye**

The silky line of light moves with a turn of the stone. This sheen, or chatoyancy, is caused by minute light-reflecting hollow filaments. Unlike those of the star sapphire or ruby (opposite), these filaments are parallel. Hardest, most valuable cat's-eyes, a variety of chrysoberyl, come from Ceylon, such as this 180-carat gem.





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Illustrations by H. Anthony Stewart

#### ♣ Jewels Worthy of a Queen: Glowing Rubies, Sparkling Sapphires

All of these gem aristocrats are different hues of the same mineral; only the diamond is harder. Burma yields finest rubies, prized most when a deep red, pigeon's-blood color. Sapphires are not always cornflower blue, as foreground six show. Display by R. Esmerlan, Inc.; ring, Harry Winston, both of New York.

#### ♣ Fable Claims Good Fortune for Wearer of Rare Star-patterned Gems

Tiny "needles" in the crystals cause the luminous rays. Traditionally the 3 crossed lines represent faith, hope, destiny. Other legends term such stones sparks from the Star of Bethlehem. American Museum of Natural History treasures the 100-carat De Long ruby and 563-carat sapphire, Star of India.

Illustrations by Paul Pryor



## Such Amethyst Crystals Lined the Walls of a Brazilian Cave

The 30- by 16-foot grotto was stripped and fragments carried away. An amethyst cluster such as this in the U. S. National Museum will pro- duce few gems, for favored purple is not evenly dispersed.

About amethyst hangs an ancient legend recounted in French verse. To avenge an insult, Bacchus, god of wine, swore the first person he met would be devoted by his tears. A beautiful maiden, Amethyst, approached on her way to worship at goddess Diana's shrine. As the breasts sprang, Diana turned the girl into clear pure stone. Re- pentant, Bacchus poured juice of the grape as a libation over her body, thus giving to the stone a beautiful although streaked violet hue.

To amethyst has been at- tributed a sobering effect; In- deed, its name comes from Greek words meaning "not" and "to intoxicate." Tradition ascribes to it other powers: to control evil thoughts, sharpen intellect, give victory to sol- diers. For ages bishops and prelates have worn amethysts in ecclesiastical rings.

With heating, many ameth- ysts turn yellow, are called "solar quartz." This name, however, leads to confusion with precious topaz (page 790). It is properly "citrine."





## Telltale Microscope Finds Few

### Emeralds in the Rough Qualify as Fine Gems

A flawless emerald of good color is extremely rare, and may cost from \$1,000 to \$10,000 per carat! From this heap being sorted at Towing and Van Eschtyer, New York, very few will reach the selected pile on the paper. The rest are sold as ore. Smelting recovers the beryllium, used in hardening copper or for making watch springs.

No precious stone has enjoyed a longer vogue than the gray- to sea-green emerald. It was among stones offered in Babylon, earliest known gem market, as long ago as 4000 B. C.

The emerald of ancient times came largely from Upper Egypt. At present the best emeralds are obtained in the Andes of Colombia, where they were mined even before the Spaniards set foot in the New World.

Large crystals belong to the American Museum of Natural History.

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♣ From Golden Amber, a Fossil Resin, Deft Fingers Fashion a Shapely Lion

Semiprecious amber was hatched by Phoenicians, according to Homer's *Odyssey*. Unlike true gems, it is not a mineral. Sometimes hardening sap imprisoned insects or leaves. Victor M. Clark of Amber Mines, Inc., carves pieces from the Baltic; \$1,000 worth at right.

♣ To Give an Emerald a Glinting Finish, Polish It on a Whirling Disk

Shellac softened by the lamp holds the gem on a stick. Expertly the lapidary braces the stick, then applies the stone to the wheel which he has brushed with polishing powder from the bowl. Rough Colombian emeralds at left wait to be cut and smoothed.



called aquamarine. There are also pink or rose and golden-yellow varieties, and a rare form, colored by uranium, is known as heliodor.

The earliest source of emeralds was the Gebel Zabara in southeastern Egypt, near the shores of the Red Sea. The mines appear to have been worked until the 16th century, when they were completely lost, to be rediscovered in 1816.

#### **Emeralds for Queen of Spain**

When the Spaniards came to the New World, they found the natives in possession of emeralds. Pizarro took some from the Incas and sent them to the Queen of Spain. The first indication of their source came in 1537 when Gonzalo Jiménez de Quesada was given nine beautiful green stones presented by the inhabitants of the town of Gunchetá, during his invasion and conquest of Colombia.

Although the Indians carefully guarded the location of the mines, "by sheer luck," states the early chronicles, "they found a youngster, probably of little cunning, who told them that the emerald mines were to be found at Somondoco." In 1558 the more famous mines at Muzo, 65 miles from Bogotá, were discovered by the Spanish soldier Juan Penabazán.

Stones looted from the natives or recovered from the mines were shipped to Spain and then sold in Paris. The finer stones were kept in Europe, the rest sent to India, Persia, and Turkey. There is hardly an Oriental ruler who does not possess some of these emeralds, even to the present day.

What is undoubtedly one of the largest of the Colombian emeralds is the unguent jar made by Dionysio Miseroni, famous Milanese gem engraver, in the Vienna collections (page 794). Carved from a single hexagonal rich green crystal, it weighs 2,680 carats, or nearly a pound and a half.\*

A similar large emerald of curious history is the Emperor Jahangir cup, also carved from a single Colombian crystal. Jahangir, "Conqueror of the World," was addicted to wine. When his favorite wife, Nur Jahan, one day found him seated with his companions, drinking from enormous cups of gold, she chided him for using a cup no better than those of his subjects.

Upon his oath that he would drink from no other, Nur Jahan presented him with the emerald cup. Jahangir was much pleased until he noted the difference in the capacity of the two vessels.

This cup is now in the Gellatly Collection of the National Museum.

Emeralds and aquamarines, from the same

mineral, differ only in color. The intense green of emeralds is due to minute quantities of chromium, which aquamarines lack.

Aquamarines of a rich sea blue command the highest prices, but chartreuse greens and other shades are equally handsome. The aquamarine, unlike the emerald, must be flawless and limpid. Because of their paler color, large stones are much more effective than small ones; the vogue is for stones of large size, sometimes 100 carats or more.

Fortunately, of all precious stones the aquamarine is found in the largest flawless crystals. One weighing 220 pounds was found near the Brazilian village of Marambaia in 1910 (page 797).

This was undoubtedly the largest gem ever discovered. Its finder encountered difficulty in transporting the huge crystal by canoe to the coast, en route to the gem-cutting center of Idar in Germany. It yielded more than 200,000 carats in superb stones.

The color of this crystal was a green or yellow green, not the most desirable shade. It was discovered, however, that by cautious heating of the stones the color could be changed to a rich sea blue of unusual limpidity, thereby greatly increasing the value of the gems derived from it. It is now customary to heat green aquamarines to turn them clear blue.

Aquamarine's mother rock is pegmatite. The deep tropical weathering of the rocks in Brazil releases the crystals from their matrices, leaving them to be easily recovered from the rotten stone in which they are embedded, or exposing them to the rain wash, which carries them down the hill slopes into creek beds.

Madagascar is another important source of aquamarines.

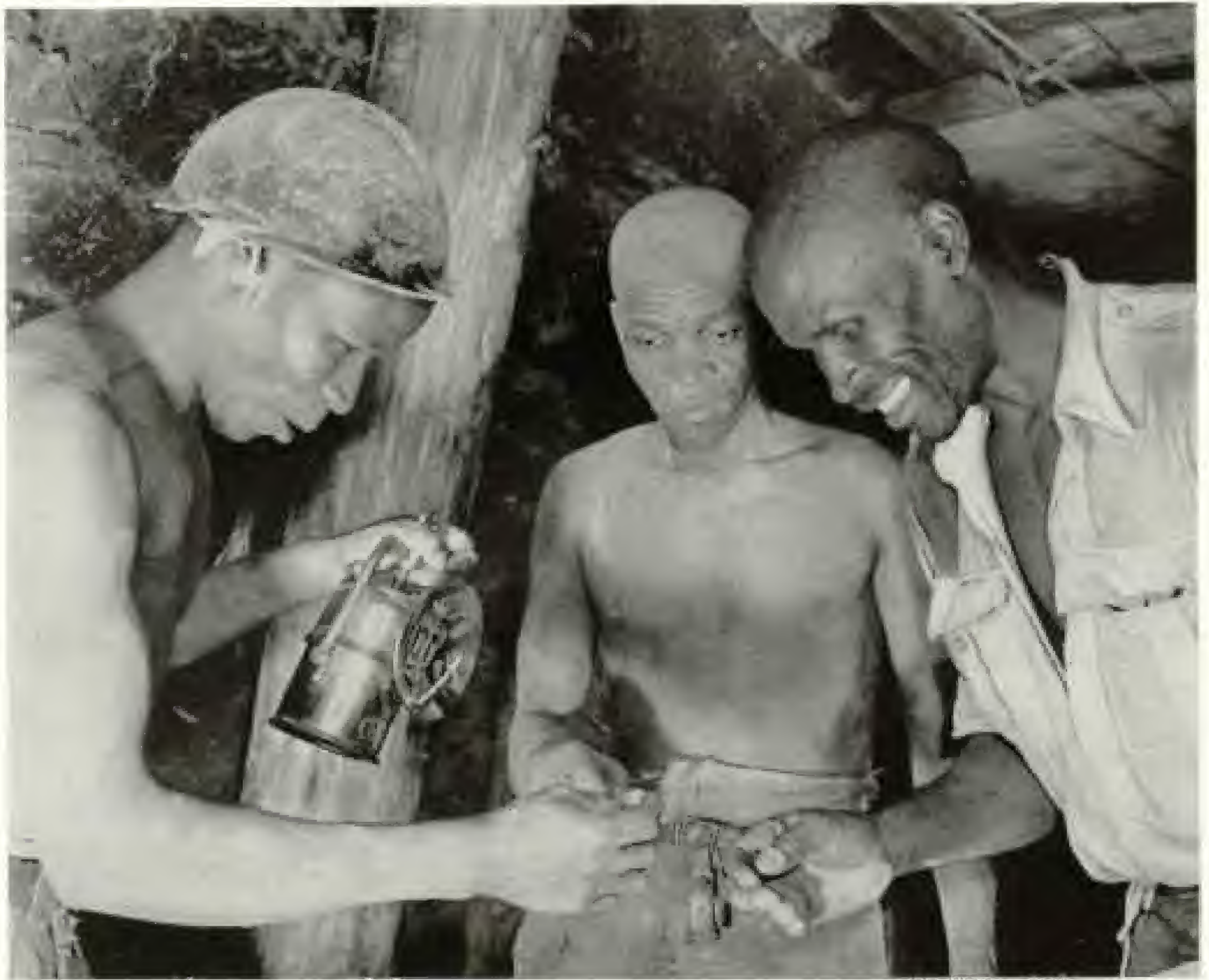
Rarer than the aquamarine is the pink beryl, sometimes called morganite. This beryl differs from other varieties in that it contains a rare alkali metal, cesium, in its chemical composition. The most desirable color of this stone is deep rose pink.

#### **Pearls Included Among Gems**

The pearl, according to the mineralogist's definition, is not a mineral, but it has always been considered among the gems (pages 788, 789). Pearls are the secretory bodies produced by mollusks as a protection against irritating inclusions or parasites that invade the body of the animal.

Oysters, clams, conch, abalone, and many others produce "pearls." The huge *Tridacna*,

\* See "The Vienna Treasures and Their Collectors," by John Walker, NATIONAL GEOGRAPHIC MAGAZINE, June, 1950.



De Beers Consolidated Mines, Ltd.

**"Look, Man, a Diamond!" His Find May Mean \$300, the Maximum Reward**

These boys, recruited from native villages, live clustered lives in company barracks. When they go home, they are fluoroscoped for contraband. Here a Barabong tribesman shows the "boss boy" (right) a stone he picked up while loading ore cars in a De Beers Consolidated mine near Kimberley.

or "baptismal font," clam yields some as large as baseballs.\* But only those mollusks with an iridescent "mother-of-pearl" shell can produce a precious pearl, for the pearl is made of the same material and in the same manner as the shell itself.

The chief pearl mollusks belong to the genus *Pinctada*, inhabiting the western Pacific and Indian Oceans. The fresh-water mussel genus *Quadrula*, common in some of our streams, also yields precious pearls.

It would seem a simple matter to introduce a nucleus into a pearl oyster and thereby induce the formation of a pearl; but years of experimentation passed before this was successfully accomplished. For centuries the Chinese placed small lead Buddhas into fresh-water mussels and obtained small pearl gods attached to the shell.

Japanese production of "cultivated" pearls began in 1920; 20 years later about 10,000,000 pearls were being produced annually. Cul-

ture pearls are expensive, but natural or "oriental" pearls remain among the dearest luxuries.†

**Opals "Most Valuable of All"**

Pliny stated that "lovers of precious stones have called *opalus* the most valuable of all, largely because of the difficulty of determining and knowing how to describe it; for in the opalus you will see the refulgent fire of the carbuncle, the glorious purple of the amethyst, and the sea green of the emerald, and all these

\* See "Shells Take You Over World Horizons," by Rutherford Platt, NATIONAL GEOGRAPHIC MAGAZINE, July, 1949.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Japan Tries Freedom's Road," by Frederick G. Vothburgh, May, 1950; "On the Bottom of a South Sea Pearl Lagoon," by Roy Waldo Miner, September, 1938; "Pearl Fishing in the Red Sea," by Henri de Monfreid, November, 1937; "Fishing for Pearls in the Indian Ocean," by Bella Sidney Woolf, February, 1926; and "Pearl Fisheries of Ceylon," by Hugh M. Smith, February, 1913.

colors glittering together mixed in an incredible way."

Today many lovers of gems, admiring the strikingly beautiful Mexican and Australian opals, unknown to Pliny, still consider this gem the most beautiful of all (page 794).

Opal is one of the few minerals that have never crystallized. One might call it a rock jelly. In chemical composition it is similar to quartz, the commonest of all solid minerals.

The oldest known opal locality, from which the Romans probably obtained their gems, is Czerwenitz, in Hungary (now Červenica, Czechoslovakia). These mines no longer yield stones. Hungarian opals show a mosaic of red, blue, and green colors of changing hues on a white base.

Desert regions of Queensland, New South Wales, and South Australia produce fine stones. Gems from Lightning Ridge, New South Wales, have a unique splendor: in a body of dark-gray or black stone, myriads of colored lights dance with each slight movement of the gem. Unfortunately the mines are almost exhausted of rich material.

Among the curious forms of natural opal from Australia are the petrified forms of extinct life, snail and clam shells, and even the bones of the long extinct swimming reptile, *Mosasaurus*, changed to colorful gems.

The opals of Mexico are translucent, with innumerable small but brilliant flashes of color penetrating the body of the stone. In some the base is honey yellow to orange brown, a rare and unusual color for opal.

The finest, and the rarest, are the "hojizandos" (from the Spanish *hojizar*, to drizzle) with colored darts flashing through a pellucid matrix. The effect is similar to the tiny rainbows of light observable when the sun shines through showers on the high plateau of Mexico.

#### Opals from Petrified Forests

One of the most unusual gem deposits in the world is the opalized forests of Virgin Valley, northwestern Nevada. Even evergreen cones, in flashing opal, are found among the petrified branches of wood buried in the ash of an ancient volcano. But the Nevada stones have a fatal weakness; as they dry out, multitudes of small cracks form which eventually weaken the gems and destroy their beauty.

The largest known opal was found in the Hungarian mines in 1770 and weighs 595 grams, or one pound and five ounces. It is in the Imperial Museum at Vienna.

One only slightly smaller, weighing 533 grams, is a magnificent black mass with broad flashes of green, blue, red, and yellow, now in

the National Museum. It is from Virgin Valley and represents the outer bark section of an opalized tree trunk.

There has been much confusion regarding topaz. Presumably the name came from Topazos, an island in the Red Sea, and the ancient gem was the peridot of modern times. Today the mineral commonly offered as topaz is a much less valuable yellow variety of quartz, called citrine.

To the mineralogist, however, topaz can mean only one mineral, a fluosilicate of aluminum. This is a fairly widespread mineral, frequently associated with aquamarine, which it sometimes closely resembles.

Topaz is often yellow, but colorless or blue crystals are more abundant (page 790).

The finest yellow stones come from mines near Ouro Preto, in Minas Gerais. Natural rose-colored stones are rare, but can be produced by carefully heating the yellow stones. The heat-colored stones are marketed as pink topaz.

Pale-blue stones are not uncommon and are sometimes sold as aquamarines. Many fine examples came from the region about Mursinka, in the Urals, but are now found more abundantly and in larger size in Brazil. Some huge crystals were recently found in an aquamarine mine, from which the National Museum received a perfectly formed crystal of 157 pounds.

American sources, while widespread, have little commercial importance. Fine blue crystals have been found in San Diego County, California, and collectors' pieces have come from Colorado, Texas, and Maine. Small topaz crystals occur in the steam cavities of a lava bed near Desert, Utah; though small, they frequently show fine color—until exposure to sunlight fades them.

According to the ancients, topaz not only cooled boiling water, but anger too; it cured insanity, asthma, and insomnia; imparted strength and good digestion; and averted sudden death—surely something worth owning!

#### Chrysoberyl Yields Three Gems

Chrysoberyl is a rare and unusual mineral yielding three distinct types of gem stone. It is a combination of alumina and beryllia. In hardness it approaches the sapphire. Simple chrysoberyl, as found in Brazil and Ceylon, shows a fine lemon-yellow to chartreuse-green color, the latter a rare and particularly handsome tint.

But the fame of the chrysoberyl rests chiefly upon two unusual varieties: cat's-eye and alexandrite (page 798).

The cat's-eye is a translucent chrysoberyl of honey to greenish-yellow color crowded with minute parallel inclusions, so that a stone cut *en cabochon* (page 780) shows a white line of silky sheen moving over the surface. Its resemblance to the feline eye gives it its name.

The alexandrite, green in daylight and red in artificial light, was first discovered in the emerald mine of Tokowaja in the Urals on the day Tsar Alexander II attained his majority.

Only small alexandrites have been produced in Russia; Ceylon has yielded much larger ones. A very rare stone, combining the effects of both the cat's-eye and the alexandrite, is known as alexandrite cat's-eye.

Mineralogically, the peridot (page 790) is the silicate of magnesium and iron called olivine. It is undoubtedly the gem known to the ancients as topazos. Olivine, common in certain types of lava known as basalt, is also found in certain kinds of meteorites.

In spite of peridot's abundance, material suitable for fine gems is rare. Its only commercial source is small St. John's Island in the Red Sea. Typical crystals from here have been found in excavations in Alexandria, Egypt, proving that these deposits were worked in very early times.

Small stones of fine color are found in ant-hills in northern Arizona. The stones weather out of an ancient lava, and the bright grains are among the materials brought to the surface by ants.

The largest known peridot once adorned the figure of a saint in Austria. It is now in the National Museum.

#### Two Varieties of Jade

The term jade (page 796) was derived from the Spanish *piedra de ijada* ("stone of the side") in allusion to its supposed power to relieve pains in the side, and referred to the green stones brought by the Spanish conquerors from Mexico. A stone of similar appearance and with similar mystical properties was known as *lapis nephriticus* ("stone of the kidney").\*

These two stones have been so thoroughly confused that both varieties are now included under the term "jade." Mineralogical examination has shown that one, named jadeite, is a silicate of soda and alumina; the second, now called nephrite, is a silicate of lime and magnesia. The two minerals can be readily distinguished, for their only common characteristic is toughness and susceptibility to high polish.

Both nephrite and jadeite in pure form are white. Nephrite may contain varying amounts of iron to yield a pale yellowish-green to

dark-green stone. Jadeite frequently contains chromium, resulting in a material of fine apple to emerald green. Boulders of jadeite that have lain buried for centuries in red tropical clays imbibe the color to become rich iron red. A slight amount of manganese in white jadeite induces a delicate lavender tint.

Jade was perhaps the most important stone known to the ancients. Superbly fashioned objects of this material have been found in both China and Middle America in tombs and similar remains as early as the 16th century B. C. The high artistic quality of these objects indicates a long period in the use of jade antedating even this remote period.

Jade chisels have also been recovered from the remains of the early Swiss lake dwellings.

#### Early Middle Americans Used Jade

The use of jade by the Chinese is well known, but the fact that the early Middle Americans also used this material, perhaps as early as the Chinese, is not generally realized. Tombs of the Olmec civilization of Mexico and Central America have yielded numerous jewels of wonderfully advanced artistic conception (opposite).

The later Maya and Aztec cultures also prized jade highly. Two pieces of jade given to Cortés by Montezuma were valued by the Aztecs at two loads of gold. Only the gods and the nobles were permitted to wear this valuable material.

The finest color for jade is a rich emerald green, the so-called imperial jade. The Chinese liken this color to that of the feathers of the Chinese kingfisher and call it *fei-tsui*; the Aztecs compared it to the plumage of the quetzal and called it *quetzal-chalchihuitl*.

Strings of carefully matched beads of imperial jade have sold for \$100,000.

The earliest Chinese jade was from an unknown source. In the Chou dynasty (about 1122 to 249 B. C.) nephrite from Khotan, in Turkistan, came into wide use. The only commercial source of jadeite at the present is the mines of Upper Burma, which started production in the 19th century.

The tourmaline (page 793) is one of the most complex and variable of mineral species. Its color ranges from white, through all shades of red, yellow, green, and blue to black. It has different colors when viewed in different directions—yellow and green, brown and red,

\* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "La Venta's Green Stone Tiger," September, 1943; "Expedition Unearths Buried Masterpieces of Carved Jade," September, 1941, both by Matthew W. Stirling; "Jade," by S. E. Easter, January, 1903; and "Finding Jewels of Jade in a Mexican Swamp," November, 1942, by Matthew W. and Marion Stirling.



National Geographic Photographer Richard H. Stewart

### Jade Ornaments, Relics of a Bygone People, Emerge from a Mexican Cache

Jade was far more precious than gold to the Olmec, Maya, and Aztec cultures of Middle America. Mexico's rare Imperial Jade remains as valuable as emerald. Where the ancients mined it was a secret never passed on to the Spaniards. Here Dr. and Mrs. Matthew W. Stirling, members of the National Geographic Society-Smithsonian Institution Archeological Expedition to southern Mexico, brush the dirt of centuries from earplugs, beads, and figurines uncovered at Cerro de las Mesas.

lavender and rose, an almost infinite variation in shades.

As if this variation were not enough, many crystals are multicolored. Some are green at one end, red at the other. A fine tourmaline showing bands of red, white, and green, the national colors of Mexico, was presented to the President of that country. Another variation is in concentric bands of different colors.

Most striking are the so-called "watermelon" tourmalines from Maine. These have a green rind and a pink interior.

In chemical make-up the tourmaline is equally complex. Ruskin remarked that its composition is like an alchemist's formula. The gem variety is a lithium sodium aluminum hydroxy-boro-silicate.

Brazil, principal source of this gem, yields fine large stones of many colors. Madagascar furnishes, among other colors, a fine red approaching the ruby in color, called rubellite. Burma, South-West Africa, and Mozambique also yield fine gems.

In tourmaline the United States has its finest gem. Maine has produced stones of unusual quality, and so has Connecticut. San Diego County, California, has produced many handsome stones, including two-colored red and green gems of superb quality and some tourmaline cat's-eyes. These mines now produce few stones.

The term garnet (page 795) covers a family of closely related minerals, including the species almandine, pyrope, spessartite, grossular-

ite, andradite, and uvarovite. The usual colors are red, brown, and yellow, but white, green, and black forms are also found.

The common species is almandine, an iron aluminum silicate, which in gem form includes the carbuncle. A purplish-red form, found only in Cowee Valley, North Carolina, is known as rhodolite. A magnesian variety frequently seen is pyrope, a smoldering fiery-red stone, whose principal source is Bohemia, for which reason it is sometimes called "Bohemian ruby."

Spensartite, a manganese aluminum silicate, yields fine golden-brown gems. Grossularite, the calcium form of garnet, supplies the essonite, or "cinnamon stone" of Ceylon.

A variety of andradite, called demantoid, has a grass-green to emerald-green color. Its name refers to its high luster, resembling that of the diamond. This rare and beautiful stone is found only in the Ural Mountains.

Garnet is a very common mineral, usually found in regular 12-sided crystals, called dodecahedrons. But crystals sufficiently clear and flawless for gem use are rare.

India produces most almandine garnet. Fine pyrope is mined in Bohemia, and is found in fair quantities in Arizona and New Mexico.

#### Zircon, Brilliant and Popular

Zircon (page 795) comes in a variety of colors. Its brilliance approaches that of the diamond. It is a silicate of zirconium, the most common of the minerals of this somewhat rare element. Natural colors vary from dark cherry red, through brown, golden brown, to yellow. Small colorless stones found near Matura (Matarra), in Ceylon, are called "Matura diamonds."

About 20 years ago many beautiful blue zircons began to appear on the market. Naturally blue zircons of a very pale tint were previously known as a rare color variety of this gem. Considerable secrecy enshrouded this new appearance until it developed that the fine color resulted from heating the zircons found in Annam, Indochina.

The rough pebbles are placed in a crucible and heated over charcoal stoves. In a similar manner, many of the zircon pebbles can be transformed into colorless gems. Both the blue and the colorless have become popular stones in the gem trade.

A rare variety of zircon shows a fine apple-green color.

The principal source of gem zircon is Annam, where it is mined as rolled crystals from stream beds. Many stones are also found in Ceylon. Fine stones are found with sapphire at Anakie, Queensland.

The very rare sphene (page 790), a silicate of titanium and calcium, is known mineralogically as titanite. Its color ranges from a fine canary yellow to green and brown. It is quite soft and therefore little suited to ring stones, but can be used effectively in necklaces and brooches.

It owes its merit to its extreme brilliance, and it shows a fire surpassing that of the diamond. A properly cut sphene shows numerous flashes of red and blue light, approaching an opal in the intensity of its colors.

There is no regular source for this precious stone. Occasionally a cuttable crystal is found in the mineral fissures of the Alps. A few good stones have been found in the old iron mines near Brewster, New York. The few stones that appear upon the market are quickly snapped up by connoisseurs.

A synthetic material, named titania, exceeds even the sphene in brilliance. A large production and market are anticipated for this new member of the family of synthetic gems.

Turquoise is "Turkey stone," the blue gem that reached Europe from the Persian mines through Turkey. It is one of the few important gems in whose formation heat and pressure were not involved, for it is formed by the simple medium of water percolating through rocks near the surface of the earth. Chemically, it is a phosphate of copper and aluminum.

Like jade and amber, it had a special interest for early races. Some of the earliest turquoise mining was on the Sinai Peninsula, and for millenniums Persia has been an important source of the finest quality material. Turquoise was an active commodity in the markets of early Egypt. The aborigines of America also prized it highly (page 785). An ancient as well as a present source is near Cerrillos, New Mexico.

Persia furnishes the finest quality, of a robin's-egg blue. Greenish-blue stones are inferior. When traversed by delicate veinlets of brown or black, it is called "spider-web" turquoise. New Mexico, Arizona, and Nevada are the principal sources in the United States.

#### Rock Crystal in Demand

Quartz is the most common of minerals. Everyone is familiar with it in the form of sand. Chemically it is pure silica. When crystallized it forms six-sided prisms terminated by a three- or six-sided pyramid. When these crystals are clear, they are known as rock crystal.

Clear and flawless rock crystal is in great demand for commercial purposes, for it has a peculiar but very useful characteristic. It is





C. Anders Commner

### Amber's Insect Prisoner May Be Millions of Years Old

Mineral-resembling amber is actually an organic material, the fossilized resin of ancient trees. Sometimes it preserves leaves, flowers, feathers, insects, and parts of animals. Germany's Baltic-coast mines produce most of the world's amber. Storms wash other deposits ashore (page 810).

piezoelectric—that is, it produces electricity under pressure. All radio transmission waves are controlled by wafer-thin plates cut from rock crystal. This peculiar property makes it useful for many other types of apparatus.

Cut and polished into faceted gems, rock crystal becomes the familiar rhinestone. One of the well-known uses of rock crystals is as polished spheres for crystal gazing, used in divination (page 792).

The art of divination, using a polished surface, became popular during the Middle Ages. Prolonged gazing into a crystal ball or similar polished surface will deaden or temporarily paralyze the optic nerve. The crystals seem to disappear into a mist arising before the gazer's eyes. In this condition an imaginative person may perceive visions.

Among the Orientals, rock-crystal spheres were popular as symbols of purity and as a dwelling place for the "family spirits."

The ancients believed that rock crystal is liquid congealed by extreme cold. Pliny stated that it is found only where the snow of winter is frozen hard, that it is really ice and nothing else. It received its name from the Greek word *krystallos* ("clear ice").

A form of quartz differing from rock crystal

only in color is the purple amethyst (page 800). A yellow variety is called citrine, erroneously topaz. Since natural citrine is rare, the commercial product is obtained by heating amethyst. Smoky-gray or brown rock crystals are known as cairngorm stone.

Quartz also occurs abundantly in a massive uncrystallized form. Very fine-grained, impure varieties of rich colors are included under the term "jasper." The impurities, usually some form of iron, add red, yellow, green, blue, or variously mottled patterns to the mass. A green variety is called plasma; when this is speckled with small red spots, it is bloodstone.

Jasper may be found in any part of the world. Ural Mountains jasper was used extensively in the hard-stone carvings of many of the master artists of Europe.

A form of quartz intermediate between jasper and rock crystal is chalcedony. It is crystalline, with a waxy translucent body, and is best known in its banded form, agate or onyx.

A reddish-brown form of chalcedony is carnelian, an orange-brown variety is called sard, and its banded-onyx form, sardonyx. When colored apple green by nickel, it is



Linde Air Products Company

#### Out of a 4,000°-F. Furnace Comes a Synthetic Sapphire Rivaling Nature's

Man-made sapphires find wide use in industry (page 786). As jewelry they sell at a fraction of the cost of natural gems. This goggled, asbestos-gloved operator handles crystal produced from aluminum oxide.

chrysoprase. Chalcedony with mosslike inclusions is moss agate, and that with markings simulating landscapes, landscape agate (page 797).

Brazil is the most important producer of rock crystal, amethyst, and citrine, as well as agate. Because of the tremendous increase in the lapidary art as an amateur hobby, the yield of jasper and chalcedony is now the most important gem production in the United States.

#### Amber Not a True Mineral

Amber is, strictly speaking, not a mineral, but is the fossilized gum of extinct coniferous trees, which, through millions of years of burial, has taken on a mineral-like durability.

The ancient Greeks recognized its organic origin. According to their legends, the sisters of the young prince Phaëthon, favorite child of the sun-god Helios, who died by lightning, wept copiously and were turned to poplar trees, which instead of tears shed drops of amber. Phaëthon was buried on the shore, and an important source of amber has been the masses washed up by the waves of the Baltic Sea.

The ancient search for amber stimulated exploration, calling for new roads and trade routes across the then known world to the

distant Baltic shores. The Phoenician amber merchants approached it by sea. Later the Romans transported it overland to Venice or Marseille.

Frequently amber contains plant and animal remains, leaves and flowers, and insects that have been caught in the viscous gum as it oozed from the tree (page 809). "The Spider, Flye and Ant being tender, dissipable substances, falling into amber, are therein buried, finding therein both a Death, and Tombe, preserving them better from Corruption than a Royall Monument," wrote Francis Bacon in his *Historie of Life and Death*.

Amber-entombed butterflies, moths, flies, beetles, crickets, spiders, scorpions, worms, feathers, and parts of animals give us an unusually complete picture of life in the forests millions of years ago.

Amber is produced in Burma and is much used in China, but the principal source is still the Baltic coast of Germany. The sea yields quantities, particularly after storms have torn masses of seaweed from the shallow seas, carrying amber with it to shore.

Since the amber was originally contained in the underlying rocks, formal mining with excavating machinery and washing plants has been introduced.

# Large-scale Western Europe Map First in New National Geographic Series

**N**O ENEMY is likely to overcome us unless he first possesses Western Europe, which is still the strategic pivot of the world."

When General of the Army Omar N. Bradley wrote these words a few weeks ago, National Geographic Society map makers were just completing three months' work on master drawings for a new large-scale map of Western Europe.

Huge lithographic presses now have turned out 1,950,000 copies of this large ten-color wall map for distribution to members of The Society throughout the world as a supplement to this December number of their NATIONAL GEOGRAPHIC MAGAZINE.

"Today our frontiers lie in common with Europeans' in the heart of Europe," said General Bradley, Chairman of the United States Joint Chiefs of Staff, in the same historic declaration.

"Our foreign policy and our military policy in 1950," he stated further, "call for the defense of Western Europe from the start, not for a liberation of our friends after they have been overrun . . ."

From ancient towns to modern airports and occupation zones, the Western Europe map shows our kinship in history and culture with this old and populous part of the world, and its strategic importance in the age of airplanes and radio.

## Three-map Series to Cover All Europe

The new map is the first of three presenting all Europe on a scale that permits showing even the smaller towns. Planned for later issues are a new map of Eastern Europe which will cover the Balkan countries, and Northern Europe which will map Scandinavia and the nations of the Baltic.

Each of the future Europe sheets will extend well into Russia, mapping the border area between the Soviet Union and its satellites.

For quick location of the thousands of place names, The Society will issue an index to each map. The index to the 8,683 names on the new map of Western Europe will soon be available.\*

All three maps are being drawn on the same projection and scale, so that the sheets may be fitted together to make a large, detailed map of Europe about four and a half feet wide and more than five feet high. With at least 20,000 place names, it will give the most detailed coverage of Europe ever provided by the National Geographic Society.

The scale of 1:2,500,000, or 39.46 miles to the inch, was chosen for these sectional maps because it is small enough to permit showing an extensive area on each sheet and yet big enough to include most important places.

Even in high-speed modern airplanes, travelers can scan their map and recognize many features below them before the plane flies off it and onto another sheet. The Western Europe map covers an area about 1,100 by 1,400 miles in extent.

In well-populated areas, the new map of Western Europe averages from four to six names to the inch. In an hour's automobile drive of about forty miles, the user will find that along his route an average of four to half a dozen or more places are located and named.

## Ideal Guide for Pilgrims to Europe

Up-to-date compilation of railways, roads, airports, and waterways makes this map ideal for the hundreds of thousands of travelers who now visit Western Europe each year. In 1949 these pilgrims from the United States alone numbered 203,429, compared to 115,485 in a typical prewar year, 1937. For 1950 the figures are running higher still.

Dollar-shy countries are glad of their guests. In England the income from visitors is greater than that from the huge textile industry. In France during the tourist season this income amounts to half a million dollars a day.

Except for Scandinavia, Italy, Greece, and Turkey—to be included in later maps—the area shown includes most of Europe where travelers from the West are welcome, not barred as by Communist régimes.

Besides France and Great Britain north to Glasgow and Edinburgh, the 29-by-37¼-inch sheet includes all of Ireland, Portugal, Spain, Switzerland, and the "Benelux Countries"—Belgium, the Netherlands, and Luxembourg. Eastward it extends to uneasy, divided Berlin and iron-curtained Czechoslovakia. Denmark south of Copenhagen, and Italy west of Bologna are included.

The jutting peninsula mapped as Western Europe, together with the British Isles, measures only about 747,000 square miles; yet this "strategic pivot of the world" is the home of

\* Members may obtain additional copies of the new map of Western Europe (and of all standard maps published by The Society) by writing to the National Geographic Society, Washington 6, D. C. Prices, in United States and Possessions, 50¢ each on paper; \$1 on linen; Index, 25¢. Outside United States and Possessions, 75¢ on paper; \$1.25 on linen; Index, 50¢. All remittances payable in U. S. funds. Postage prepaid.

225,000,000 people, many of whom have relatives scattered from Canada to Patagonia, from Bermuda to Australia and New Zealand. Though only about three times the size of Texas, Western Europe contains some 31 times as many inhabitants.

From this comparatively small area came many of the explorers, peoples, institutions, ideas, and skills that built up in Europe and the Americas what we know as Western Civilization.

In the heart of Europe lies pivotal Germany, which twice in the present century has suddenly attacked its neighbors and twice has been overcome in catastrophic world wars. The map shows it broken into zones of occupation. Western zones are marked by the Stars and Stripes, Union Jack, and Tricolor; the eastern zone by Soviet Russia's red flag.

As the split between East and West has widened, a dozen nations—Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, the United Kingdom, and the United States—have committed themselves to resist any new aggression.

Under the North Atlantic Treaty signed in Washington on April 4, 1949, these 12 nations affirm that they are "determined to safeguard the freedom, common heritage and civilization of their peoples, founded on the principles of democracy, individual liberty and the rule of law." They declare that an attack on any one of them, or their possessions, in Europe or North America, will be considered an attack upon all and will be resisted jointly.

#### Travelers See Results of ECA Billions

Meanwhile, war-shattered Western Europe is fighting its way out of the frightful wreckage of World War II with the aid of the United States under the Economic Cooperation Act of 1948, better known as the Marshall Plan.

At the halfway point in the Marshall Plan, on April 3, 1950, Gen. George C. Marshall, author of the Plan, said "a near miracle" had been accomplished. But, he added, "We must work for, and expect, another miracle."

Traveling almost anywhere within the limits of this map, except in Spain which is not a member of the Organization for European Economic Cooperation, the American visitor sees many evidences of ECA assistance. Productive farms and healthy livestock bespeak fertilizers, seeds, animal feed, and technical advice from the United States. Some 600,000 tractors, three times the 1938 number, till Western Europe's soil.

In the area of the map lie some fifty major industrial projects assisted by ECA. These are chiefly devoted to the production of basic materials such as steel and other mineral products, electrical energy, and oil refinery equipment, but they cover a wide range of other industries.

Two plants to produce streptomycin are being built in France. Portugal is getting assistance on a large pulp and paper mill. In the Netherlands, ECA is assisting in the IJssel Meer (Zuider Zee) reclamation project, which is planned to recover 550,000 acres from the sea (page 749). France and Italy are getting new air liners. ECA dollars are going into steel plants such as those at Hayange and Echange, in Lorraine, and near Port Talbot in Wales.

The Marshall Plan means for Europeans millions of jobs, pay envelopes, and the feeling of confidence and security that goes with them.

Western European nations themselves are uniting for the common good. Examples of such cooperation include the Council of Europe, with a consultative assembly meeting at Strasbourg near the Rhine, and more recently the French Schuman Plan for pooling coal and steel with Germany.

#### Saar Now in Union with France

The map shows the new provisional State of the Saar. In 1947 that potent coal-mining and industrial district voted overwhelmingly to separate itself from Germany and to join in economic union with France. The Saar State is independent in internal affairs but depends upon France for protection and handling of foreign relations.

The Saar's new status and a few slight changes in Germany's western borders are subject to confirmation by a peace treaty with Germany, still unwritten more than five years after the war.

Boundary changes so small they are hardly perceptible are reflected in the new border between Germany and the Netherlands. There are 19 of these minor corrections, totaling about 25¼ square miles with a population of 9,200. The changes straighten out certain border anomalies which have plagued transportation lines, water control, and customs enforcement. Other minor changes in the borders of France, Belgium, and Luxembourg with Germany are incorporated in the new Western Europe map.

In the words of the English poet William Cowper, who died a century and a half ago:

What is it, but a map of busy life,  
Its fluctuations, and its vast concerns?

# J. W. Westcott, Postman for the Great Lakes

BY CY LA TOUR

*With Illustrations from Photographs by the Author*

IN THE black of night, the little cruiser *J. W. Westcott* headed for midstream in the Detroit River. Her big Diesel engines droned at full throttle to make headway through a heavy chop and gale. A 30-mile-an-hour wind had whipped the usually calm river into a virtual inland sea.

The small boat plowed ahead, burying her nose into big waves that sent the murky water spilling over the bow and windshield. She was on her way to "rendezvous" with a Great Lakes freighter. Her mission: to deliver the mail.

Standing beside Tom May, a veteran riverman, at the wheel of the sturdy mail boat, I suddenly picked up the long, dark lines of a ship. The looming freighter slid through the water, a white wave curling back along her black hull.

High above the water, the ship's lights blinked through the darkness as we rubbed against her side. We pushed with all our Diesel might to keep pace with the big vessel, which held fast to its regular speed.

Forty feet above us stood a crewman silhouetted against the faint light. He lowered a mail bucket, which skittered down over the side of the freighter and swung into the cabin of the mail boat. In a matter of seconds he hauled it up again. The freighter plunged ahead as the *Westcott* turned to set its course for shore.

The contact we made with the "laker" was strictly routine and is repeated many times through every 24 hours of every day from mid-April to mid-December.

## "Out of the World" for Weeks at a Time

Crewmen who ply the Great Lakes often have no contact with the outside world for several weeks at a time. To these thousands of men and their landside families, the 40-foot power cruiser, on whose white cabin roof appear the words, "U. S. Mail," means a lot. To them their "floating post office" is perhaps the most important boat anywhere in the world!

It is more vitally important to shipowners and ship captains. For them the *Westcott* relays confidential information and orders via telegraph and mail. Cargoes and destinations for the Great Lakes fleet are frequently top secret.

When such is the case, an owner wires instructions to one of his ships through the

privately owned J. W. Westcott Company, a marine reporting agency, on Detroit's First Street. Such messages are sealed in envelopes and delivered with the next mail. Without this service, Great Lakes shipping would be seriously handicapped.

Written orders have preference over ship-to-shore telephone, which can cause much misunderstanding and delay when reception is bad. Then, too, there is always the possibility of a competitive freighter picking up a telephone call and racing to get to port first. So Great Lakes ship operators have come to depend largely on the tiny *Westcott* for safe and sure delivery of their orders.

Sometimes it is virtually impossible for the mail boat to contact all ships passing through the Detroit River from either Lake Huron or Lake Erie. When thick fog settles over the area, many ships are forced to drop anchor and wait for it to lift before continuing on their courses.

When this happens, a backlog of as many as 16 freighters will sail through the river. The *Westcott* reaches as many as it can.

## Time a Vital Factor

With a comparatively short operations season, time is the vital factor in the highly competitive Great Lakes shipping industry. If a freighter laden with valuable cargo to be delivered on stated schedule were to stop or even slacken its speed to wait for mail delivery, thousands of dollars might be lost.

Statistics give an inkling of the great importance of this industry to our Nation's economy. In 1949, some 152 million tons of iron ore, grain, coal, and limestone and more than 92 million barrels of oil were transported in ships of American registry alone. Actually, more tonnage is handled by these carriers than the combined total tonnage that passes through the Panama and Suez Canals.

During the eight-month period when the Detroit River is ice-free and open to ships, the *Westcott* makes some 22,000 mail deliveries.

In 1949, it handled 914,195 pieces of mail, not only letters but parcel post packages as well. Detroit postal zone 22 is exclusively for such marine mail.

Detroit rivermen like to reminisce about the way this unique mail service was born. Capt. John Ward Westcott, for whom the present boat is named, was the youngest captain on the Lakes when he retired 76 years ago. He

wanted to work out an idea to save time in Great Lakes shipping—and make himself some money.

He bought a rowboat and would row out to meet cargo barges as they were towed past the city by tugs. He delivered mail to crewmen for 25 cents per letter. Then he started taking orders for small stores and fresh food. He worked the clock around, grabbing sleep between "tows." Gradually Westcott built up his own marine reporting agency.

Early in this century, tow barges gave way to steam-propelled vessels. From then on, various small power craft cruised the Detroit River mail beat.

Two years ago high operating costs led to a Government attempt to abandon the mail run. But shippers protested so vigorously to Washington that private companies were invited to bid for the contract. The job went to the firm Captain Westcott founded many years ago.

#### Mail Is Just a Side Line

For several years the *Westcott* didn't handle mail. Other power cruisers did the job on contract for the Government. At that time the Post Office Department had a ruling that boats carrying U. S. mail could transport nothing else. And the Westcott Company has always performed a multitude of chores for the lakers.

When this ruling was relaxed, the *Westcott* again started delivering mail. "Mail is actually a side line with us," says J. W. Westcott, present head of the firm and eldest son of its founder.

One of the *Westcott's* most important other services is coffee supply. In the company office is a large blackboard chart which lists the kind of coffee used on each ship that passes through the Detroit River. In addition to the brand name, the board also lists the type of grind, whether drip or percolator. Ships order coffee, and the little *Westcott* makes the delivery.

Another service the company offers is laundry and dry-cleaning pickup and return. "They put it off dirty; we have it done up and get it back," says Westcott. The boat also makes regular deliveries for a local marine supply store and serves as paper boy by getting Detroit and other newspapers to ship crews every day. Machinery parts and sailors' baggage are two other items the *Westcott* handles.

The cruiser even embarks or debarks an occasional passenger. Even this is done without a freighter cutting down its speed. Just as the mail is put aboard, the *Westcott* brushes alongside a passing ship and keeps pace with

it. Then a crew member on the larger ship lowers a ladder, the passenger grabs it and hoists himself aboard as the mail boat turns around and heads to shore. A few times the *Westcott* has had to fish a passenger who "missed the boat" out of the water.

These days crew members often get notice to report for Army physical examinations. The *Westcott* not only delivers the summons from the draft board, via mail, but also gets the prospective draftee to shore.

When a crewman gets word that he is to report for an examination, he notifies the draft board in his home town to send his papers to Detroit. When this is done, the crewman lowers himself to the deck of the *Westcott* the next time his ship passes through the river. He goes ashore, then rejoins his freighter or tanker the next time it reaches Detroit.

The Westcott Company maintains two branch offices—one at Port Huron, north of Detroit, and another at the lower end of the river. When a freighter passes one of these, a crew member often shouts an order for coffee or supplies ashore. The branch office telephones the order to the main office in Detroit, and the goods are delivered when the ship passes the city.

Should the *Westcott* miss delivering an important message to a ship from its owner, the main office phones one of the branch offices, both of which operate their own boats and can make special deliveries.

The Westcott establishment works 24 hours a day. Three crews of two men each put in eight-hour shifts on the *Westcott*. The office is staffed by three persons during the day and one at night. The Port Huron station has three men who work in the office and three on boat duty. The lower river branch, which operates in Canadian waters, employs three Canadians.

After making another run, we put in at the pier just outside the Detroit River Post Office, where the *Westcott* was loaded with more bags and bundles of mail. Dawn was coming up. The wind had died down and the river was calm again after churning all night long.

There have been times when the weather was so rough the *Westcott* couldn't battle through to passing freighters. But the little boat usually makes it.

I recalled the inscription from Herodotus I had seen on the New York Post Office Building: "Neither sun nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds."

I looked over the *Westcott* and thought this motto could well be paraphrased to include "fog, gales, high seas, and freezing spray"!



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**Detroit's Busy Errand Boat Delivers Mail on the Run to a Great Lakes Ore Carrier**

Daily the *J. W. Westcott* plies the Detroit River ferrying letters, packages, and personnel to passing vessels. Here two men on a carrier feed a hoisting line to the mail launch. In a few minutes they'll bear from home.



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#### ♠ Marine Post Office Clerks Sort a Million Pieces a Year

Packages and pigeonholed letters at the Detroit River Station await passing lakes carriers. Each compartment bears the name of a ship; this rack contains more than 500. The delivery boat gave up mail sorting several years ago; now the job is done on shore.

#### ♣ Mail-boat Owner and Pilot Keep Watch on River Traffic

Few bodies of water anywhere in the world see more shipping than the Detroit River, one of the Huron-Erie connecting links. Each year the *Westcott* makes some 22,000 mail deliveries. John Ward Westcott, son of the agency's founder, here checks incoming vessels.







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**Pittsburgh-bound, 13,750 Tons of Mesabi Iron Ore Glide Past the Mail Boat**

Such ungainly but efficient carriers, their hatches spaced to fit leading-pier chutes, load in three hours (the record is 16½ minutes). In 1942 they moved 92 million tons of ore. Then as now they gave wararmament a mighty boost.



### Pilot-Postman Has a Watery Route

Westcott's 24-hour dispatch service requires three crews of two men each. These two, pilot and helper, contact a ship once every 30 minutes, on the average.

Great Lakes iron-ore, limestone, and coal carriers travel at maximum speeds with capacity cargoes. For eight ice-free months they build up blast-furnace stockpiles, enabling steel mills to operate through the winter.

Other vessels carry the Midwest's grain to Buffalo and Canadian ports for transshipment to eastern cities and Europe. All are marvels of efficient, low-cost operation.

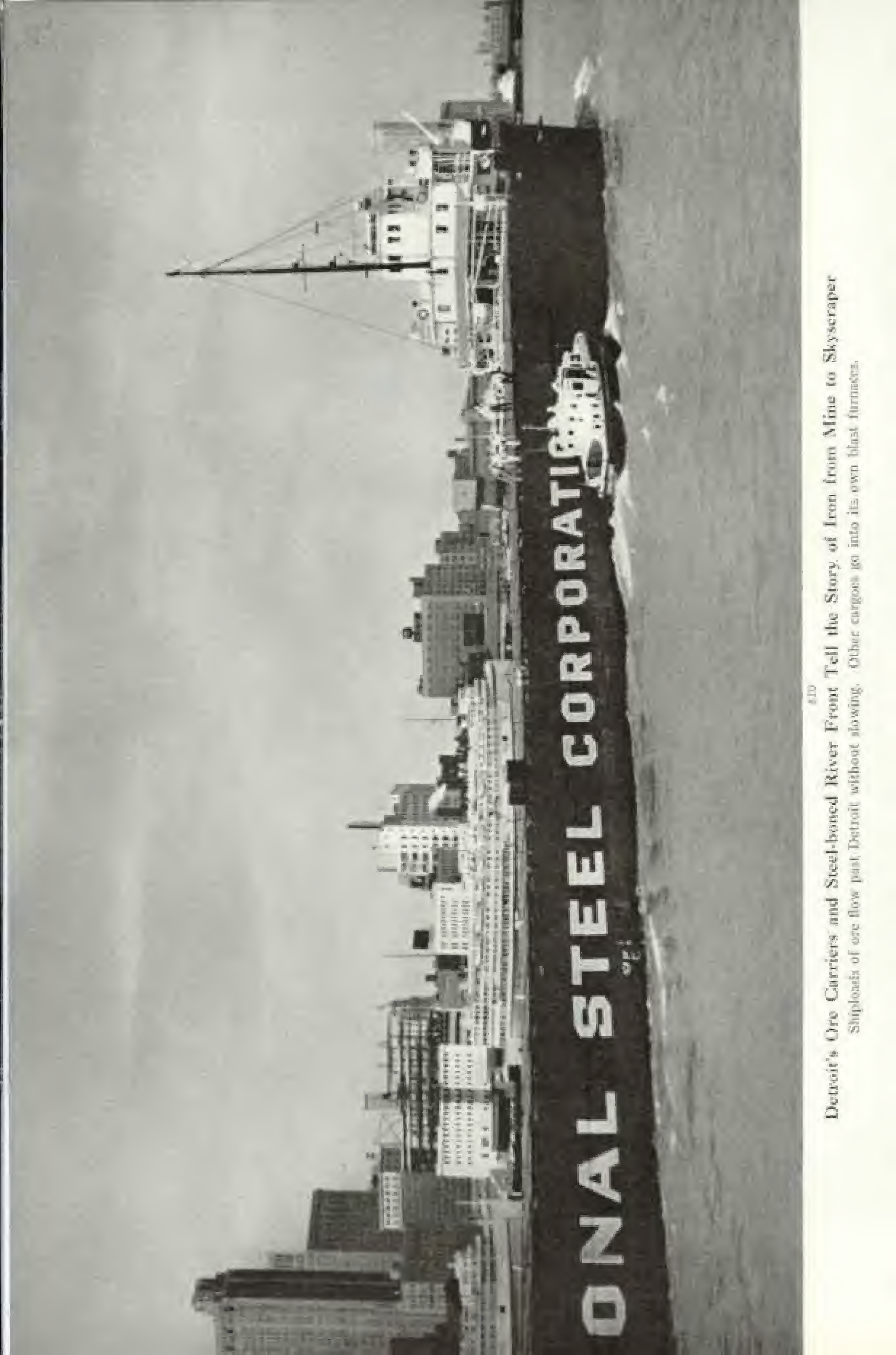
Carriers move on schedules almost as exact as those of express trains. The legendary captain unable to find time for a haircut until ice jammed the Lakes is the hero of a story told less in jest than in earnest.

Above: Each bundle on the skipper's shelf is destined for a ship. Left: His helper stuffs newspapers into the mail bucket.



**"Haul Away!" A Package from Home Goes Up the Riveted Hull**

Since 1874 Westcott launches have supplied Great Lakes seamen with laundry, tobacco, candy, newspapers, soap, and toothpaste. Ailing crewmen have been carried ashore and replacements put on board.



**ONAL STEEL CORPORATION**

Detroit's Ore Carriers and Steel-boned River Front Tell the Story of Iron from Mine to Skyscraper  
Shiploads of ore flow past Detroit without slowing. Other cargoes go into its own blast furnaces.



J.W. WESTCOTT  
DETROIT

## A Spotter Tags Ships with His Glass

Westcott branch offices at both ends of the Detroit River keep watch on all traffic—some 26,000 passages a year.

This marine reporter, stationed in his office, identifies an incoming ship with an old brass telescope. Next he notifies the mail station. Soon the Westcott heads out to make delivery.

Good eating is traditional aboard Great Lakes ships. Perishable food is stored in huge stainless-steel refrigerators. Westcott supplements these rations with small stores and fresh coffee.

The main office's coffee chart (below) indicates each ship's brand. Smokestack symbols, known as house flags, identify shipping lines (right).

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COFFEE - GIVE SOME DIFFERENT BRANDS THEY REQUEST, IF DO NOT ASK FOR, REFER TO LIST BELOW.

<b>VAN ROOY</b> ALL G.L.S.S. CO. BOATS		<b>"COLUMBIA" - G. DUNBAR BROS. ONLY</b> OTHER "SHIP BY STEEL CO." AT REQUEST	
ANGELINE CADILLAC WACKAWAL LYREL WINEPIN LAFERING OLJET	LASALLE MARGUETTY MICHIGAN PRESQUE C. SONGER C. SONGER YODER	<b>"SEÑORA"</b> STEEL CO. BOATS	<b>DRIP (small)</b> MAGNA MAGNOLA PAINE STONE-TENNEN A. SUTTON
<b>HASEROT</b>		BILLINGS FRIDAY ST. JOHNSTON MAIA MINCH MURPHY RIMBALL SWEETLY WASH	<b>PHILIP'S BRAND (PM)</b> DUFFY GALLAGHER MAGNOLIA FALCON SANDERS JR. CUTTHROAT J. C. WILLIAMS
<b>WATERLAKE (W.P.M.)</b> P.M.H. BOATS ONLY			



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♣ *J. W. Westcott Takes On Cargo at Her Water-front Station*

Detroit and Cleveland newspapers list ship arrivals and departures at lakeside points. From these schedules Westcott clerks calculate each vessel's arrival time. They have some 15,000 seamen and 700 ships to keep track of during the navigation season.

♣ *A Freighter Captain Sorts the Mail in the Texas House*

No brass buttons or braid for Lakes shippers; they prefer khakis or business suits. Mail usually goes to them before distribution. Cabins below the pilot-houses are called "texas houses," after the largest of the old-time Mississippi River boats' "State" rooms.





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♣ Mail! Three Seamen in a Rollicking Mood

Shakespeare and Shaw vie with Zane Grey and pin-ups. The classics' popularity is not surprising in view of the many college boys shipping on during vacations.

♣ The Crew's Thoughts Drift Miles Away

For eight months these men never leave ship save for a few hours in port loading or unloading. Passing narrow channels, they sometimes see their families waving.





# Darius Carved History on Ageless Rock

By GEORGE G. CAMERON

Chairman, Department of Near Eastern Studies, University of Michigan

*With Illustrations from Photographs by the Author*

**I**N THE IMPERISHABLE stone of a 4,000-foot Iranian mountain, artisans of Darius the Great carved his vainglorious autobiography almost 2,500 years ago. The achievements of this king of ancient Persia (now Iran) they extolled in three different languages of his realm.

This gigantic cliffside boast became, like Egypt's famed Rosetta Stone, a major key to an understanding of long-forgotten languages and the cuneiform, or wedge-shaped, scripts in which they were written.

Nevertheless, despite numerous attempts to secure a perfect copy of this important document, there remained to our day tremendous gaps in our knowledge of its wording and thus a failure to appreciate its magnitude.

By use of 20th-century tools to gain access to the monument, and modern techniques of field archeology to obtain a more accurate record, I was able to achieve what men had long desired: a better, fuller copy, and hence a greater understanding of the Persian's noble monument.

## Cliff Overlooks Caravan Rendezvous

Darius could have found no better or more conspicuous place for his project than the last peak of a long, narrow range which skirts the plain of modern Kermanshah. At the foot of the mountain springs bubble up into a pool of crystal-clear water and supply a small stream, which flows past the village of Bisitun and away into the plain (map, page 833).

From time immemorial caravans have watered their beasts at these springs. Here every army which has marched from Iran into Iraq has camped, for the mountain and its springs lie on the age-old caravan trail between Ecbatana (modern Hamadan), once a center of the Medes and Persians, and fabled Babylon.

To the ancients themselves the spot was holy: 500 years before the Christian Era they called it the "Place of God," Baga-stana, which has descended to our day as Behistun or Bisitun (pages 826-827).

The monument was not unearned, for Darius became king in 522 B. C. only after a series of bloody pitched battles with nine other contenders to the throne. It was carved so the whole world might be informed of his prowess and of his debt to his god, the "Wise Lord" Ahuramazda.

A part of the story is told by a massive relief cut into the limestone mountain 340 feet above the springs and 100 feet above the highest part of the mountain to which man can climb (page 839).

There today stands Darius, with high brow and straight nose. On his head rests the Persian war crown, carved with exquisite care to resemble the gold band studded with oval jewels and rosettes worn by the Great King himself (page 836).

Behind him appear two of his officers, the bearers of his bow and lance. Before him floats the winged figure of the god Ahuramazda, who taught Darius to speak the truth and whose left hand grasps the ring which bestows sovereignty on monarchs (page 829).

Beneath the god stand eight rival contenders, their necks roped together, their hands tied behind their backs; a ninth, the arch-enemy, lies prostrate under the king's left foot, his own knees and hands lifted in agony. A tenth and subsequent foe was pictured a few years later (page 830).

The relief alone was inadequate for Darius. He also commanded that the story be carved in three languages of the empire: Old Persian, the language of the king and court, inscribed beneath the relief in four and a half columns of closely written texts; in Babylonian, inscribed on two faces of a rock jutting out from the mountainside to the left of the relief; and, to the right of the sculptured panel, in Elamite, the language then spoken at Shush, or Susa ("the palace" of the Biblical book of Esther). Somewhat later, the Elamite inscription was recopied to the left of the relief.

## Story of Exploits Forgotten

So inaccessible was the Great King's handiwork that even the citizens of his empire soon forgot the story that was told. Worse still, as hundreds of years rolled by and the languages spoken in his day were succeeded by others, men even lost the ability to understand these tongues or to read the cuneiform scripts in which they were written. But within the last century Darius's lordly monument itself provided the key by which the riddle of these languages and their scripts was solved.

The story of decipherment began when travelers compared the curious wedge-shaped signs



826

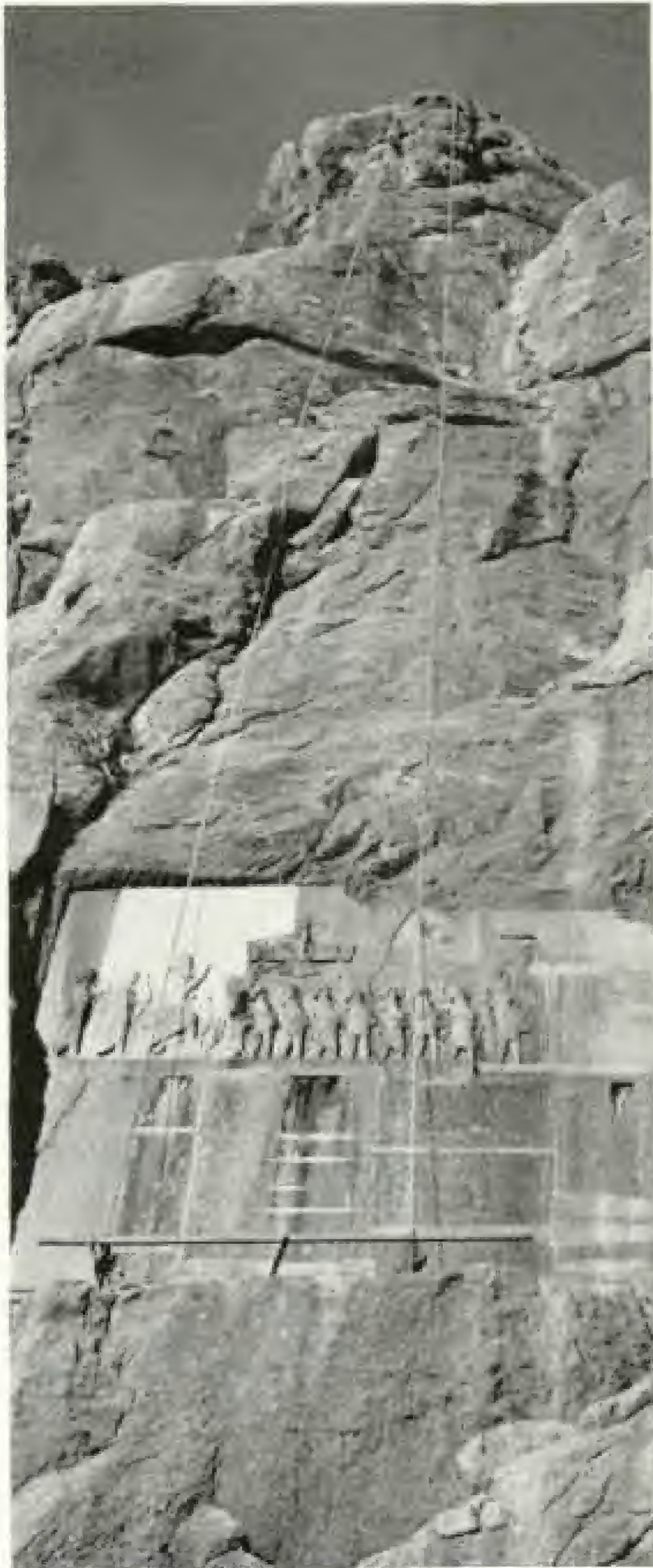
**4,000-foot Bisitun Mountain, "Place of God," Overlooks an Ancient Caravan Trail**

Every army marching from Iran into Iraq passed along the Ecbatana-Babylon road, which skirts the mountain (page 825). Bisitun village sits (center) beneath King Darius's life-size sculptures, here too distant to be distinguished.



### Darius Chose This Dramatic Limestone Billboard to Advise the World of His Prowess

Said the King: "If thou shalt conceal this record and not tell it to the people, may Ahuramazda be a smiter unto thee and may there not be unto thee a family." As if obeying this injunction, the author copied and translated it.



Scaffold's Cables Stretch 200 Feet

Oil riggers drilled holes into the rock and embedded steel pins with cement. Then they attached the cables. The archaeologist's crew, like house painters, could raise or lower the scaffold by operating two winches. Here Darius (third from left) is enrobed with the author's latex rubber solution. This mold, removed after 24 hours, preserved casts of the 2,500-year-old text for detailed study. An accurate translation is thereby assured, despite the whims of erosion.

at Bisitun with those appearing on other, more accessible monuments in old Turkey and Persia. Sometimes they brought back copies or even samples of these "writings" to Europe, but no man there could read them.

By inference, one of the languages with its system of writing was thought to be of Persian origin, for it was very common within Persia, particularly at Darius's former capital, Persepolis.

Another was assumed to be Babylonian, for its script closely resembled the writing on monuments found in what is now the country of Iraq, in the "Garden of Eden"—the land of the Two Rivers, Tigris and Euphrates.

The third was totally unknown.

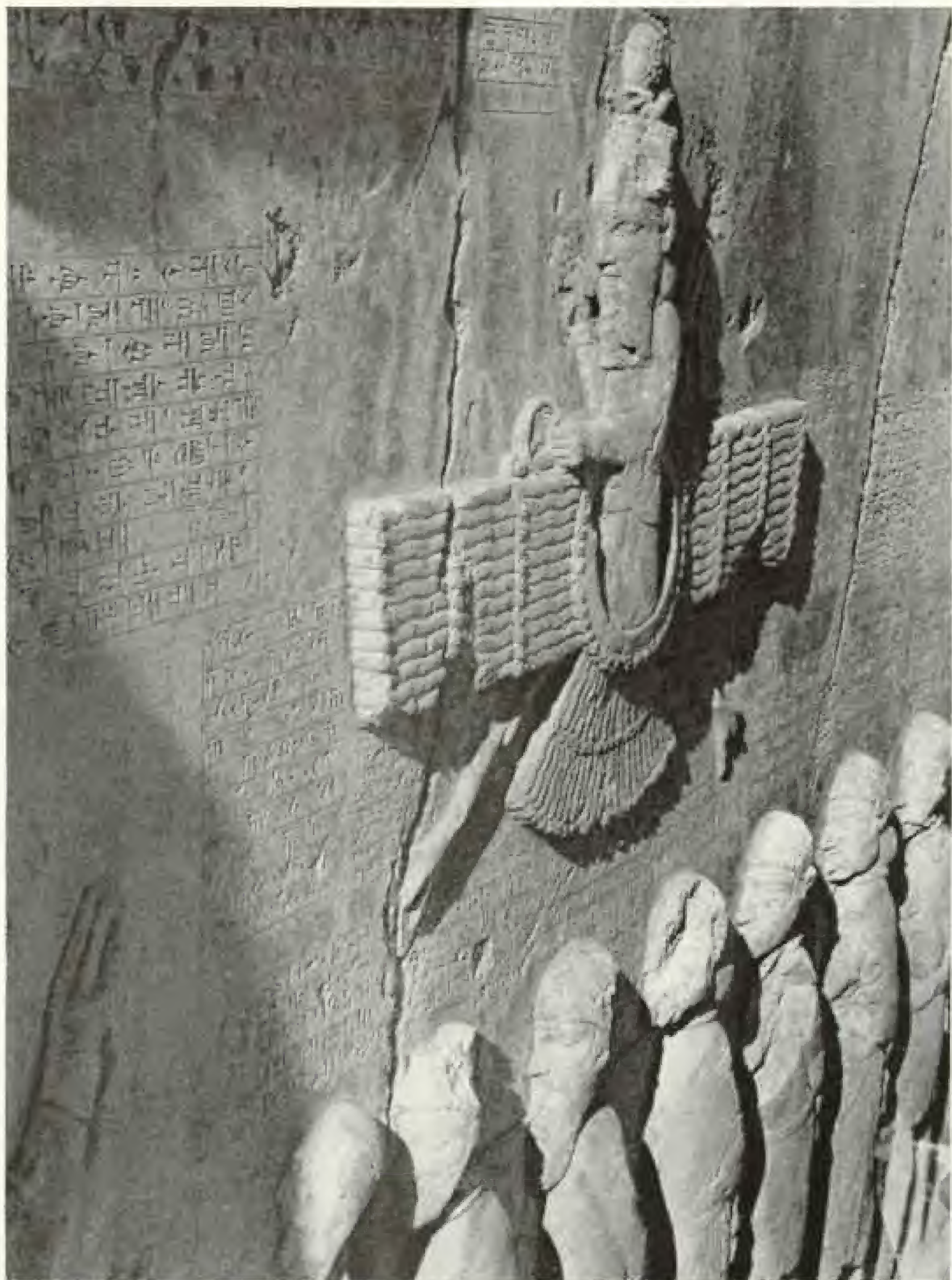
The initial step in decipherment was made by a German, Georg Friedrich Grotefend, who chose two short but supposedly Old Persian inscriptions and painstakingly compared them, sign by sign. When, in 1815, he published his results, it was all but obvious that he had succeeded in finding the key to the understanding of these particular inscriptions.

But the material at hand for full decipherment was wholly inadequate. No long text was available to check his discoveries. Also, he had investigated only one of the three languages. Since all other inscriptions copied up to that time were too short and limited, it proved impossible to use his probable decipherment of the one language as a key to the understanding of the other two.

The inscription on Mount Bisitun gave greatest promise. Here, as we now know, are 515 lines of texts in Old Persian, 141 long lines in Babylonian, and 650 lines in Elamite. Bisitun, therefore, represented a challenge which man must meet and overcome if he would seek the hidden meanings of cuneiform writings.

The first attempt to copy Darius's story was made a little more than a century ago when two Frenchmen sailed from Toulon at the behest of their government and with the support of the two most famous French Academies. They had wonderful experiences; they scrambled with bleeding hands and feet up the rock they had been sent to copy, and regained terra firma by an effort of gymnastics which, to hear them tell it, could be equaled only by the lizard.

Their toil and peril here were fruitless, however. In the end, they failed in



**Ahuramazda, the Persians' Winged God, Floats in Stone Above the King's Enemies**

This deity gave aid to Darius because the King "was not hostile, not a follower of the Lie, nor a doer of wrong." Here he grasps the ring which conferred kingship; his right hand is raised in blessing. His figure emerges from the wings of a solar disk. Presumably the crown once was topped by a silver or golden ball (page 844).

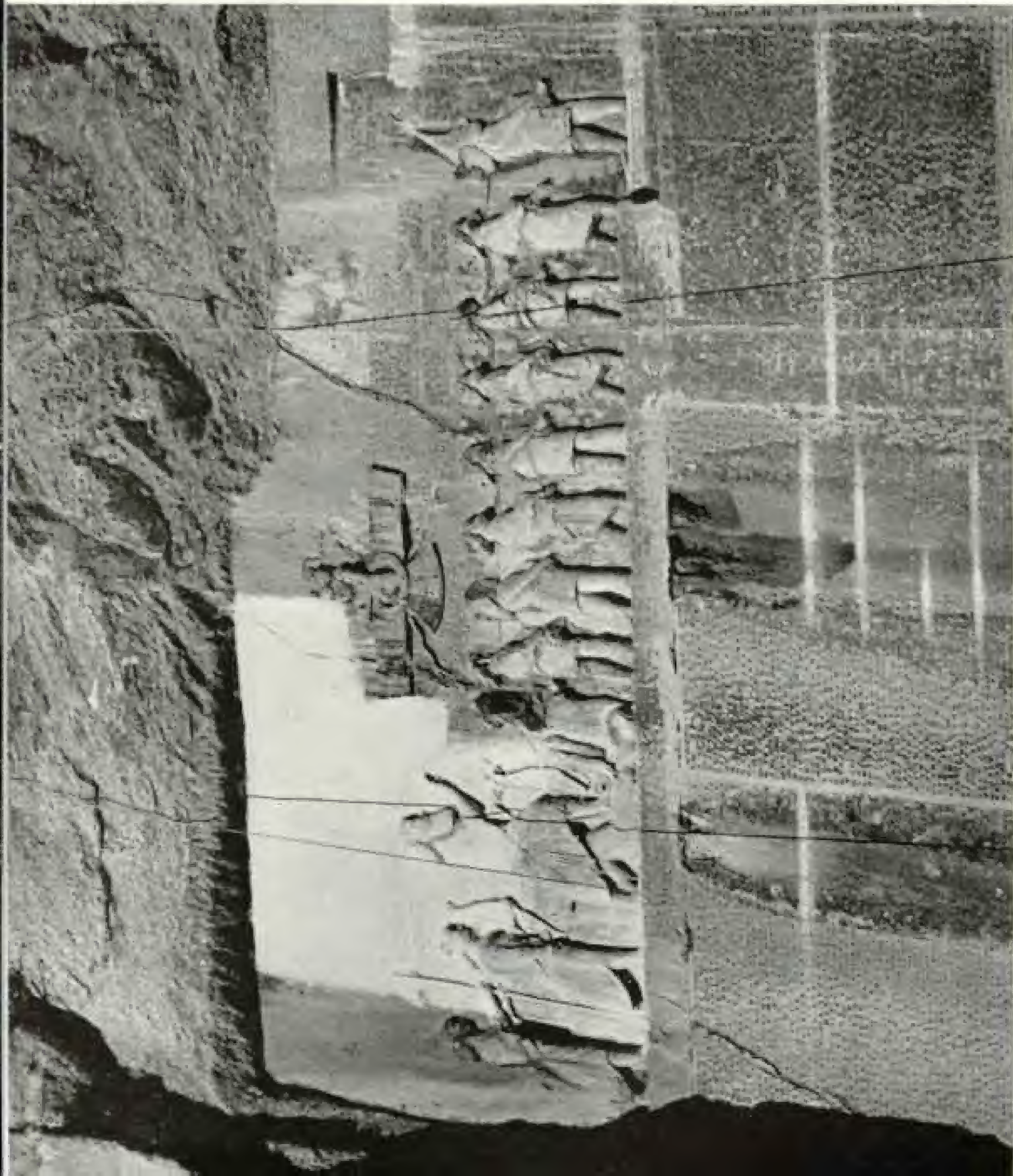
### Hands Tied, Necks Roped, 9 Captive Kings Hear Darius's Sentence

In this 10-by-18-foot panel stands the 5-foot-10 Persian monarch, one foot upon his acclamation, Gauchata, the usurper. Eight defeated rivals for the throne are but 3 feet 10. Four-foot-10 attendants carry the royal lance and bow. Ahuramazda, whom Darius acknowledged as his "Wise Lord," rides in a stony sky (pages 825, 829, and 833).

Just as the carving was being finished, Darius defeated another enemy, a Scythian king who "wore a pointed hat." He instructed his sculptors to add this new figure to the gallery. They surveyed the scene; there was no room! Every inch was taken. But Darius's order was law; so the king with the pointed hat was carved (right) as the tenth and last prisoner in the royal roundup. Space for him was created by mutilating a column of Elamite inscriptions. Thereupon the sculptors recut the text anew beneath the Babylonian inscription, spoiling the monument's symmetry (page 840).

Water from rock faults trickles across the 2,500-year-old inscriptions. In their Darius proclaims:

"This is what I did. By the grace of Ahuramazda, I did it in the same year. O thou who shalt examine this inscription in future, let it convince thee as to what was done by me. Regard it not as a lie."



Bisitun Folks, Pictured from the Monument, Parade to a Moslem Shrine. They Ignore Darius's Graven Deity  
These people called the sculptured kings "dervishes." But Western scholars before them imagined "captive tribes of Israel" or the "12 Apostles."

131





#### Ropes to Willing Hands Pull the Scaffold's Cables Away from Jutting Rocks

High on his "flying trapeze," Dr. Cameron felt like a circus aerialist. Once a steel cable snagged a ledge and tilted the platform alarmingly. Again a tumbling boulder, splintering, showered the party with fragments. Wind, rain, and cold did their utmost to stop the work (pages 840, 843).

their purpose because, they said, the inscription was inaccessible.

#### Rawlinson's Pioneer Achievements

Unknown to the two Frenchmen, an Englishman, Sir Henry C. Rawlinson, had already succeeded in climbing the precipitous face of Bisitun. His description of the ascent is often hair-raising. He concluded that the climb is one which only an enthusiastic antiquarian could be expected to undertake.

However, he was no mere mountain climber. Laboriously, and with infinite patience, he copied the Old Persian text and then set about to decipher it. Repeatedly he returned to the

Rock to obtain copies of both the Elamite and the Babylonian inscriptions, upon which he also bent his effort and ingenuity. With his publication of the copies and translation of the Old Persian texts in 1847, and of the Babylonian texts in 1851, the long-sought key to the understanding of the world's oldest writings was made available to all mankind.

The challenge of Bisitun had been met and overcome.

But the elements have exacted a heavy toll from the ancient inscriptions. The winds and sands of time, autumn rains, and winter's chill have played havoc with line after line of the texts and made them difficult to read.



Further, despite his monumental achievement, Rawlinson was engaged in making the first copy, and in the earliest stages of decipherment, when often he had no way of knowing what to look for. His copy, naturally, was defective.

More than that: although he copied nine and a half columns of texts, four additional columns containing 323 lines defied him, for underneath these four columns there is no ledge on which a man can stand.

In an effort to clarify some of the more dubious or difficult readings of the Old Persian text, an eminent American professor at Columbia University, A. V. Williams Jackson, climbed the Rock in 1903. He checked or collated many passages and secured photographs of the inscriptions for the first time. But the full story of Bisitun had not yet been told.

So again, in 1904, an expedition sponsored by the British Museum set out for Bisitun. Since Leonard William King and Reginald Campbell Thompson, who labored for the Museum, could profit from more than a generation of good scholarship in the ability to read and understand ancient writings, it was only to be expected that they should improve enormously on Rawlinson's readings.

Also, by a fortunate discovery, they were enabled to use a rock shelf high up the mountainside, thus coming closer to the inscriptions they sought to recopy. Where Rawlinson had been forced to stand upon a tiny ledge immediately beneath the texts, they dropped a rope from the shelf above and, sitting in a kind of boatswain's chair, swung back and forth across the face of the vertical Rock.



Drawn by Harry A. Oliver and Victor J. Kofler

### Darius's Persia Is Modern Iran, Oil Prize of Power Politics

Aryan, Greek, Arab, Mongol—a hundred armies have tramped across this ancient land. Six years ago its roads sped American war aid to Russia; today Iran fears Korea's fate. Darius the Great, who, invading Greece, almost changed the face of Europe, left a mighty monument at Bisitun. The author, copying its trilingual text, preserved an immortal document (page 825).

Carefully they reworked the nine and a half columns that Rawlinson had copied. Their success is indicated by the fact that theirs is today the standard publication. The last secrets of Bisitun, it would seem, had been solved.

Yet they, too, made mistakes. They were unable to read the signs in innumerable passages, and they made a number of surely erroneous or impossible restorations. The fault was by no means wholly theirs, for any three men reading a worn and eroded inscription may interpret it in three, if not more, differing ways.

A succeeding generation of scholars had ad-



British Oil Executives Test the Cliffside Perch Rigged by Their Workmen

When Darius's carvers finished work, they chiseled away the staircase to the sculptures. Thus early archeologists found most of the cliff face inaccessible. Employees of the Kermanshah Petroleum Company anchored steel cables to a mountain ledge and suspended the scaffolding. This crude elevator enabled Dr. Cameron to study all the inscriptions at close range. Hussein, his Persian assistant, stands at right (page 837).

vanced suggestions and emendations which needed to be checked, by improved archeological techniques, against the original inscription upon the fabulous Rock.

#### How Did Carvers Reach Cliffside?

Other problems likewise called for a solution. Would a closer examination of the enormous relief which accompanied the inscriptions reveal any new details of Persian art? And how had Darius's workmen succeeded in carving the relief and the lengthy texts high up a mountainside on a spot which is today all but inaccessible?

A final question involved the four columns of inscriptions which had defied the efforts not only of Rawlinson but also of King and Thompson. If these columns could be read, what secrets would they tell? Some hitherto unknown detail of Darius's attack on Greece; or some unpolished facet of the religion of

these one-god-worshiping Achaemenid Persians? Yet no man even knew the language in which these four columns were written.

All these things I knew when, in March of 1948, I was named Annual Professor of the Baghdad School of the American Schools of Oriental Research, an institution whose corporate members are the outstanding universities, colleges, theological seminaries, and rabbinical schools in America.

Because of the international situation in 1948, it appeared unlikely that the Annual Professor would be able to make any substantial contribution to the work of the schools within Iraq. I proposed, therefore, an expedition to the Rock of Bisitun, an expedition which would attempt to solve some, if not all, of the problems I have outlined and thus bring to an end more than a century of work upon this truly historic monument.

Within a few months I reached Kerman-



Abdul Ali, the Author's Helper, Ascends to the Scaffold's Landing Ledge

The 30-foot ladder rests on a small platform 240 feet above the road. From this point to the inscriptions Dr. Cameron faced 70 feet of sheer cliff. Ladder and scaffold solved his difficulties.

shah, which was to be our base of operation. My wife and two sons accompanied me.

Five miles northeast, at Taq-i-Bustan, are the remains of a walled park or "paradise" used by kings of Sassanid Persia 1,500 years ago. Carved in the mountain walls near by are two grottoes and a bas-relief illustrating hunting and other scenes from the lives of the same Persian sovereigns.

#### Oil Company Riggers Help

Modern methods of transportation and communication had doomed the town to moribundity, but with the discovery of Iran's natural underground wealth, oil, and the establishment here of a refinery, Kermanshah has blossomed into new life and vigor (page 838).

Now its dusty streets, some even paved, teem with surging groups of Kurds and Persians; buses, trucks, and private cars vie for honors with horses, camels, donkeys, and the heavily laden human back. An American hospital helps to serve the major medical needs

of the growing city, and with its directors, Dr. and Mrs. Russell Bussdicker, we found friendly lodging.

First stop was the office of the Anglo-Iranian Oil Company's very cooperative local manager, who assured us that the skill and methods of 20th-century oil engineers would be at the service of the linguist's learning and the archeologist's desire.

Guided by shepherd boys around the rear of massive Bisitun, his experienced riggers ascended to the shelf 200 feet above the inscription; there they drove holes into the solid rock, placed steel pins in the holes, and cemented them in. Now we were ready for a frontal attack on the remaining secrets of Darius's noble memorial.

Carefully we dragged a scaffolding up the mountainside as high as man can climb, to a comparatively level spot beneath the inscriptions. Again we went behind the mountain, climbed to the now familiar shelf, lowered ropes to the base of the massif, and one



"I Am Darius, Great King, King of Kings"

Carved in the Rock, the monarch wears his war crown. His mustache is twisted and his hair gathered into a bun. The square beard, combed into 10 curls, is an inset stone held in place by pegs driven into the holes on either side. Vandals' bullets scar the image. Darius the Great ruled Persia from 521 B. C. to 486 B. C. Twice he invaded Greece, but in 490 B. C. he suffered a history-making defeat at Marathon. Like the Greeks, he was an Aryan (pages 825, 843).

by one pulled up the ends of two cables. These we anchored solidly to the pins already in place. Then we returned to our scaffolding and attached it to the cables (pages 828, 832, 834).

As we looked up, however, we saw that it was going to be no easy matter to raise and lower the scaffolding daily over the face of the mountain. Tremendous outjutting and overhanging rocks would certainly interfere with our upward or downward progress.

Thirty feet above our heads was a little shelf. If we could leave our scaffolding near that shelf at the end of each day's work

and descend the rest of the way by ladder, our task would be easier. So we placed a long ladder to reach this shelf against the rock wall. Now, in truth, we were ready (page 835).

Up to this point we had had a large crowd of sight-seers and willing native workmen. Three only were needed upon the scaffolding, one to man each of the two winches, and one to fend it off from the rocky wall. I would be one of the workmen, and so only two others were required.

I turned to two men who had appeared to be most competent.

"Will you come up top with me?"

In unison they replied, "Not us!"

"Why not?" I asked.

"Too dangerous," replied these Kurdish villagers, who have long been noted for their headstrong daring!

Shocked, I asked for volunteers, offered prize money, and had for answer only low negative murmurs. My project faced disaster if these men failed me!

Finally, one of the riggers, on loan to me for this day only, stepped forward and, following him, a slight lad, named "Servant of Ali." Here were my workmen for this day; perhaps tomorrow would take care of itself.

Ours was a hard task, for time after time one or both of the winches were jammed up into the numerous overhanging rocks. But little by little we raised our scaffolding higher and higher; we fought not only the outjutting boulders and our own weight on the scaffold, but also the weight of dozens of men clinging down below to ropes by which they too were trying to hold our

platform away from the mountain's face.

#### We Reach the Ledge!

We passed the little shelf 50 feet above them, against which our ladder rested; we passed an oblique gash, the significance of which at first escaped us; and we passed solid rock scarped by thousands of chisels.

At long last our scaffolding rested securely on the ledge immediately beneath the inscription, which now, for the first time, my hands and eyes caressed.

It was a triumphant moment. All past worries, over the arrival of the materials and the feasibility of my method of attack, disappeared. All obstacles, including the mountain itself, had been overcome. Nothing remained but to apply a new technique of copying inscriptions and the knowledge gained from 20 years of study to the age-old memorial.

The expedition, I knew in that moment, would succeed.

Our first day's work ended on this note. As we prepared to descend, I realized the meaning of the oblique gash which we had passed on our ascent, and which we could now see slanting sharply downward just below us. It was an ancient pathway, now partially blocked by fallen rocks.

We left our scaffolding where it was and followed the path down. Forty-eight feet of it still remained. Then the path ended, in scarped rock, still almost 50 feet above the watchers below.

Five feet below its end, however, there was a little semicircular platform about 9 feet long and from 18 inches to 5 feet in width. We dropped to this platform and looked down again. There, 12 feet beneath us, was the top of our ladder, just resting against the edge of a tiny triangular shelf.



Hussein of Iran Eyes His Persian Ancestors' Forgotten God

Ahuramazda, the carved deity, here faces a cuneiform inscription covered with a rubber mold for duplication (page 840).

Cautiously we lowered ourselves once more, our hands and feet seeking purchase in a fissure which ran down to the shelf below. Our bodies were taut as, one by one, we gained the shelf and descended the ladder.

Difficult and dangerous though this method of descent and ascent might be, here was our easiest way of access to the inscriptions. From that time on, we knew, ropes could help our progress up to the scaffolding, which itself would be used only as our platform at the height of the inscription and relief.

Our first day's work was done, but I needed a workman to replace the company's rigger. Once again I asked for volunteers, this time for the morrow. Encouraged by our day's success, a young boy ranged himself behind Seryant of All.



### An Oil Refinery Has Transformed Sleepy Kermanshah into a Boom Town

Buses roll down streets, some of them paved, but women's fashions show little progress. The Moslem veil, condemned by a former Iranian Shah, has returned to favor. Dr. Cameron made Kermanshah his headquarters while working at the Rock of Bisitun, a part of the snow-capped range in the background (page 835).

"What is your name?" I asked.

"Hussein," was his reply.

The humor of the situation struck me at once. There are two patron "saints" to the Persian Moslems. Their names? Ali and Hussein!

For three days these boys worked with me upon the scaffolding, but unfortunately Abdul Ali soon found other interests. When I tried to replace him, again my pleas for assistance, regardless of the wages offered, fell on deaf ears. The work was still "too dangerous."

#### Checking Texts of 12-foot Columns

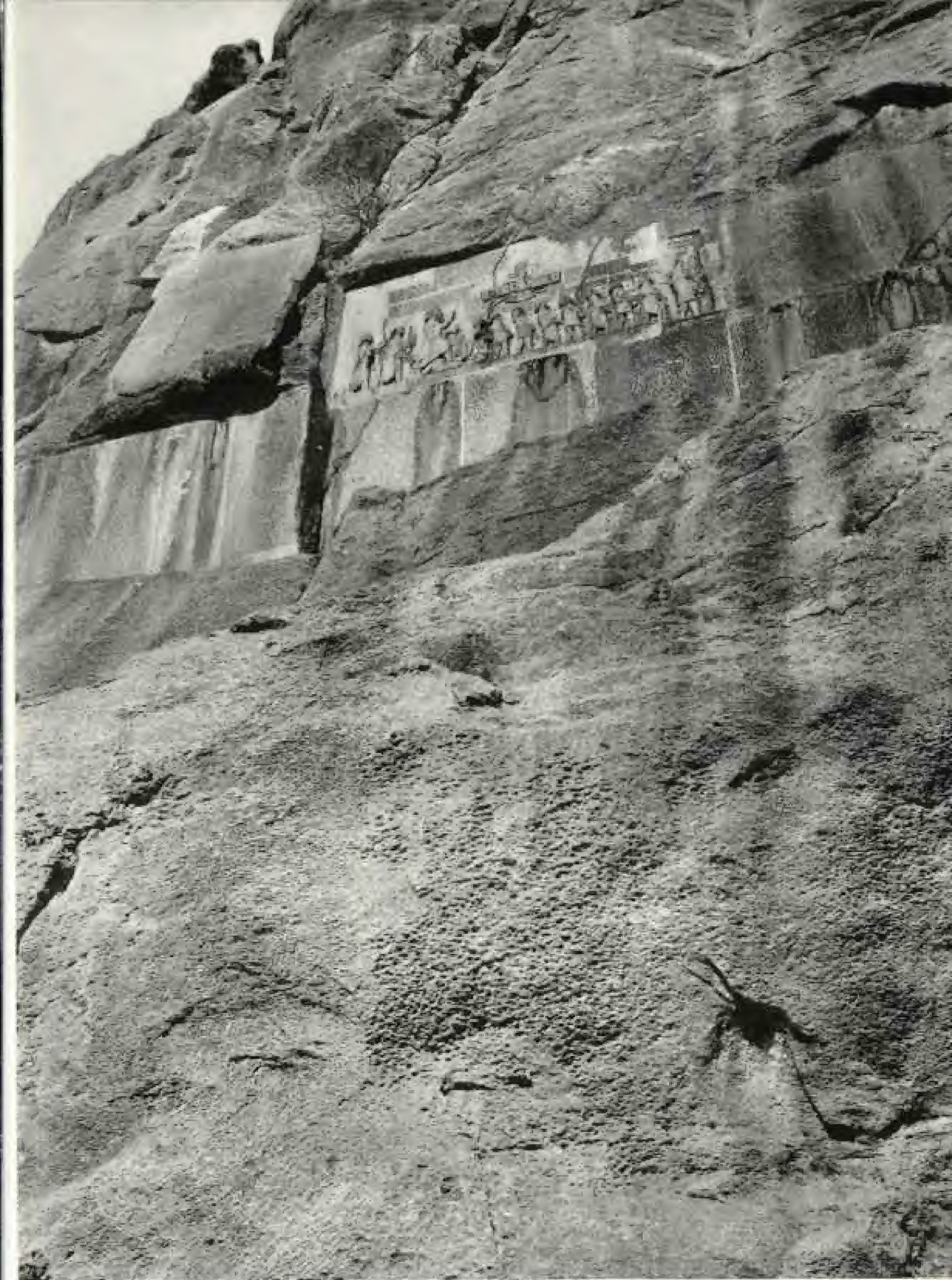
In these straits my son Thomas, not yet 15 years old but eager to contribute to the project, volunteered. From that day on, the Persian Hussein, Tom, and I worked from the scaffolding, made our copies, and fought the winds, rain, and cold that all too soon began to interfere (pages 837, 841).

A major goal was to recheck all previous readings of the copy of Darius's story which is written in Old Persian. This is carved directly beneath the relief in five vertical columns, each of which, except for the last, measures about 12 feet high.

At first sight, this portion of the monument appeared to be infinitely more unreadable than it had been more than 100 years ago when Rawlinson copied it, and even more damaged than when King and Thompson worked upon it. A horizontal fissure above the columns, but beneath the relief, was obviously responsible for part of the damage, for this was actually the exit of an underground "river."

After a rain lasting less than seven hours, for instance, water issued from the fissure and washed down across the face of the inscription for more than 52 hours. Since the rock itself was limestone, centuries of tumbling water had eaten it away to a depth at times of five or six inches—and of course all the writing upon such spots is now gone.

But all inscriptions beneath its path had not disappeared. Although the water has dissolved the limestone at the top of each column, that limestone has itself been deposited, upon the face of the inscription, lower down! Where once there had been wedges or signs carved into the rock, signs long thought to be destroyed, there was now a solid deposit of rock. This was not "destruction" at all, but preservation! It was a stalactite (geologically speaking, a



### Darius's Monument to His Own Glory Reflects the Pageant of Ancient Persia

Old Persian, Babylonian, and Elamite, three tongues long forgotten, recorded the King's achievements. Their decipherment solved the riddle of the cuneiform (wedge-shaped) scripts and threw light on histories of Babylonia and Assyria (page 825). Bisitun thereby became Asia's Rosetta Stone (the Greek key to Egypt's hieroglyphs).

tufaceous) formation over the surface of the original inscription.

We were in a position somehow to "erase" this sedimentary deposit, but how were we to remove it without damaging the signs beneath it?

Acid was certainly not the solution. Acid would eat away not only the deposit left in each cut wedge, but also the solid rock itself. A hammer and plain water was our answer.

By delicate hammering through the surface deposit I could reach the original rock surface. Then I could rub a moistened cloth across the face of the invisible wedges. As the water evaporated, there was a difference in coloration between the original rock and the filled-in wedges. Sign after sign, word after word, thus became evident!

Sometimes our problems were solved in a disconcerting manner. For instance, there was a phrase in one line which for two generations had been the subject of debate among scholars. It was quite clear that Darius was saying something about one of his henchmen, but no one had been able to read it.

When the passage came clear in our work, we were reminded only of the "vanishing Yebudi, the little man who wasn't there." For Darius merely says, "At that time my servant was not there at that place"!

Thus some gains are in reality small or insignificant.

Others, however, contribute more to our knowledge, such as a new reading in which the King declares, "Now do you believe what I have done, [even] this [story]; to the people tell it, do not conceal it."

This passage, also long fought over by orientalisists, intrigued us much, for we were indeed endeavoring to carry out Darius's wishes.

#### Boulder Nearly Causes Tragedy

The way rocks might fall from the cliffside was indicated when, one day, Hussein was sent to the shelf high above, while I remained upon the ledge. At a given signal he was to swing the cable over a projecting rock, and I was to do the same on the ledge below. The signal was given, we swung in unison, and I heard a sinister rumble above me, that of a falling boulder.

For me upon the ledge, as for my wife and sons below, there was no shelter. I gave a cry of urgent warning and flattened myself against the face of the inscription. The large boulder hurtled by, hit the ledge, and seemed to explode. All of us were struck by some of the tiny fragments; but the overwhelming relief that flooded us, as hurriedly

each responded to the other's call, can well be imagined. We never tried to move the cables in just that way again.

The ledge beneath the Old Persian version varies in breadth from 5 to 6 feet; to the left it continues beneath the Babylonian and the second Elamite copies, although it is not quite so broad. To the right of the Old Persian text there is at present no ledge whatsoever. Above this portion of the monument, at the height of the sculptured panel, are the four columns of texts never before copied, and of which not even the language was known.

Carefully, from the shelf above, we adjusted the positions of our cables and then, returning to the now familiar ledge, raised the scaffolding so that it stood in front of a part of this hitherto unknown text.

What would it tell us?

First glance showed that this text was frightfully weathered, damaged in part beyond recovery. Yet here and there signs came clear, and they were Elamite signs.

I began to read, "And Darius the king says: a man named Phraortes . . ." and realized that the text was duplicating what, in a much better state of preservation, appeared beneath the Babylonian version below and to the left of the relief!

We moved from the first to the second column, from the second to the third, and continued to read in Elamite. Finally we moved to column four—and there was no change in language or in phraseology; sign after sign, word after word, this text was a duplicate of the other well-known Elamite inscription!

Naturally, I was disappointed, for my hope of finding a new inscription of Darius was gone. Still, there was certain gain: by determining what was here written, we had unlocked a door that, until opened, would always be tantalizing. Furthermore, by copying this text also we could unquestionably improve the reading of the known Elamite text which had been copied by others and which was still to be secured by us.

#### Text Transferred to Latex

Our copying technique involved photography, our eyes and hands, and a latex solution. Photographs were easily made from the scaffolding. On paper my hands copied what my eyes could see. With the latex compound, however, we were able to make molds which any scholar could read and trust, and which reproduced every sign as it was made by the ancient sculptors, or, rather, as it appears today (page 837).

We first cleaned the rock surface with soft





Thomas Cameron, the Author's Son, Measures the Ledge Where the Carvers Stood

This platform, 5 to 7 feet wide, lies some 100 feet above the highest point to which Dr. Cameron could have climbed without his scaffold, whose shadow here falls on the rock. A mold whitens an Old Persian text.

brushes, then applied successive coats of the liquid. The first, very thin, dried within 10 or 15 minutes. Over a second coat we laid thin strips of gauze and painted this again with a third coat, which was dry in less than an hour. Upon a thicker, fourth coat, to give body to our mold, we laid strips of burlap bags or sacking, which we then painted for the fifth and last time. After 24 hours we loosened the edges, peeled our mold from the rock, rolled it up, and carefully lowered it to the ground.

This hitherto uncopied text extends for 22 feet across the face of Bisitun. Our scaffolding measured but 16 feet long, but three feet in from each of its ends was the winch by which the platform could be raised or lowered. Necessarily, then, we often found ourselves working on one of the outside ends, beyond the winches, where there was no guardrail.

The position was not automatically dangerous, except when we reached out beyond the end itself, although we were always fully aware that a slight slip would project us onto

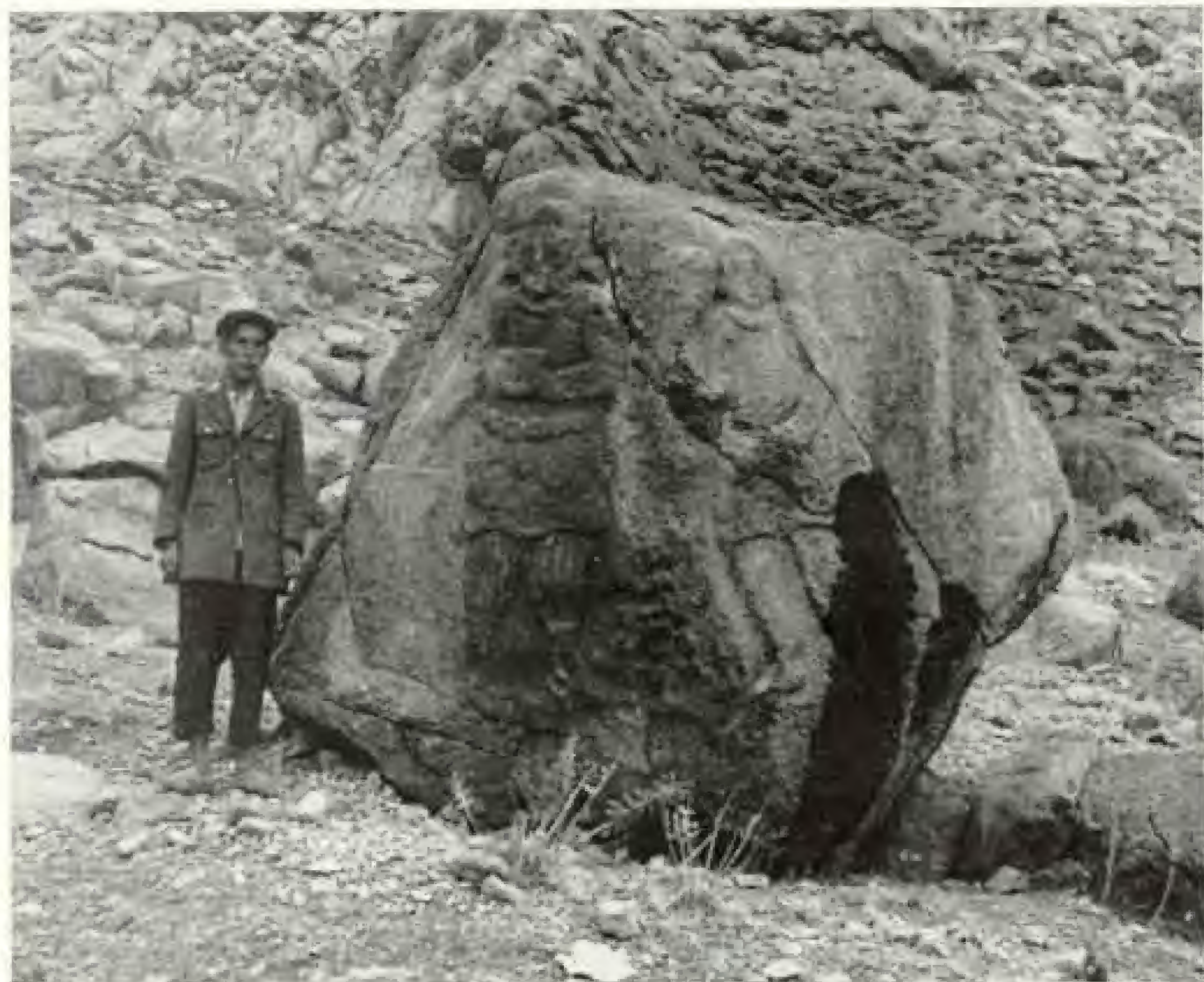
the rocks far below. One day, as Tom and I were so engaged, he pulled me back just in time and made the soothing and quite truthful remark, "Dad, if you fall, I'll never speak to you again!"

#### Wife and Son Stand Watch

Down below us, as frequent glances assured us, were my wife Frances and son Douglas, who daily rode with us from Kermanshah in our jeep. Promptly at noon each day, Hussein, Tom, and I descended the path and ladder to eat a family lunch with them on the mountainside; otherwise, they watched and waited hopefully for the safe and successful ending of each day's work.

They cut our rolls of gauze and bags of burlap into thin strips for easy application, and tied them to ropes by which they could be pulled up to the scaffolding.

Later, for the gauze, we substituted woven native cloth which could be bought in the colorful bazaar of Kermanshah.



### What Mighty Monarch? Who Carved His Figure on Bisitun Boulder?

The bearded, cap-bearing king, flanked by attendants, left no identifying inscription, but he is believed to have followed Darius by a thousand years. If so, he was a Sassanid, one of the dynasts (A. D. 226-641) who restored Darius's monotheistic faith to its ancient purity. Invading Arabs in 641 overthrew the Sassanids and their religion, Zoroastrianism, named for its prophet, Zoroaster. A faithful few, refusing to accept Mohammed as their prophet, fled to India. There their descendants, known as Parsis, maintain ancient Persia's sacred fires. Hussein, a modern Persian, stands beside the monolith.

Each of us was heavily laden as morning after morning we trudged up the mountain-side and climbed over massive rocks to reach the foot of the ladder. We carried up Mount Bisitun water, latex, brushes, food, extra clothing and blankets, as well as a dangerously fragile but important bottle of concentrated ammonia for thinning the latex solution.

Occasionally, as the wind shifted, it wafted to our nostrils a delicate perfume from tiny clusters of mountain flowers wedged in shallow crevices high up the spongelike rock. Sometimes we interrupted our lunch or labor to watch the antics of foot-long lizards clinging to the vertical rocks, or to observe the startled birds into whose nesting places, in crags around the sculptures, we were intruding.

Even more interesting was the pageant that unrolled below us, where the road wound along the foot of the mountain and twisted and

turned through the plain. There we could see the tea and coffee houses, police post, and school groups around the life-giving springs whose waters nourished a clump of trees and fed the half-fertile soil.

Down the road from the near-by village came Kurdish women, gracefully erect, shy, yet proud, each head crowned by a jar to be filled with water. There too herds of sheep and goats wended their way along the road to distant pastures, or patient donkeys laden with farm produce plodded wearily to market.

### Called "Fools" by Unappreciative

Buses and private cars, Baghdad-bound, spilled their passengers out for a stretch, a cup of tea at the near-by teahouse, and, for some, a climb partway up the mountain to see what these "foreigners" were doing. One—and an American, at that—whom we later met

in Baghdad, unwittingly asked us if we knew who the "fools" were who, when he passed Bisitun, had been clinging to the precipitous sides of the mountain!

Far across the plain, another mountain range lifted its rugged and soon snowy crest.

For 10 of our 21 days at Bisitun the weather was delightful, and crowds often gathered to watch our progress. After that, however, we had to fight the elements.

First came the winds, buffeting our little scaffolding so hard that at times we felt like circus performers, flying through the air with great ease.

One grievous day a page torn from my notebook scudded across the 52-foot length of ledge, and then, at terrific speed, began to go straight up the mountain. It was thousands of feet to the peaks above, and we seemed to see it go over the top. It was at one of these times, I believe, that Tom and Douglas gave Superman's urgent cry, "Up, up, and away!"

Then came clouds, rain, and cold—clouds that blanketed Bisitun in mist, with snow on top, and rains that drenched us, slowed our progress, and made our work almost a nightmare.

#### Hard to Keep Warm

One bitterly cold day, when Hussein appeared for work dressed only in a thin shirt and pair of trousers, we lent him a coat and a blanket, and still the brave lad's teeth chattered.

Thereafter, as often as possible, I worked alone upon the scaffolding, although there seemed to be no way that one could keep warm. In addition to underwear and socks, two pairs of trousers, shirt, and sweater, all of wool, I wore an army coat and a native sheepskin jacket and still needed, thrown round my shoulders, an army blanket, which the wind was loath to leave in place.

After completing our examination of the Old Persian and first Elamite texts, we moved cables and scaffolding to the left of the relief to recheck readings of the second copy of the Elamite inscription. This done, we prepared to raise the scaffolding above the huge outjutting rock which, on two faces, bears the story of Darius as written in Babylonian. This, we knew, was a dangerous undertaking.

It was next to impossible to prevent the upper part of the winches from jamming up into the overhang. Also, as Rawlinson correctly noted a century ago, the mass of rock on which the inscription is engraved bears "every appearance . . . of being doomed to a speedy destruction, water trickling from above

having almost separated the overhanging mass from the rest of the rock, and its own enormous weight thus threatening very shortly to bring it thundering down into the plain, dashed into a thousand fragments."

Inch by inch we tried to ease the scaffolding up over the "hump," and time after time the overhang foiled us. Once, when the scaffold was sharply tilted, a cable somewhere above slipped over another overhang, and we were tipped at an even more alarming angle. Slowly we righted our fractious "craft" and made a fresh and, this time, a successful ascent.

With the latex solution we were then able to obtain a new and better copy of this portion of the inscription.

#### Sculptures Carved with Skill

Our work was nearing a close, but we had still to examine the reliefs and to follow the ancient path to its onetime end.

Viewed from the ledge or from the ground below, the sculptures appear to be carved roughly and without much skill. This is by no means true. In fact, they compare favorably with the famous reliefs executed at Darius's royal capital, Persepolis, 450 miles to the southeast.\*

Those at the capital were intended for public gaze: past them, on every New Year's festival, marched kings and princes bearing tribute from lands near and far. Those at Bisitun, on the contrary, are placed high up the mountainside where the life-size figures of the King and his guards appear diminutive, almost infinitesimal. Nevertheless, these same figures are excellently conceived and carefully executed: fingernails, beards and mustaches, bracelets, bows, even shoes are skillfully delineated (pages 830, 836).

With royal disdain, Darius stares at the nine rulers whom he conquered, and tramples with one foot his archenemy, Gaumata. The King's beard, frizzled and curled, is a separate block of stone set into the rock; it is held in place by two iron pegs, leaded in. One peg, thrust into a hole bored in the living rock, starts in his neck and ends in the inset block; the other begins in front of his mouth.

All the orifices or openings were once filled with lead.

Other inset pieces add detail and beauty to the shoulder and the bow of Darius, to the bow of one of his guards, and to the crown of the figure of the winged god, Ahuramazda. Jutting out more than three inches from the

\* See "Exploring the Secrets of Persepolis," by Charles Beaudouin, NATIONAL GEOGRAPHIC MAGAZINE, October, 1933.

god's crown may still be seen an iron peg, encircled with lead; once, no doubt, the peg was surmounted by a silver or gold ball which glittered in the sun to indicate deity (p. 829).

Above the relief, an inscription bears Darius's proud boast of his kingship and royal descent. The wedges by which the names of his ancestors were cut into the rock were themselves filled in with lead so that they too could add luster and dignity.

The local villagers may even preserve some faint memory of the brilliant ornaments that once made of this monument a still more magnificent spectacle, for an interesting rumor fanned out over the countryside as we worked upon the relief.

The rumor arose when, one day, my wife appeared at the Rock wearing a dress trimmed with gilded buttons and a braided goldlike belt. "The American," it was reported, "has given to his wife a gold belt from one of the figures of the nine dervishes!"

#### Modern Riflemen Damaged Figures

Here and there we could see signs of willful mutilation in the relief, all done in modern times by the bullets of passing riflemen. Because of this, and because of damage to the inscriptions caused by the underground streams of water, the Iranian Government has most properly sought some method by which the life of the sculptures and writings at Bisitun might be preserved.

In times past, when queries of this sort have been directed to scholars, the only answer they knew to give was, "We must preserve them by recording them as accurately as possible."

Our expedition, however, managed to preserve a portion of the relief in even better fashion: by making a mold of the noble figure of Darius, a guard, and the "liar" Gaumata. From that mold, in time, a cast will be made, and so the Great King may stand before peoples in America or elsewhere just as he has stood for almost 2,500 years on the Rock of Bisitun.

At long last, we were ready to trace the full course of the old path by which Darius's sculptors reached the spot on the mountainside almost inaccessible today. Slowly, cautiously, Hussein and I moved across the deliberately smoothed or scarped surface 60 feet around the mountain's face to the point where, perhaps, that path might once have had its beginning. A pleasant surprise awaited us: here was a level platform, with two steps leading downward.

In the top step holes had been cut, doubtless for the purchase of wooden rails. Below the

second step there was nothing but a vertical descent, for the stairway also had been chiseled away completely. But now we knew almost the full explanation of the method by which the Persians themselves had attained the heights.

#### Four Goals Attained

All four goals were thus achieved: we had copied the four hitherto uncopied columns; we had checked all three texts which had previously been copied (and solved many difficulties in each of them); we had photographed, examined, and taken molds of the relief; and we had been able to determine the method by which the Persians had reached the heights to carve their handiwork.

Then came the final day when, for the last time, we stood upon the ledge. My hands touched gently a portion of the inscription which our labor had clarified.

"Says Darius the king . . . if thou shalt not conceal this edict, but shalt reveal it to the people, then shall Ahuramazda be thy friend, there shall be to thee a large family, and thou shalt live long."

It was a pensive moment.

American and British corporations had given of their materials and of their time; the American Schools of Oriental Research and the University of Michigan had granted me the opportunity; and I and my family, with the help of a little Persian boy, had added our energy and skill. We had all been struggling to achieve the same goal—a recording of Darius's monument for posterity—and the Great King's blessing now seemed to be addressed directly to us!

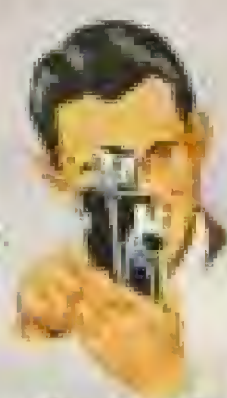
Slowly, Hussein, Tom, and I descended the pathway and climbed down the ladder. As we reached the ground, our hands gave a gentle pat to a low bush beside the ladder, a bush covered with small pieces of cloth tied there by countless prayerful souls beseeching Allah for a son. We too uttered a silent prayer, but one of thankfulness that our labor, now ended, had been successful.

For the last time, as a family group, we looked up once more to the majestic figure of the King of Persia. Then, hand in hand, touched by the last lingering rays of the sun, we let our eyes wander over the beautiful panorama of sky and mountains, plain and village below us. As we stood thus, the school bell pealed and the next generation of boys of Iran issued from the door of the schoolhouse far below.

Our day, our work here, was done.

For additional articles on Iran, see "NATIONAL GEOGRAPHIC MAGAZINE Cumulative Index, 1899-1909."

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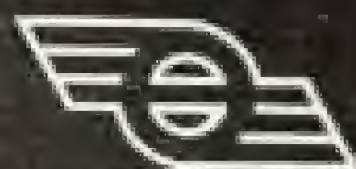
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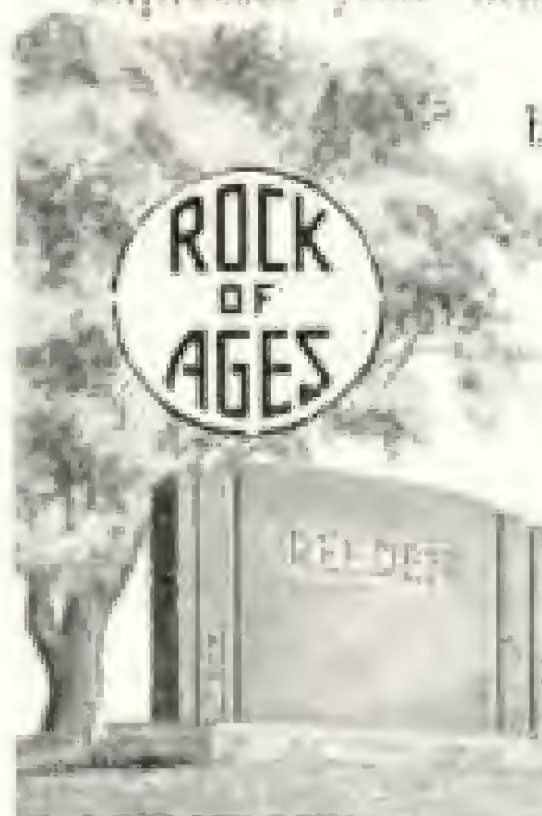
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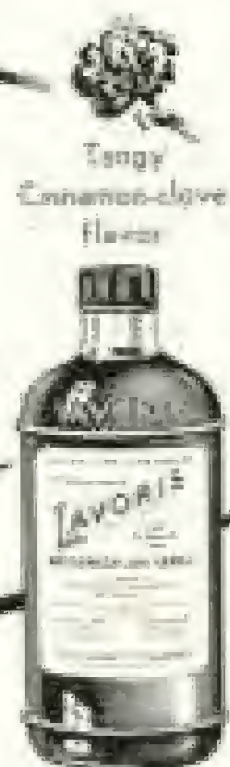
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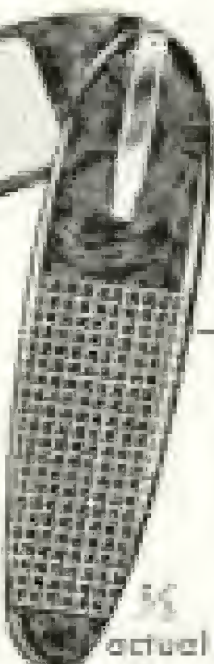
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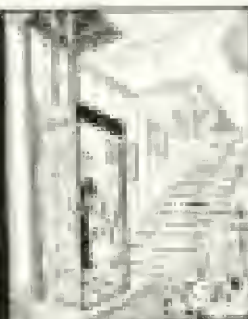
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"Ooooh! Yesss!" said Billy.

So the telephone man got the Central Office and asked Santa Claus to come to the telephone if he wasn't too busy making toys. Said there was a nice little boy named Billy who wanted to talk to him. By now Billy's eyes were big as saucers, but quick as a flash he had the receiver to his ear. Next thing he knew, he heard a voice saying—

"Hello, Billy. This is Santa Claus."

"Where . . . are . . . you?" asked a breathless little voice.

"The North Pole," said Santa.

"Is it cold up there?" Etc. Etc. Etc.

They talked for several minutes and there wasn't a happier lad in all the land than Billy. You can just bet those telephone people were pretty happy about it too.

**THIS IS A TRUE STORY** of how a telephone installer spread gladness among little boys and girls wherever he found them in the homes he visited during the pre-Christmas period. . . . Nobody asked him and his Santa Claus conspirators in the Central Office to do it. It was their own idea—and just another example of the friendly spirit of telephone people. . . . Wherever they are, and whatever they do, they aim to serve you not only with efficiency but with courtesy and consideration as well.

**Bell Telephone System**



# TIME IS THE ART OF THE SWISS



*No finer gift than a fine Swiss watch*

Measure, if you can, the value of such a gift! A fine watch has reason to be proud of its Swiss origin, of its meticulous workmanship, its unrivalled beauty. For 300 years, Swiss craftsmen, intent on measuring time, have kept *ahead* of time in designing watches. And the fine Swiss watch your jeweler will help you choose is made as though the reputation of Switzerland depended on it alone! *For the gifts you'll give with pride, let your jeweler be your guide.*

The WATCHMAKERS



OF SWITZERLAND



*A fine Swiss watch goes through almost 2,000 operations, represents weeks of precision crafting and microscopic inspection. And you may be sure it can always be serviced economically and promptly.*



“For Santa”

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