VOLUME C NUMBER FIVE

THE NATIONAL GEOGRAPHIC MAGAZINE

NOVEMBER, 1951

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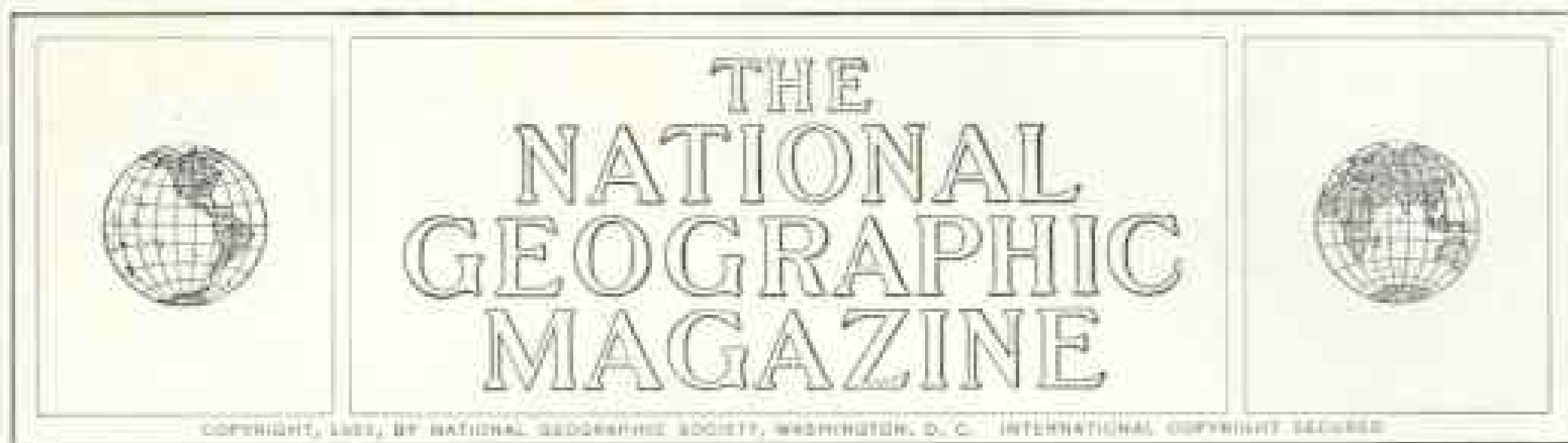
Sixty-four Pages of Illustrations in Color

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

$6.00 A YEAR — 60¢ THE COPY

Vol. C, No. 5 WASHINGTON November, 1951



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The DAR Story

By Lonnelle Aikman

With Illustrations by National Geographic Photographers B. Anthony Stewart and John E. Fletcher

IN DOWNTOWN Washington, D. C., showplace of the marble and limestone giants of Government,* stands a gleaming colossus dedicated to what 154,000,000 Americans regard as the world's most successful revolt.

Headquarters of the National Society of Daughters of the American Revolution, its three-buildings-in-one add up to the biggest and most beautiful structure which women have ever raised. It is staffed, with the exception of a few maintenance workers and a business manager for the rental of its auditorium, exclusively by women.

One might say that the national home of the "Daughters," as they informally call themselves, is a monument to woman's consistency. For the organization it houses has held throughout its lifetime to the undeviating principles of Americanism on which it was founded.

From this nerve center lines of feminine leadership and guidance reach out to 170,000 members in every State of the Union, as well as many abroad. Devotion to the heritage of the past is a pattern that shines through the warp and woof of all the Daughters' accomplishments. Heroines of the American Revolution—Molly Pitcher, Hannah Arnett, Deborah Sampson, and the rest—have their own special niches of fame at headquarters' appropriate D Street address, No. 1776 (page 566).

But DAR work, carried on through a network of chapter, State, and national committees, is by no means limited to the ancestral. In one way or another it touches nearly every phase of current American life, whether civic, educational, health, or national defense.

Behind the classic front of the DAR in Washington buzzes a surprising variety of activities. Not only are there rows of offices for the many chores one would expect in running the country's leading women's patriotic association; there are also 28 historic rooms, a museum, and an extensive genealogical library.

The unique DAR concert auditorium, with a seating capacity of almost 4,000, is the largest in the city (pages 584-5). Between annual sessions of the Daughters' conventions it serves the Nation's Capital as a cultural center. There, before large and appreciative audiences, are presented symphony concerts, lectures, ballet, folk singing, debates, and a wide variety of other programs whose performers may range from world-renowned artists to Washington's own Very Important Persons, lending a hand for a benefit amateur night.

National Geographic Lectures Held at Constitution Hall

Members of the National Geographic Society have a special interest in the DAR auditorium. Since 1933 Constitution Hall, as both auditorium and building are called, has been the familiar setting for The Society's weekly winter-season lectures (page 573). Even before that, the old auditorium in Memorial Continental Hall was used to present such outstanding lecturers as the great British explorer, Sir Ernest Shackleton, returned from Antarctic exploits.

Veteran members of the National Geographic Society can recall many exciting evenings when trail-breaking explorers, scientists,

* See, in the National Geographic Magazine: "Washington: Home of the Nation's Great," by Albert W. Atwood, June, 1947; "Washington, Home City and Show Place," by Leo A. Borah, June, 1937; "Wonders of the New Washington," by Frederick G. Vosburgh, April, 1935; and "Washington Through the Years," by Gilbert Grosvenor, November, 1931.

DAR Headquarters in Washington, D. C., Carries the Appropriate Number, 1776

This massive three-in-one combination—Memorial Continental Hall, Constitution Hall, and their connecting link, the Administration Building—forms the largest structure ever raised by women. The Administration Building, standing at 1776 D Street, bears the Declaration of Independence date.

and aviators reported adventures that opened up new horizons of man's knowledge, from North Pole to South Pole, from the depths of the sea to the stratosphere.

Prominent on the star-spangled list of those who have spoken in Constitution Hall are the bright names of MacMillan, Byrd, and Beebe; General of the Armies of the United States John J. Pershing, and General of the Air Force H. H. Arnold; Lowell Thomas, back from Tibet; Auguste Piccard, who dared the stratosphere to study cosmic rays; and U. S. Army airmen Albert W. Stevens and Orvil A. Anderson, who won the world's altitude record in a stratosphere balloon.

At an early gathering in 1932, one of the most distinguished audiences ever brought together under one roof witnessed the presentation to Amelia Earhart of the National Geographic Society's Special Gold Medal, honoring her solo flight over the Atlantic.*

It was by no accident then that President Hoover, in making the award on behalf of The Society, described the tragically destined aviatrix as belonging "in spirit with the great pioneering women to whom every generation of Americans has looked up."

To see DAR headquarters "whole," I drove slowly, one evening at dusk, around the full city block it occupies in the shadow of the Washington Monument. An endless chain of winking headlights from homeward-bound traffic lent an air of mystery, of shadow and substance, to the stately-columned façade of Memorial Continental Hall. Beyond stretched the simple, horizontal lines of the connecting Administration Building; still farther loomed the great square of Constitution Hall, with its massive entrance steps and broad, Ionic-pillared portico.

Continental Congress Draws Thousands

Each spring more than 4,000 delegates converge on these buildings to attend the Continental Congress, the DAR national convention which has become as much a part of the Capital scene as the cherry-blossom festival. The spring date itself is a symbol of DAR feeling for American history. The Daughters permanently reserve Constitution

* See, in the National Geographic Magazine: "My Flight from Hawaii," by Amelia Earhart, May, 1935; and "Society's Special Medal Awarded to Amelia Earhart," September, 1932.

Hall for themselves during the week that includes April 19, date of the Battle of Lexington.

Curtain raiser for the Congress is the formal opening at Constitution Hall (pages 584-5), resplendent then with flags and flowers, with pretty pages, jeweled badges, ancestral bars, and broad official ribbons of blue and white, taken from the staff colors of General Washington.

Patriotic speeches by DAR leaders and distinguished guests are the order of the day. Often the President of the United States addresses the gathering. In fact, since the National Society was founded, virtually every President, at least once during each administration, has either spoken at the Continental Congress or sent his good wishes (page 571).

George Washington Slept Here

The Daughters have set up more than 12,000 plaques commemorating Revolutionary homes, trails, graves, and battlegrounds (page 579). Washington was a frequent visitor at the Capital's 2618 K Street when the house belonged to Thomas Peter and his wife, Martha Parke Custis, granddaughter of Martha Washington. The general's diary tells of a stop here in November, 1799, a later date than that shown on the marker.

On April 19, 1951, occurred one of the big dramatic moments of DAR history. It happened that this Battle of Lexington anniversary was also the day when General of the Army Douglas MacArthur returned to the Capital to make his now famous "old soldiers" speech before the joint meeting of the U. S. Congress. Slipping away from the welcoming Washington crowds a little later, he came to Constitution Hall to address the Daughters gathered there for their Sixtieth Continental Congress (page 582).

"I determined to stop by," said the general, "to avail myself of an opportunity I have long sought personally to pay you the tribute that is in my heart.

"Of all the great societies of the country during the past century, I know of none which has fought more diligently for the preservation of those great ideals which bulwarked our forefathers in their efforts to secure and preserve freedom. . . . In this hour of crisis all patriots look to you. Good-by."

Behind the emotion-packed high spots of such sessions and the patriotic pageantry that marks all DAR conventions, the practical, basic work of each annual meeting goes on—election of officers, committee reports, drafting of resolutions, and other acts of leadership by which the Daughters carry out their now Nation-girdling programs.

In the crumbling yellowed pages of old issues of the *Evening Star* and *Washington Post* one can trace the modest beginnings of today's strong and influential society.

DAR Founding Spurred by Indignant Woman

During the summer of 1890 an open letter in the *Washington Post* attracted public attention and spurred the first formal and united action. The date was July 13, in a peaceful horse-and-buggy year when an editorial writer could point to the development of a new "dynamite gun" so frightful in its destructiveness that it would discourage future warfare.

Looking past this and other timely items of that quiet Sunday morning, *Post* readers came on a strongly worded letter from an indignant woman. The writer was a Capital resident, Mrs. Mary S. Lockwood. Like many thoughtful women of the time, she felt that feminine exclusion from membership in the

Genealogical Detectives Track Down Family Ties in DAR's Flag-decked Library

Theater boxes remain from the days when the high-ceilinged room was the DAR auditorium, used for conventions and other gatherings. Not only members but lawyers and hobbyists make use of the library's facilities (page 591).

lately formed patriotic organization, Sons of the American Revolution, was not only a discrimination against her sex but a failure to honor properly the heroic part women played in the Revolution.

"One-sided patriotism," Mrs. Lockwood called it. "Were there no mothers of the Revolution?" she asked. "Were these sires without dams? I trow not . . . I have heard of a man," she added caustically, "who had a dam by a mill site, while he had no 'mill by a dam site.' But I have yet to hear of a man who had a Revolutionary sire without a dam by the home site."

To clinch her point, she told of Hannah Thurston Arnett, who lived in Elizabethtown, New Jersey, during the desperate days of December, 1776. When a group of American leaders, including her husband, met at the Arnett home in a despairing council that leaned toward acceptance of the British offer of amnesty, she rekindled courage and the will to resist by denouncing would-be traitors to the Revolution. She even threatened to leave her own beloved husband if he should forsake the cause.

"On the roll of honor," Mrs. Lockwood concluded her letter, "are the names of men who fought for their country and won distinction afterward, who were in this secret council. . . Where will the sons and daughters of the Revolution place Hannah Thurston?"

The answer was the founding of the DAR.

Man Volunteers Aid

Interested Washington women, rallying to the support of Mary Lockwood, immediately began taking steps to form a society that would do honor to the Hannah Arnetts.

From Newark, New Jersey, came another open letter to the *Washington Post*, from a great-great-grandson of Hannah Arnett and one of the leaders of the women-excluding Sons of the American Revolution. Its writer, William O. McDowell, volunteered to help with the practical details of arranging meetings, adopting a national constitution, and electing officers. After his part was done, he promised he would turn the job over entirely to the leaders of the budding organization.

After various preliminary conferences during that hot Washington summer, the first official meeting of the DAR was held on October 11, 1890. The date chosen, the eve of the anniversary of Columbus's discovery of America, had been suggested by McDowell as particularly appropriate, since it was the generosity and wisdom of a woman, Spanish Queen Isabella, that provided Columbus with the means of outfitting a fleet for his perilous voyage.

Eighteen women signed up for membership at the first DAR meeting, including the four later officially recognized as founders—Mary S. Lockwood, Eugenia Washington, Mary Desha, and Ellen Hardin Walworth.

A constitution was adopted. Caroline Scott Harrison, wife of the President of the United States, was elected President General (pages 581 and 583). Eleven members contributed $3 each in dues.

The National Society, DAR, was launched —with a treasury of $33 and an uncharted future.

Founders' Promises Fulfilled

The new organization's aims were packaged in an elastic phrase, "patriotic, historical, and educational." As stated in their constitution, the founders resolved "to perpetuate the memory and spirit of the men and women who achieved American independence." They would do this by raising monuments, protecting historic spots, encouraging Revolutionary research, preserving historic documents, and promoting celebrations of patriotic anniversaries.

Further, they would "carry out the injunction of Washington in his Farewell Address: 'to promote . . . . institutions for the general diffusion of knowledge,' thus developing an enlightened public opinion and affording to young and old such advantages as shall develop the largest capacity for performing the duties of American citizens." They would "cherish, maintain, and extend the institutions of American freedom; foster true patriotism and love of country. . ."

Today's Daughters can look back on six decades of literal fulfillment of the promises made by their society's founders.

They have restored hundreds of historic buildings and raised and marked patriotic monuments all over the country. They have collected an immense amount of Americana; encouraged good citizenship and patriotism among the young by thousands of special awards and large and continual contributions to educational facilities. They have founded and maintain two schools of their own in isolated mountain regions.

"It would take hours to tell you all about the thousand-and-one programs we now have under way," said slim, blue-eyed Mrs. James B. Patton, of Columbus, Ohio, current President General (page 581).

"Fundamentally, of course, our work is for 'God, home, and country.' But we are not afraid to be out in front fighting for what we believe in . . . Now everyone has come around to what we have been saying for years—that our country is threatened by frightening, un-American forces, by enemies within and without. By spreading light on the American ideal

The DAR Preserves Yorktown's Old Customhouse

Built in 1706, this building was the first customhouse in the American Colonies. Here papers were issued to skippers wishing to land cargoes at various ports. After serving in a number of capacities, the house was bought in 1924 by the DAR's Count de Grasse Chapter and opened as a museum. It commemorates the career of a gallant Frenchman who helped write the victory chapter of the independence struggle.

Francis Joseph Paul, Count de Grasse, was placed in command of a French fleet in 1781 and sent to the aid of the Americans. With 28 ships and several thousand troops he sailed from the West Indies for Chesapeake Bay, arriving late in August. The soldiers and some of the vessels he sent to the York and James River fronts.

De Grasse's fleet, repulsing a British naval force, set up a blockade that prevented reinforcements from reaching Cornwallis's beleaguered army at Yorktown.

George Washington, on hearing of the Frenchman's death in 1788, wrote: "His name will be long deservedly dear to this country."

"We Shall Fight to Preserve Freedom . . ." Harry S. Truman

DAR officers and distinguished guests fill Constitution Hall's big stage. Recording Secretary General, Mrs. Warren Shattuck Currier, reads President Truman's greetings to the Sixtieth Continental Congress.

"I wish," said the message, "that all our citizens would join with your society this year in paying homage to the ideals on which our Nation is founded. . . . It is the task of the free world . . . to defend, with armed force if necessary, this continuing liberation of the human spirit . . ."

Past Presidents General (far left) are distinguished by broad official ribbons (page 581). Vice Presidents General (right) wear narrower bands.

we hope to help others to see more clearly through the fogs of Communist propaganda that surround us on every side."

Back in 1890 the time was ripe for the development of an organization such as the DAR. Patriotic fervor, revived around the 1876 celebration of the first hundred years of independence, had merged with an expanding Nation's pride in "manifest destiny." Women's clubs were growing and federating, and enthusiasm was perking for various national organizations working toward woman suffrage and other feminist causes.

So the DAR grew and prospered. By 1900 there were some 30,000 members meeting the requirements of direct lineal descent from ancestors who, "with unfailing loyalty" in military or civil capacity, had served the cause of American independence.

"Foolhardy Women" Build Well

In 1902, when enrollment had risen above 38,000, need for a national headquarters was unmistakable. Ignoring remarks about "foolhardy women," the organization purchased a portion of the undeveloped and swampy land north of what is now Constitution Avenue, at the edge of Washington's Mall.

This land had once been part of the huge tract owned by the "obstinate Mr. Burns," as George Washington, misspelling his name, called the crusty old Scot who was the last to sell his property for the use of the Capital that was to open for business in 1800.

Later, one of Washington's early mayors, Capt. Thomas Carbery, built a pleasant residence on the DAR site-to-be. The old Burnes cottage and the Van Ness mansion erected beside it were other landmarks of the area.

The DAR Memorial Continental Hall, however, was the first private building of national scope to rise in the vicinity of the White House, Treasury, and the old State, War, and Navy Building.

This area now contains nearly a dozen huge Government and semipublic structures, including the handsome buildings of the American Red Cross and the Pan American Union.

The cornerstone for Continental Hall was laid in 1904, with the same historic trowel used by George Washington more than a century earlier to dedicate the foundation of the National Capitol.

That women could get things done in a hurry was proved in 1905, when enough of the building was ready to hold there the Fourteenth DAR Continental Congress.

Gradually, over the next quarter-century, the rest of the mammoth headquarters took form.

First, in gleaming Vermont marble and granite, Memorial Continental Hall stood complete, with broad stone terraces and three handsomely columned porticoes (page 596).

Inside was the original auditorium, patterned after an old town meeting hall and seating 1,600. Reaching to the roof, surrounded on three sides by galleries, this auditorium saw 20 sessions of Continental Congress between 1910 and 1929. It even witnessed a little world history, in 1921, when the hopeful Washington Conference on the Limitation of Armaments held meetings there.

Meantime, more ground had been bought to provide additional space for ever-expanding activities. Adjoining Continental Hall, the Administration Building was opened in 1923, with 32 rooms to house the growing executive and clerical staff.

But already the Daughters were beginning to crowd their old auditorium. So, step by step, as the contributions piled up from faithful members and chapters around the country, Constitution Hall came into being. Completed in 1929, it provided a tailor-made meeting place, built and equipped to fit the needs of the huge annual gatherings.

On the grounds that same year another long-term project came to fruition, a memorial to the organization's founders. The work of a DAR member, the late Gertrude Vanderbilt Whitney, it portrays in white marble the simple draped figure of a woman, arms outstretched (page 586).

But woman's work, says the old saw, is never done. Only last year a general renovation job was completed at a cost of well over a million dollars. Added to the extensively remodeled Administration Building were new office rooms and a huge streamlined voting hall, whose fast-operating equipment now eliminates the hectic all-night sessions that once marked DAR election night.

Another addition was the new Museum Gallery, where thousands of historic articles, lovingly gathered through the years, could at last be displayed in a setting suitable to one of the Nation's outstanding collections of early Americana.

Museum with Home Touch

"We like people to think of this not as a formal museum but as a collection of precious relics of their forefathers and ours," said soft-voiced Mrs. Fay Edgar, hostess and assistant curator of the DAR museum.

She was speaking, as I came up, to another visitor, a young soldier. In khaki uniform, pants tucked into sturdy boots, he seemed to belong to a world far from that of spinning wheels, period furniture, and old portraits. But he was very interested, very solemn.

Scotland's Winged Mr. Ramshaw Is a Star Attraction at Constitution Hall

Backstage at the DAR auditorium, Capt. C. W. R. Knight, British falconer and lecturer, introduces his pet golden eagle, Mr. Ramshaw, to Dr. Gilbert Grosvenor (center), Editor of the NATIONAL GEOGRAPHIC MAGAZINE, and Dr. Alexander Wetmore (right), Secretary of the Smithsonian Institution. Captain Knight addressed the Washington membership of the National Geographic Society, whose annual series of lectures has been given in Constitution Hall since 1933 (page 565).

We moved over to the "parlor section" of the long, high-ceilinged gallery. Silver tea things were set out on a Pembroke table beside a comfortable-looking wingback chair. Near by stood the original desk of John Hancock and, beyond, a Chippendale sofa which had belonged to another signer of the Declaration of Independence, Thomas McKean.

A grandfather clock, a simple early-American fireplace, and a table on which John Paul Jones's spectacles lay casually on an open copy of the Bible completed the picture. It looked cozy enough to imagine a scene of bewigged gentlemen, in knee breeches and buckled shoes, sitting there for a teatime chat on post-Revolution problems—say, the hot controversy over Bill of Rights amendments, or trouble with hostile Indians in the Northwest.

In the whole sweep of the museum perhaps the most impressive exhibit is the cleverly lighted portrait of Martha Washington, seen through a stone archway (page 589). A duplicate of the one that hangs in the White House, it was painted in 1905 by Eliphalet F. Andrews, who founded the Corcoran Gallery's School of Art in Washington.

The portrait's red-damask background was made especially to pick up the color of a part of her skirt.

Altogether, the museum owns more than 6,000 items. Mostly gifts from individual members and chapters as well as from many outsiders, this collection is too large to be shown at one time; hence minor objects are shifted about once a year.

Among the most prized permanent exhibits is a copy of the life mask of George Washington made by the French sculptor, Jean Antoine Houdon, who spent two weeks at Mount Vernon with his subject.

Other items always on view include a lyre-shaped brooch of what looks like rose-gold netting, but is actually some of Washington's own hair; Martha Washington's teapot, from

New American Citizens Will Study These Booklets

DAR's popular *Manual for Citizenship* summarizes American history, explains our form of Government, and gives simple rules for becoming a citizen. Millions of copies have been distributed since the first edition in 1920. Eighteen languages are employed; these copies are in Czech (page 597).

which she served soldiers at Valley Forge; and several worn and delicate spoons designed by Paul Revere.

There are earrings which gay Dolly Madison wore; a fragile lace-trimmed satin gown that once belonged to Caroline (Mrs. Benjamin) Harrison (page 583); a pinch of tea from the Boston Tea Party; and Patrick Henry's ring inscribed with the familiar words, "If this be treason, make the most of it!"

You would expect this patriotic society, with accent on home as the backbone of America, to have a sizable collection of everyday articles of the past. It has.

There are displays of old kitchenware and china, including rare pink Spode, Lowestoft, and Staffordshire. Other cases feature pewter, brass, and the noted South Jersey glass, including "witch balls" that sometimes were hung in the windows to catch the sun and keep evil spirits away. At other times they kept flies out of the sugar bowl.

There is also a Revolution-time cradle; and exhibits of babies' christening robes, children's old-fashioned clothing, and enough dolls and toys to pop the eyes of today's small fry.

Finally the soldier and I stopped before cases that hold relics of the American fight for independence—a Continental Army uniform, a Revolutionary musket, swords, cartridge belts, and an early 13-star flag (page 582). He smiled as we read the carved inscription on an old powder horn, "The Red Coat who steals this Horn, will go to Hell from whence he's born." And I mustered enough impertinence to ask the question that had been puzzling me.

How did it happen that a young man on brief leave in the Capital could find time to visit such a spot?

"I'm from California," he told me. "It's my first trip East, where everything is so much older than it is back home. I thought maybe I could learn something about where we all came from . . . what it was like in that other war.

"And it's nice," he added, "to find people who are for *us* so hard."

To the visitor wandering about Memorial Continental Hall the whole building is a museum, with accent on the "memorial."

Memorial Hall Lives Up to Name

The impressive semicircular south portico, for example, is dedicated to the Thirteen Original States (page 596). The triple bronze doors by which one enters commemorate Revolutionary heroes, as well as DAR founders and charter members. In the spacious marble entrance hall and near-by corridors are more than a dozen memorial busts to young America's giants—Washington, Jefferson, Franklin, John Adams, to mention a few.

One eye catcher in the way of decoration is a solid-silver, wall-length bas-relief of the Declaration of Independence, topped by a silver reproduction of the famous Trumbull painting of the signing. It was presented to the DAR by the husband of a past President General, Mrs. Grace Lincoln Hall Brosseau.

If you are fascinated by period furniture, Continental Hall has 28 rooms for your delight.

"Here you'll see some of the typical scenes

of early-American households," explained my guide, Mrs. Cecil Norton Broy, whose duties as curator of the museum also include charge of the historic rooms.

"Each room is named for the State society which bought it. Various chapters and members contributed the furnishings," she continued. "We have painted the walls in authentic Williamsburg colors, and many of the Daughters have donated cherished family heirlooms."

On the grand tour we passed through halls lined with glass cases of colorful quilts and coverlets, handmade before 1830. Peeping through doorways, I saw colonial parlors, music rooms, and libraries; an early-American kitchen with massive fireplace (page 588); a time-mellowed bedroom, complete with four-poster bed and china washbowl set; and a charmingly gabled "children's attic" crammed with toys and relics. There were even baby shoes worn in 1763 and old alphabet plates of a long-lost "ABC" age (page 589).

National Geographic Photographer Robert F. Sisson

Tamassee Sparks the Lamp of Knowledge

Tamassee School, South Carolina, was founded by the Daughters in 1919. It brings "book learning" and vocational training to descendants of pioneers cut off from regular schooling by mountain isolation. Tamassee now covers hundreds of acres and enrolls 400 students. A similar DAR project, the Kate Duncan Smith School at Grant, Alabama, trains 550 boys and girls (page 580).

Browsing antique fanciers find in these rooms such prized collectors' items as a chair in which Washington and Lafayette each sat, the mantel from a house where Henry Clay lived, and fifes, flutes, and drums whose martial notes once fired the spirits of fighting colonists.

Most curious of all is the New Jersey room, whose woodwork and furniture are made of old ship's timbers, and whose stained-glass windows depict scenes of the Revolution. Wood panelings and Jacobean-style furniture were all made from the reclaimed hulk of the British ship *Augusta*, sunk in the Delaware channel during the 1777 battle for control of the Philadelphia approaches.

To the public the State rooms may be little museums, but they are by no means limited to sight-seeing. At Continental Congress time each namesake spot becomes a lively bit of home ground as State delegations and committees gather there for greetings and consultations.

All over the buildings, in fact, one finds this home touch in plaques acknowledging donations from States, chapters, or individuals toward building their national headquarters.

It is an astonishing fact that no professional money raisers had a part in creating this vast edifice, now worth $7,000,000. At one fund-raising session many a Daughter pledged "the price of the hat on her head."

Gifts have ranged from whole structural parts to the tiniest spoons for the banquet room. In Constitution Hall, for instance, the back of each seat bears the name of a specific donor, many of whom made the presentation as a memorial to a distinguished ancestor or to a beloved DAR officer or friend.

Again, the new tables, stacks, and other equipment of the recently enlarged and modernized Genealogical Library also came from the organization's own ranks and are so marked and acknowledged. One of the largest individual contributions made was a bequest of $26,000 to the library for the purchase of books in its field.

Library Is Busy Spot

When the original library was opened, on completion of Memorial Continental Hall, its collection amounted to only 126 books. Today it holds 39,000 bound volumes, plus a wealth of other material useful to the detectives of genealogy who track down the lost links of family connections (page 591).

For those interested in woman's part in the making of America, there is a shelf of reference books telling of the lives and times of such heroic figures as Deborah Sampson, who masqueraded in men's clothes to fight like any other soldier in Washington's army, or rough-and-ready Molly Pitcher, who brought water to the fighters of Monmouth, New Jersey, and took over the firing herself when her gunner husband fell wounded.

Even in the despairing days of Valley Forge one finds an amusing sidelight on the human character of the commander in chief in this letter to a young lady admirer.

"General Washington," it reads, "having been informed lately of the honor done him by Miss Kitty Livingston in wishing for a lock of his hair, takes the liberty of inclosing one, accompanied by his most respectful compliments."

Showplace of the library is the big reading room which now occupies the converted old auditorium in Continental Hall (page 568). In this hushed, high-vaulted room, where the flavor of the past lingers on in eagle-decorated theater boxes, I found men and women bent over piles of books and pamphlets.

"Thousands of people use our facilities every year," said the librarian, Mrs. Mary T. Walsh. "Lawyers come in to check family details concerning wills and property problems. Hobbyists spend full working days here, along with our own and other professional genealogists. Many retired Army and Navy officers, some of them generals and admirals, are among our regular visitors.

"We're pretty busy now," she added, "but you ought to see us when the members flock in by the hundreds during Congress-week rush!"

Besides published books and similar formal material, the library offers genealogical researchers numerous other aids, some not found elsewhere.

In air-cooled archives I saw rows of cabinets containing thousands of folders of typed and hand-copied documents—marriage certificates, wills, Bible and tombstone records. These papers, acquired as proof of eligibility to DAR membership, often hold answers to questions of family ties and ancestors' service.

There is a special room for the Recordak machine that enlarges microfilm rolls of old State census reports and collections of early church records. Before it patient researchers sit for as many hours as eyes will allow, scanning faded names, places, and dates of long-ago facts of life and death.

In hundreds of bound volumes marching along the shelves I found one huge and useful collection of records amassed over the years in connection with membership applications. It contains summaries of information on the lives and families of Revolutionary War pensioners which were abstracted from the not-to-be-removed originals on file in the National Archives Building.

I thumbed through a few. Their statistics seemed as remote as the Biblical "begats."

"But it can be a great thrill," observed Mrs. Walsh, "when someone digging into such material comes on that bit of information he has been hunting for 20 years. . .

"Yes, research here does turn up some funny names. Among the members of one Dewey family, for example, were characters named Pleiades Arastarcus, Octavia Ammonia, and—believe it or not—Encyclopedia Britannica!"

Genealogists at Work

The speed with which DAR genealogists can trace one's ancestors seems at times like magic. I heard of one case where the mention of a name and a brief look into the files of family records produced immediately the desired information concerning a forebear's Revolutionary career.

"But it's not always so easy," said chief genealogist Miss Theodora Wingate. "Occasionally the entire story of an illustrious family may unfold within the pages of a single volume of family history. More than likely, however, we will spend days or weeks searching out the elusive details needed to corroborate various statements made in applications for membership."

At headquarters 15 professional genealogists work steadily at the job of examining applications. New members have been admitted lately at the rate of eight to nine thousand a year. "Supplemental lines" (proof of relationship of a member to more than one Revolution-serving ancestor) amount annually to more than a thousand.

Since there is no limit to the supplementals, and since credit for Revolutionary service is given for ancestors holding even the smallest

of civic posts between 1775 and 1783, some members have established 20 or more lines. Along with the credit goes the right to dress up in an equivalent number of ancestor bars, in addition to the original membership pin.

In reverse order, many of the Daughters have "come in" on a single ancestor.

The organization's membership list includes 42 descendants of fighting Nancy Hart, the Georgia log-cabin heroine whose salty personality and bold exploits made for some of the Revolution's most dramatic history.

On one occasion Nancy helped a rebel Whig escape from a pursuing party of the King's men. Later she herself captured another whole group of Tories, after feasting them on her last turkey.

"Just how does one go about proving eligibility to the DAR?" I asked a staff genealogist, Mrs. Fletcher Quillian. "What should I do, for instance, to look into the family tradition that my great-great-great-great-grandmother had seven sons in the Continental Army? The story goes that she told Lord Cornwallis, who had taken over her farm, that she wished she had seven more sons to send."

577 National Geographic Photographer Robert F. Sisson

A Yard of Honors Describes a Busy DAR Career

Spinning wheel and distaff, the official membership emblem, begin this insignia ladder. Each of the next 15 bars represents a Revolutionary ancestor. Beyond them is the pin of a former chapter Regent. Then come four pins designating the offices of State Chairman, Treasurer, past Regent, and Vice Regent. Top bar is for a national Vice President General. J. E. Caldwell and Company, Philadelphia, makes the Daughters' official insignia.

"First," explained Mrs. Quillian, "you make up a simple family chart. Start with yourself, and draw lines on both sides back to as many ancestors as you can, including all dates and residences possible.

"Then the real work begins. You may find the Revolutionary service of an ancestor in State, county, or town records, here in our library, in the Library of Congress, or in other historical and genealogical libraries throughout the country. Assistance may also be had from the original papers of Revolutionary pensioners and from the original Census records, on file in the National Archives Building.

"Perhaps you have old family letters or pictures showing family links. You may get vital statistics from State capitals, county or town officials.

"As to family traditions," she smiled, "they are the hardest of all to verify."

I agreed. "We might even find that our seven-sons legend also belongs to 77 other families."

Complex Organization with Hard-working President

Since its beginning, nearly 400,000 women have established ancestral right to DAR membership. Today, the 170,000 active members are banded into 2,680 chapters, set up not only all over the United States but in Alaska, the Canal Zone, Hawaii, the Philippines,

DAR Gift Books Build up a Boys Club Library

The Daughters sponsor thousands of Junior American Citizens clubs within civic groups. Here the Trinidad Boys Club of Washington, D. C., receives a donation for its Ernie Pyle Library from the DAR's Army and Navy Chapter. Mr. Pyle, killed on Ie Shima in 1945, is pictured (right) in war correspondent's uniform.

Puerto Rico, Cuba, England, France, and Italy. When last officially heard from, there was even a chapter in Shanghai, China!

Formidably complex are DAR working methods and make-up.

"Our governing body is the National Board of Management," said Mrs. Marguerite Schondau, administrative secretary, whose office is at the hub of organizational affairs. "This board includes the President General, the First Vice President General, 10 national officers, 21 other Vice Presidents General, and all the State Regents."

Business by Mail, Meetings, and Committees

Only in Washington, I found, is there a permanent and paid executive-clerical staff. The national officers who run the organization are elected in a staggered system of three-year terms, and consequently are always changing. Living in various parts of the country, they carry out their duties through an intricate arrangement of periodic meetings, correspondence, and committees. None receives a salary, and only the President General rates a travel expense account.

At the peak of the pyramid, the President General is one of America's busiest women. She is expected to attend all the annual State conferences at least once and to visit as many chapters as possible. Often her railway and flight stubs add up to 25,000 miles a year.

As official spokesman, the President General makes dozens of major speeches and scores of minor ones during the year. She presides over all national meetings and appoints all national committees. She writes a monthly message or article for the *Daughters of the American Revolution Magazine*. She is charged with responsibility for the operation of the headquarters, with all its financial obligations and personnel problems.

Naturally, with these duties, Madam Presi-

dent has a voluminous correspondence. When I saw Mrs. Patton in her pleasantly feminine office at Washington, she was about to take off for a nine-State midwest and western tour of duty. There was a handsome bowl of red roses on her desk. There was also a typewriter at her elbow.

"We're a little shorthanded this morning," she said, "so I'm using my 'hunt-and-peck' system to get out some *must* mail."

What the Daughters Do Fills a Book —and More

What the Daughters Do is the name and subject of a 12-page booklet published by the DAR.

From national headquarters they issue the DAR magazine, containing material of current and historic patriotic interest, special articles, and organizational news.

They publish a monthly *Press Digest*, to guide DAR press chairmen. They print and distribute many other publications of all sorts, including patriotic posters, pictures, and activity booklets.

But no quick summaries or skeleton lists can do more than suggest the broad scope of work that goes on within each of the organization's chosen historic, educational, and patriotic fields.

The traveling public from Maine to California finds the DAR signature on more than 200 historic buildings preserved through this society's efforts, either in cooperation with others or, in certain cases, alone.

Some are owned outright by local chapters and serve as chapter houses as well as historic museums (pages 570 and 595). A number have been placed in DAR custody by civic and State authorities.*

Reproduced or painstakingly restored to original form, often furnished with relics of the past, these restorations include log cabins and mansions, forts, churches, taverns, schoolhouses—even an apothecary shop—that early America knew. Each holds its own bit of the American memory.

To pick a few at random, there is the magnificent Kenmore home in Fredericksburg, Virginia, where George Washington's sister, Betty Lewis, lived.

Burnham Tavern in Machias, Maine, is a reminder of the colonist plot hatched there for the capture of the British ship, *Margaretta*. The plot brought about the first sea battle of the Revolution.

And at Yorktown, thanks to the Daughters' donation of appropriate furnishings, you can see a typical planter's parlor in the old Moore House, just as it must have looked when the articles of British surrender were drawn up there on October 18, 1781.†

At the first DAR meeting the organization's historic work was launched with a resolution to support the then much-discussed project of a burial monument to George Washington's mother, Mary Ball Washington.

Since then, the Daughters have set up more than 12,000 markers at old trails, battlegrounds, Revolutionary graves, and other sites (page 567). They have raised a Pilgrim Memorial Fountain at Plymouth, Massachusetts. In a dozen States, along the National Old Trails Road, they have put up a monumental *Madonna of the Trail* in honor of the pioneer mothers of covered wagon days.

Among current projects is a memorial bell tower to be built at Valley Forge. The tower will house 49 bells and is expected to cost a quarter-million dollars. Feminine postscript to this job of commemorating the hunger and hardships of the terrible winter of 1777-78 is the fact that some of the funds come from the sale of a cookbook of the Daughters' favorite recipes.

Less obviously, but steadily, the routine work of collecting historic and genealogical information goes on. Old records and manuscripts, personal diaries, early maps, and similar material are gathered. Members write papers on people and places of past significance to add to the national file made available to chapters for study and special occasions.

As an aid to tombstone research, headquarters even issues practical hints on how to bring out worn and battered lettering by the use of chalk and other substances. I copied down a couple of the more amusing epitaphs that have found their way to the library:

> Here lies cut down like unripe fruit,
> A son of Mr. Amos Tute. . . .
> The means employed his life to save
> Hurried him headlong to the grave.

And these somewhat macabre lines:

> Beneath this dust lies the moldering crust
> Of Eleanor Batchelor Shoven;
> Well versed in the arts of pies, puddings and tarts
> And the lucrative trade of the oven.
> When she'd lived long enough,
> She made her last puff.
> A puff by her husband much praised;
> And now she doth lie
> And make a dirt pie,
> And hopes that her crust may be raised.

DAR Schools Change Life in Mountain Districts

Not everybody knows that the Daughters' educational program provides schooling for

* See "Shrines of Each Patriot's Devotion," by Frederick G. Vosburgh, NATIONAL GEOGRAPHIC MAGAZINE, January, 1949.

† See "Tidewater Virginia, Where History Lives," by Albert W. Atwood, NATIONAL GEOGRAPHIC MAGAZINE, May, 1942.

thousands of young Americans each year. Besides operating two schools of its own, the organization partially supports a dozen other authorized schools and colleges around the country, and maintains a large student-loan fund.

In addition, there are special DAR awards presented annually to the man with the highest standing in certain subjects at West Point and Annapolis, as well as at the Merchant Marine and Coast Guard Academies. Once these prizes were swords. Today they take the form of $100 Government bonds, or the equivalent in binoculars or some such suitable article.

DAR contributions give a lift to two American Indian institutions—St. Mary's High School at Springfield, South Dakota, where Indian girls receive vocational and home training, and Bacone College, in Oklahoma, for both boys and girls. Bacone is the only accredited school for collegiate work exclusively for Indians of all tribes in the United States.

To qualify for aid, a school must be endorsed by the State Daughters, investigated by the National Society, approved by the Continental Congress, and finally, must fill an educational need not otherwise met.

On the eve of World War I such a need cried out to the South Carolina Daughters from the mountainous "sunset corner" of their State, near the Georgia-South Carolina border. There, in the Tamassee Indian region, where an American Revolutionary general, Andrew Pickens, had subdued hostile Indians, the South Carolina chapters established the first independent DAR school.

Called Tamassee, it was destined to bring "book learning," vocational training, and health guidance to the descendants of American pioneers long deprived of these essentials by isolation.

Through the years the project has steadily expanded, fed by Nation-wide DAR donations and some outside aid. One early bequest by a sympathetic mountaineer turned up as a bucket of dimes, nickels, and quarters.

Tamassee, "Enterprise in Living"

Today Tamassee occupies hundreds of acres of woodland, orchards, gardens, and pastures. It owns cattle, farm machinery, and a power plant. To its 400 day and boarding students it offers home economics, first aid, practical farming and manual training, along with academic subjects (page 575).

An "enterprise in living," this school has become an integral part of the community. In its chapel the neighbors gather for Sunday services. Its Health House is headquarters for the county nurse, who "jeeps" from there on her regular rounds of mountain-trail homes, and every year holds reunion check-up there for mothers and their new babies.

Meantime, stimulated by the bright promise of Tamassee, a second school was organized along similar lines at Grant, Alabama. Opened in 1924 and named the Kate Duncan Smith in honor of Alabama's first Regent, it too has grown prodigiously.

Some 550 students living on Gunters Mountain, beyond the reach of the easy transport of more settled communities, are now enrolled for vocational and other courses reaching to senior-high-school level.

Patriotism Key to DAR Heart and Pocketbook

Key word to all DAR programs is patriotism. The Daughters yield to no one in their enthusiastic support of literally dozens of projects promoting the principles and display of love for America.

The teaching of more American history in the public schools; increased celebration of American holidays; the widespread (and correct) use of the American flag—all are constantly being urged by the organization. Last year, flag committees distributed to schools, colleges, and other institutions nearly 9,000 flags, ranging from small ones to a giant-sized gift valued, with its flagpole, at $1,000.

There are national, State, and chapter committees working for the advancement of American music and for the development of motion pictures dealing with historic and appropriate children's subjects. Steps were taken this year to present an annual award to the producer of what, in DAR opinion, is the best film for children between the ages of eight and twelve.

Since 1895 the DAR has sponsored the Children of the American Revolution, an affiliate organization of boys and girls whose eligibility requirements are the same as those of the parent society. Its headquarters are in Constitution Hall (page 590). Many CAR members, now numbering about 12,000, transfer to the DAR and the SAR (Sons of the American Revolution) between their 18th and 22d birthdays.

Also under the Daughters' wing are more than 11,000 Junior American Citizens clubs, comprised of hundreds of thousands of boys and girls of all races and creeds. Drawn from public schools, orphanages, reform schools, and various community centers, these junior citizens are taught loyalty to the American system and citizenship duties, while enjoying the fellowship and entertainment of group activities (page 578).

A hint of the organization's feminine interests is found in its support of Girl Home Makers Clubs.

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DAR High Officers Meet under the Portrait of the First President General

Caroline Scott Harrison, wife of President Benjamin Harrison, headed 1890's infant DAR (page 583). Mrs. James B. Patton, current "PG," stands on the left. Past Presidents General are Mrs. Grace Brosseau, Mrs. Roscoe O'Byrne, Mrs. Julius Talmadge, Mrs. Russell Magna, and Mrs. William Pouch (seated), Mrs. William Becker and Mrs. Henry M. Robert, Jr. (standing). Scene is President General's reception room, Washington, D. C.

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↑ Gen. Douglas MacArthur and Family Greet the Sixtieth DAR Congress

"In this hour of crisis all patriots look to you," the general told the Daughters. His wife, Jean (with flowers), a DAR member, acknowledges applause. Arthur, their son, stands on far left. Right: President General Patton.

↓ GI's Compare Today's Uniforms with Continental Dress

The DAR museum in Washington owns more than 6,000 pieces of Americana, too many for all to be shown at once. A tattered 13-star flag represents the original States. Man in continental uniform examines a flintlock pistol.

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Indiana Room Honors William Henry Harrison, Indiana Territory's First Governor

The ninth President looks down on the gown (right) of Mrs. Benjamin Harrison, wife of his grandson, 23d President. Mrs. John Ashley, wife of a Revolutionary general, wore the wedding dress (left) in 1769.

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4,000 Delegates and Guests Pack Constitution Hall for the Sixtieth Continental Congress

Each year the opening session sees a dramatic spectacle as the Stars and Stripes floats down from the ceiling. Every spectator rises. Here the DAR's national officers march to the stage.

Kodachrome by B. Anthony Stewart and John E. Fletcher

Hand to Heart, Everyone Stands at Attention as Pages Carry State Flags down the Aisle

Month after month, Constitution Hall presents the best in concerts and lectures, but during the week of April 19, date of the Battle of Lexington, the Daughters reserve the auditorium for themselves.

DAR Honors Founders at Memorial Statue

Eighteen women signed up at the first official meeting in 1890, and eleven contributed $3 each in dues. Today the membership totals 170,000, and national headquarters has a value of $7,000,000.

This white-marble memorial rises in the shadow of the Administration Building. It is the work of the late Gertrude Vanderbilt Whitney, a DAR member. Her symbol of sisterhood stands with welcoming arms outstretched.

President General Patton (left) placed a wreath on the memorial during the Sixtieth Continental Congress. She is flanked by her cabinet (ribbons). Women in black are members of the committee which helped to set up the monument in 1929.

⌄ Memorial Continental Hall contains 28 State rooms reproducing scenes of early American life. All were furnished by DAR State chapters and members. Louisiana women presented this setting from old New Orleans. Members of the 1951 delegation modeled the period costumes. Furnishings include an iron "trysting" seat.

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^ **Churn, Fireplace, and Spinning Wheel: an Early American Kitchen**

The old-fashioned parlor, a stiff place full of starch and plush, was reserved for formal calls, weddings, and funerals. Family gatherings and meals were held in the large, comfortable kitchen. There women cooked, ironed, mended, and baby-sat. Men coming in from the fields hung up caps, took off boots, and relaxed before the cheerful fire. This exhibit, called the Oklahoma Room because it was provided by Oklahoma Daughters, is one of the 28 State rooms in Memorial Continental Hall. Its furnishings came from all over the Nation.

< Children in the DAR museum play beside a spinning wheel made in 1753 by Israel Chapin, later a general on George Washington's staff. Martha Washington presides.

v New Hampshire Room, known also as the Children's Attic, is crammed with toys.

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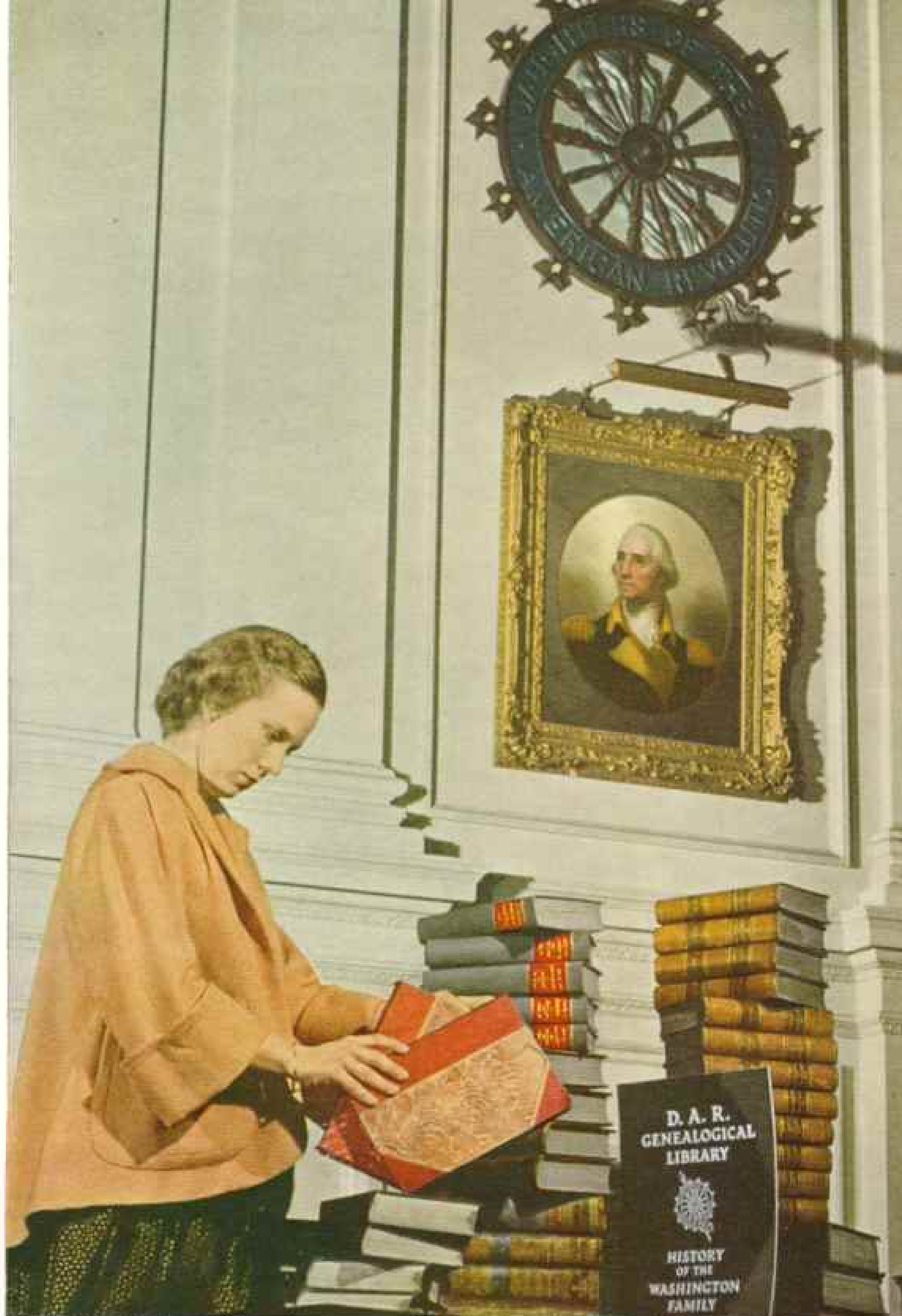
▲ Children of the American Revolution Meet at DAR Headquarters

CAR was organized by the Daughters in 1895. It was the project of Harriett Lothrop, who, as Margaret Sidney, wrote the *Five Little Peppers* books. CAR welcomes any boy or girl with an ancestor who served the Revolution. Age limit is 22.

▼ It's Party Time for the Pages, the DAR's Pretty Ushers

Pages, acting as guides and messengers, serve faithfully all during Congress week. In recognition, the national officers give a ball in their honor. Escorts are chosen from young men in the Government, military services, and embassies.



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Ancestor Hunting in DAR's Genealogical Library Rewards Many a Member

Old wills, census and tombstone records here uncover many Revolutionary forebears. Distaff and spinning wheel on wall form DAR insignia. Rembrandt Peale painted the "porthole" portrait of Washington.

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Convention's Work Is Done; 1,500 Daughters and Guests Relax at the 1951 Banquet

During most of the Congress, delegates carry on daily sessions, committee meetings, elections, and genealogical searches. Here they enjoy the fruits of their labors.

Kodachrome by B. Anthony Stewart and John E. Fletcher

With Music, Flags, and Flowers, the Daughters Say Good-by until the Next Year

The President General, her cabinet, past Presidents General, and other national officers sit at the speakers' long table in Washington's Mayflower Hotel. Music is by the United States Marine Band.

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↑ Good Citizenship Earns a $100 Bond for a Washington Schoolgirl

Each year DAR State organizations conduct citizenship contests among high-school seniors. Here Mrs. J. M. Kerr, Treasurer General, makes the District of Columbia award to Laura Weese. Joane Huff, a runner-up, looks on.

↓ DAR's National Defense Office Mails Reams of Patriotic Material

This office keeps an eye on legislation and prepares articles on America's heritage. Mrs. Frances Lucas, Executive Secretary of the National Defense Committee, examines gummed portraits of American Presidents for distribution to schools and individuals.

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↑ A Bit of Old Natchez Moves to Washington Headquarters

Mississippi's delegation displays a model of Rosalie, a DAR restoration. The mansion was built in 1823 on the site of old French Fort Rosalie. It was acquired by the Mississippi Daughters in 1938 and opened to the public as a museum.

↓ A Sunburst of Radiant Smiles: White Dresses Identify Pages

Pages are appointed by the President General from lists submitted by State Regents. They must belong to the DAR and be less than 30 years old. Each girl has her own special task, but is expected to do any extra chore cheerfully.

There are also committees concerned with the state of the Nation's natural resources and legislation on the subject. As a conservation project of their own, the Daughters recently purchased a grove of redwoods in Del Norte County, California, and dedicated it to servicemen and women of World War II.

One of the best known and most interesting of all DAR contributions is the distribution of its *Manual for Citizenship*, a helpful guide to aliens and foreign-born citizens. A simple summary of American history and Government, plus information on how to become a citizen, this booklet has been given away by the millions since it was first issued in 1920. It is published in 18 languages, including Chinese, Armenian, Yiddish, Hungarian, and Russian (page 574).

The Attorney General of the United States, J. Howard McGrath, addressing the opening session of the Sixtieth Congress in April, 1951, gave unstinting praise to this and allied accomplishments of the DAR toward "fostering and expanding social justice in the United States.

"Your patriotic activities with respect to new citizens," he said, "are a matter of which I have personal knowledge, as the immigration and naturalization functions of our Government are carried on under my supervision in the Department of Justice. Your society has been of immeasurable aid in making each new citizen conscious of the greatness of his privilege of being an American citizen, as well as of his obligations and responsibilities as such.

"In addition, your sponsorship of playgrounds and youth centers, your assistance in settlement houses, your educational program, which affords opportunities otherwise completely lacking to underprivileged boys and girls; your provision of dental and medical clinics and day nurseries, and your entire Junior American Citizens program have helped not only to build constructive citizens but also to combat juvenile delinquency and to insure that the seeds of communism fall on unfriendly soil."

National Defense Committee Covers Broad Territory

At an office in the Administration Building the inquiring reporter finds still another far-reaching field of DAR operations in the office of the National Defense Committee.

"We are the clearing house," modestly explains dynamic Mrs. Frances Lucas, executive secretary of the National Defense Committee (page 594). But the work she guides for her chairman and committee covers more ground than the description indicates.

This committee's duties involve not only cooperation with the community in numerous civic chores and encouragement of education and citizenship along lines of the American tradition. Its leaders also gather and spread information on United States military and internal preparedness, on the Nation's domestic and foreign policy, and on State and national legislation concerning matters of DAR interest. Frequently committee officers testify before congressional hearings concerning pending bills.

Since such activities come under the 1946 Federal Regulation of Lobbying Act, Mrs. Lucas, as the responsible executive secretary, files a report for the lobbyist register published quarterly in the Congressional Record.

"It shocked some people," she smiled, "but it was the law. Not everybody remembers that lobbying, like propaganda, can be good or bad."

Visitors Stream Through Office

Mrs. Lucas was an active member of the Coast Guard Emergency Volunteer Service during World War II, and on one occasion suffered frozen hands while helping to evacuate employees from a munitions plant in danger of exploding. Her present assignment may be less exciting, but it could hardly be called dull.

Besides attending a continually ringing telephone and seeing a stream of visitors (retired Army and Navy officers, Congressmen, representatives of civic and patriotic groups), she keeps an eye on country-wide legislation of DAR concern. She gathers information for DAR resolutions on national-defense matters, to be submitted for vote at the annual Continental Congress.

She also follows news columns and editorial pages of newspapers in Washington and around the country.

"Whenever possible we cooperate with the editors," she explained, "by sending them information on subjects along our line which we feel they may wish to pass on to their readers."

She pulled out a clipping from a pile on her desk. "Here, for example, is an editorial from the Washington *Times-Herald*. It is called 'Packaged Thinking,' and refers to material which we had made available to the paper, warning women's organizations against gullibly accepting ideas now being channeled to

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← **Crinoline Skirts Swish at Columned Headquarters**

Architects consider Memorial Continental Hall's south portico one of the world's most beautiful. Its thirteen columns, arranged in a semicircle, are dedicated to the Thirteen Original States. Washington Monument looms through the trees.

Kodachrome by B. Anthony Stewart and John E. Fletcher

them through propaganda control points."

In its routine activities the DAR National Defense office sends out each year, to a regular mailing list, more than 100,000 pieces of patriotic literature. Together the chairman and executive secretary prepare monthly articles for the DAR magazine and *Press Digest* on such subjects as the dangers of communism and United States alliances with other nations.

This last subject rates considerable space, for it is DAR national policy, frequently expressed, that any form of world government involving loss of national sovereignty is undesirable.

Still other matters that concern this office have to do with American groups and individuals cited by the Government as subversive; or certain textbooks and other publications suspected of running counter to the American way.

"We are continually answering inquiries from our members all over the country regarding the standing of persons and publications," Mrs. Lucas told me. "For their guidance in selecting speakers, we see that every State chairman of our National Defense Committee is supplied with the Government's citation booklets and other pertinent information.

"Down in the basement," she added, "are cabinets packed with data on communism alone. We were one of the first organizations to collect material of this sort. Later, it was much used by the FBI and Un-American Activities Committees. Back in the twenties, two DAR members even infiltrated a Communist camp and brought back notes of the goings-on to the home office."

Long List of Wartime Services

In connection with America's over-all national defenses, the DAR long has advocated a strong program of military preparedness.

When the country has been at war, the Daughters have been quick to offer their services. During the Spanish-American War, they initiated and helped launch the first official corps of women nurses for the Army and Navy.

A DAR Hospital Corps committee, sparked and directed by Dr. Anita Newcomb McGee, took on the official assignment of screening the flood of applications pouring in to the War Department from women volunteers all over the country. Nearly 6,000 applicants were considered, and about 1,200 of the nurses selected saw active duty.

World War I contributions of the DAR amounted to more than $3,730,000 in cash and other donations, including gifts ranging from ambulances and field kitchens to knitted garments and tobacco.

Besides lending land to the Government for emergency office space, and getting its members solidly behind Liberty Loan drives, the organization was active in all sorts of war relief at home and abroad. One of the accomplishments of the "DARlings," as French Ambassador Jusserand called them, was the restoration of a devastated French village, complete with farm equipment, livestock, and a new water system.

Again, during World War II, the DAR piled up a new list of services: 26 million hours for Red Cross work; nearly $400,000 for the blood plasma fund; blood donations from more than 13,000 members.

Ships' Crews "Adopted"

The Daughters outfitted and sent abroad almost 200,000 "buddy bags." They "adopted" the crews of 89 LCI (Landing Craft Infantry) vessels, for special attentions and gifts. Among outstanding presentations to the services were portable X-ray units for hospital ships, an electric pipe organ for an aircraft carrier, and a radio distribution system, with 2,500 headsets, for a veterans' hospital.

Today, as the Nation gathers its powers for the long and tough job of winning the peace, DAR headquarters once more is organizing for service. Word has gone out asking all members to sign up for whatever civilian or military defense activities are under way in their communities and to be alert for any emergency.

Here in Washington the Daughters tell a story to be added to the vast accumulation of Capital taxicab lore. An out-of-town member, it seems, once asked a taxi driver to take her to the "Revolutionary Building."

"The what?" he asked.

"You know, the headquarters of the Revolution," she told him.

"Sorry, ma'am," came the answer. "You better find another driver. This cab don't get into that kind of trouble!"

It isn't likely that you will see this year's model of revolution at DAR headquarters, 1776 D Street. But you do find there a good deal of determination to serve their country's needs as the Daughters see them.

In a less perilous world and time, back in 1900, an early President General had some words to say that are even more expressive now.

"America's best possession," Mrs. Daniel Manning told the Ninth Continental Congress, "is the devotion of her citizens. . . We New Yorkers, Californians, Puerto Ricans, Alaskans, and Hawaiians claim her government and protection, and she in turn claims our devotion for her protection.

"This is the mutual link that binds us."

Iceland Tapestry

By Deena Clark

"YOU'LL need a passport, a cocktail dress, a dinner gown, a raincoat, galoshes—and a boundless capacity for astonishment!"

The airline executive briefed me as I asked about the trip I planned to Iceland.

I found he was right, especially about the last.

Our swift four-engined air clipper was perhaps inspired when it was christened *Reykjavik* by lovely Madame Thor Thors, wife of the Icelandic Minister to Washington. In early sailing times, 13 days would have been fast time to Iceland, about midway between New York and Moscow (map, page 604). The plane headed northeast-by-east and ticked off the 2,679 miles to Keflavik Airport, on the southwestern shore, in just 13 hours.

Living Ice Scours Frozen Lava

As the plane approached the craggy island, we saw far ahead gleaming ice domes capping lofty volcanic mountains. Down the valleys glaciers descended like frozen waterfalls. Below us crystalline snow glistened on ebony-black lava. The incredibly blue sea lashed the coast line and spread over ancient lava reefs that turned chalk-white foam to lace.

The small contingent of United States troops which landed last May at the same airport came almost as rapidly, in air transports. The airport, midway between Ernest Harmon Air Force Base, Stephenville, Newfoundland, and Rhein-Main Airport, Frankfurt, Germany, is a focal point of European military air transport. Thus Iceland's position still is of the utmost strategic importance, a perfect steppingstone on the great circle air route, halfway between the Old World and the New.

Iceland is a member of the North Atlantic Treaty Organization. The United States troops landed at the proud little island republic's invitation, just as they had in much greater force in 1941, during World War II.*

The 30-mile drive to our hotel gave us a swatch of the Icelandic scenery that was to come. Black, contorted lava fields, unrelieved except for huge snow-covered boulders, spread in all directions. The desolate acres, once molten oceans of boiling rock, looked like a hurricane-whipped sea which had suddenly petrified in all its fury.†

The strange liaison of fire and ice was apparent as we approached the capital city, Reykjavik. The ground was frozen, but all around we could see steam rising through the thin crust of earth from the subterranean volcanic fires below. We saw ducks enjoying a warm pond directly adjacent to skaters on a natural ice rink.

Reykjavik is home to more than one-third of Iceland's people. Now well-equipped with American refrigerators and washing machines, the city claims the distinction of having been chosen as capital by the gods themselves.

According to tradition, when Ingolfur Arnarson, a hardy chieftain of the 9th century, approached Iceland, he threw overboard the carved oak pillars from his high seat in his ancestral hall in Norway. As they splashed into the sea, he vowed to settle permanently where they drifted ashore.

After a three-year search, the swollen beams finally were found in a bay in southwest Iceland, near hot springs which sent up white clouds of steam and vapor. Arnarson called his new home Reykjavik, "Smoky Bay," and it has been smoking ever since.

I was amazed at the extreme diversity of the city's buildings.

A modern apartment section is flanked by dwellings of corrugated iron and wood frame. Most of the houses are made of reinforced concrete, as all building materials except stone, gravel, and sand have to be imported.

How the Icelanders cherish the few trees they have! Even if they were large enough to provide lumber, they probably would not be cut for such a mundane use. "One of our great natural resources," Bjarni Gudmundsson, of the Foreign Ministry, told me wryly, "is driftwood!"

Farmers Reap a Driftwood Harvest

The farmers in the remote section of Öraefi have drawn lots for a long stretch of treacherous, stony seaboard lying many miles away from their farms. They reap a rich harvest of building materials in the wreckage of Icelandic and other boats washed ashore.

The houses (one I saw wore a sod roof with grass growing out of it) looked boxy and bare at first, but soon I felt that they were exactly right for their setting. Bright paint on the rooftops gives color and makes up for the lack of trees and landscaping.

Lustrous calcareous spar, one of Iceland's few minerals, is ground and mixed with sandstone. Added as a rough finish to concrete houses, it sparkles in the winter sun.

"Please tell your friends we don't live in igloos here," an Icelander implored me. "And while you're about it, maybe you'll say we aren't overrun with polar bears, either," he

* See "Ancient Iceland, New Pawn of War," 21 illus., National Geographic Magazine, July, 1941.

† See, in the National Geographic Magazine: "Walking Tour Across Iceland," by Isobel Wylie Hutchison, and "Island of the Sagas," by Earl Hanson, both April, 1928.

added. "Sometimes we see them in the spring, if they drift ashore on a moving ice floe, but it's a rare treat to get a glimpse of one."

Cleanliness is the city's most striking characteristic. No ashes or dust mar its appearance.

It is a paradox that the subterranean heat, which so often has caused devastation and misery in the past, has brought Iceland one of its greatest boons. Huge natural furnaces, which require no human stoking, heat underground water to a high temperature.

Nature Heats Reykjavik Buildings

This hot water escapes to the surface in boiling springs. In mammoth pipes it is led 10 miles to a pumping station and then into quarter-million-gallon tanks squatting on a high hill on the outskirts of Reykjavik. From there it flows into radiators at about 175°F., keeping the city's homes and offices cozy even in blizzard weather.

Water flows from the hot springs at more than two hundred gallons a minute, with more always on tap. Formerly Reykjavik burned about 35,000 tons of exorbitantly priced imported coal each year. Now she's spic and span, with no chimney sweeps to pay. There's enough hot water left over to warm a glistening, tiled swimming pool that is in constant use, summer and winter.

Men and women in the business area were well-dressed and prosperous looking. Some were on their lunch hour from the small factories which produce clothes, soap, soft drinks, ceramics, or furniture. Others had just walked the block and a half to town from the busy fishing wharf and shipyard.

The Icelanders we met were handsome and splendidly built. They looked as if they might have stepped right out of one of the Viking sagas. In most familiar fairy tales the heroic actions of the prince deliver the princess. In many Icelandic tales it is the young princess who rescues the hero.

The descendants of those ancient heroines, who, with their men, survived centuries of intermittent volcanic eruption, earthquake, famine, and plague, continue the tradition of strength combined with beauty. Modern Icelanders are usually fair with blue eyes and light complexions.

One of the sagas tells of the birth of brunette twin sons to a wealthy and powerful early settler. They were born in the absence of their father, and the mother was so alarmed at their dark complexion that she exchanged them for the fair-haired sons of a bondwoman in the household. The twins were given the surname *Heljarskinn*, "Hell's-skin," indicating that for a long, long time Icelanders have preferred blonds.

There is nothing cold about Icelandic hospitality. The people are apt to be rather reserved with a stranger, but at his transformation into a guest, their thoughtfulness knows no bounds.

Morning coffee at Bishop Sigurgeir Sigurdsson's was a memorable party. His home, like that of almost everyone in Reykjavik, flaunted starched, immaculate white-lace curtains at every shining window. Inside, ivy and smilax were trellised over doorways, a green and inviting welcome.

The Bishop's attractive wife received us in the charming national dress (page 615).

The bounteous repast introduced us to flaky pastries, homemade cookies, and bread freshly baked in an American oven. The electricity was generated by the current of the near-by river Sog.

We tried the ever-present *skyr*. Made of cow's milk, it tastes like a combination of tart whipped cream and smooth cottage cheese. "An excellent baby food," our host told us, "because of the calcium content." It is also an excellent tourist food—because of the taste content.

The food in Iceland is superb, especially the fish—fresh-caught and sweet. Ordinarily, fish is my last-resort choice on a menu, but in Reykjavik I could not get enough of it.

We sat down to a *smörgåsbord* banquet that offered 13 kinds of sea food, including *hardfiskur* (a dried fish with a nutlike flavor), and 14 varieties of meat and fowl.

"Angel Shrimp" a Special Delicacy

My special choice was a tiny, delicate, pale-pink shrimp, no longer than a baby's rosy fingernail, appropriately called "angel shrimp." Served with a special sauce and piled on dark, rich bread, it made me want to stay in Iceland forever.

The water in Iceland matches the excellence of the table fare. Sparkling-clear and filtered through many layers of porous lava rock, it is so pure that it can go directly into car batteries without distilling.

After "tea" at 11 o'clock, Icelanders break the long wait between 1 o'clock lunch and 7 o'clock dinner with 3:30 "coffee time." Then they indulge their sweet tooth with fancy tarts, cream or chocolate filled, or, in season, wild strawberries and mountain blueberries.

The sun streaming through the windows of the Bishop's dining room lighted up walls literally covered with excellent paintings.

In many homes hung canvases by Johannes Kjarval, Jon Stefansson, Jon Engilbertz (page 623), and others that reflected the Icelander's intense love of his country and its majestic beauty.

Scenes of fishing coves, glaciers glowing

Luther M. Horan

Icelanders Sun-dry Codfish for Southern Markets

Before the 19th century fishermen dried all the cod for the foreign trade. Now most are iced, frozen, or salted (page 609). Only 65 tons of last year's 151,859-ton catch were dried. Strung on racks, these fish may air two months. A newer, more economical process dries fish in electric ovens.

with the piercing cold, and weird lava fields, often described as "congealed pandemonium," held places of honor in every living room.

Iceland is an artist's utopia. The Government, from its Culture Fund, assists outstanding designers, composers, and writers with special grants. It has bought more than four hundred works of contemporary art for the National Gallery.

Museum for Favorite Sculptor

On the Bishop's earnest suggestion, we visited the Einar Jonsson Museum, a combination workshop, museum, and residence. The Icelanders presented it to their beloved sculptor in recognition of his genius.

Here are housed Jonsson's works, grand conceptions in stone and bronze. His themes are mystical and symbolical, illustrating the triumph of spirit over matter. One impressive piece shows an evil giant who has stolen a lovely woman from her fishing village. Legend says the monster had only the dead of night in which to work. If he were caught by the morning light, the sun's rays would petrify him, freeing his victim.

The statue shows the giant, half turned to stone, rising from a block of columnar lava. In anger and frustration, he shakes his fist at the rising sun, while the woman in his arms faints with joy at the powers of light.

Jonsson's best-known work in America is

Hekla, Waking from a 102-year Sleep, Hurls Out Clouds of Ash

Liveliest of Iceland's volcanoes, Hekla boasts 21 eruptions since 1104 (page 629). Medieval clergy likened its fiery craters to the gates of hell; they pictured rocketing lava bombs as condemned souls shaped like blackbirds.

After a century's lull, Hekla awakened in March, 1947. A column of ash more than twice the height of Bikini's atomic-bomb cloud poured from a three-mile-long fissure. Thunderous rumblings were heard 200 miles away. Rivers of melting ice rushed down the slopes. In their wake, streams of lava flooded 10 square miles in 13 months.

Here, during the first day's eruption, Hekla spewed as much as 100,000,000 cubic yards of ash an hour. In nearby Fljótshlidh, a terrified couple awakened by pumice raining on their roof thought they had gone blind. The ash, sweeping across southern England, showered Finland two days later.

▼ Riders ford a glacial stream in Thórsmörk (Thors Wood) Valley, a popular summer resort near the south coast.

Th. Josefsson

Iceland Tourist Bureau

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Drawn by Harry S. Oliver and Victor J. Kelley

Iceland, Atlantic Steppingstone, Lies about Halfway Between New York and Moscow

Iceland's name is misleading, for an arm of the Gulf Stream warms its shores, and perpetual snow covers only one-eighth of its 39,750 square miles. Volcanoes through the centuries have smothered a large part of the island with lava. Population is sparse—three persons to the square mile.

the statue unveiled in Philadelphia in 1920. It depicts Thorfinn Karlsefni, an adventurous Viking, and, according to the sagas, the first white man to settle in America with his young wife.

Long before our country was even a gleam in Columbus's eye, our continent was visited A.D. 1000 by Leif, son of Eric the Red. Karlsefni's son, Snorri, is said to have been born on the North American Continent, possibly in New England, in 1003. So, if the story is true, the first white child born in America was an Icelander.

The most comfortable thing about the Hotel Borg, after the heavenly light and warm eiderdown quilts and the intense quiet filling the halls, was that everybody spoke English.

Reykjavík boasts theaters where American movies are taken straight, with no chaser of Icelandic subtitles. Probably the six-year stay of our United States troops during World War II helped perfect the "American" we heard everywhere.*

Many Icelanders knew Stephen Foster by heart, and were as nostalgic about *My Old Kentucky Home* as if they had been born on a plantation instead of in a fishing cove.

We heard remnants of Yankee wisecracks on every hand, "Let's sit here, Hulda, and watch the fjords go by!" Our boys learned enough Icelandic to call a girl a *stúlka*, and were successful in talking many of them into holy wedlock.

American soldiers had their influence on the monetary situation as well as the matrimonial. Our army command used local labor for construction work, since Iceland has neither army nor navy to draw on, having declared herself permanently neutral.

The unit of currency is the *króna*, which is rated at about 16 to the dollar. "Working for the good old kronur," was sung to the tune of *Rum and Coca-Cola* in every new installation.

With the high wages paid at the American installations, and little to spend money on, prices rose rapidly. The present inflation, therefore, to a certain degree is due to the influx of the thousands of men who were invited to enter Iceland to protect the Nazi-coveted "unsinkable aircraft carrier."

Choice Handicrafts Sell Despite Inflation

The cost of Icelandic living has increased tremendously since prewar times. For instance, United States cigarettes, sold on a Government monopoly, cost 73 cents a pack. Most things cost about five times what they did before the war.

The severe rise in prices, however, serves

* See "American Soldier in Reykjavík," by Corporal Luther M. Chovan, NATIONAL GEOGRAPHIC MAGAZINE, November, 1945.

only to challenge the visitor stalking bargains to take home. There are shops full of souvenir handkerchiefs, bookmarks, pillowcases, all painted or embroidered with Icelandic scenes. There are desk sets beautifully carved in wood by the sculptor Rikardur Jonsson.

There is French perfume, minus our American luxury tax, and bubblelike glassware from Czechoslovakia. There are sealskin gloves and purses locally made, as well as sheepskin rugs and bath mats. Handmade woolen mittens and sweaters, using patterns handed down from saga times, line the shelves.

The economical buyer can find luxuriant silver, blue, and white pelts on the fox farms that dot the island. The raw fur is relatively inexpensive, especially minus our tax, and it can be made up here at home.

Icelandic eider down is a choice offering in the shops. The female eider duck plucks the valuable down from her breast and uses it to line her nest. It is collected at regular intervals. The puff sleeping bags made up for tiny babies are ideal for rock-a-bye purposes.

Any mother can delight her little girl with a doll dressed in Icelandic costume, like the one that Mrs. Olaf Johnson sent home to mine. She will love the blond braids roped and twined under a velvet tam, and the sequined dress bodice, laced with gold thread stitched like filigree.

The clanking yet delicate filigree bracelet I could not resist in Reykjavik meant more to me after I went to a jeweler's to see the shining silver wire actually curved and blazed into links of leaves and flowers.

Gudmundur Gudnason is considered the most skillful gold and silversmith of the country. He learned the craft at the age of 15 from his father, and has been at it himself for 50 years. He told us it would take five days to make the silver belt that is traditional with the national dress. He has encrusted some costumes with as much as $1,500 worth of silver lacings, buttons, and ornaments.

It seemed surprising to find smiths in Iceland, a country with practically no metals, until we were told that the first settlers brought much silver with them in their small boats. They chose it because it took up very little space in comparison to its value. In the early days it was so abundant that the beams of temples were covered with it.

Weather Changeable but Not Severe

The weather was wonderful for our trip to the university, high on a hill about twenty minutes from the center of town. A dry snow, crystallizing as it fell, had dredged the city with sparkling powdered sugar.

The weather was one of the most amazing and pleasant surprises of Iceland. The coldest thing about the country is its name. When we took off from La Guardia Field, on St. Patrick's day, it was 31° F., and when we landed at Keflavik it was a matching 31°.

An arm of the warm Gulf Stream makes the climate like that of southern Canada. New Yorkers often shiver in winters far more severe than those in Reykjavik. January is the capital's coldest month, averaging about 32° F. Chicagoans endure an average of 25°.

Average summer temperature is 52° F. Mercurial changes are the rule. Twenty-four hours' worth is sufficient to give you a good sample of everything the weather has to offer.

The early morning may bring a day that is sunny, crisp, and invigorating. By 11 o'clock the skies may loose a winter wind so strong you cannot stand upright while crossing the street. During a heavy storm, with a wind blowing at top speed, it snows horizontally.

Iceland Warns of Storms

The Meteorological Institute in Reykjavik gathers information on weather conditions in various parts of Iceland and from foreign stations, broadcasting 24-hour forecasts two or three times a day. These are of inestimable value, since storms coming from the west are usually first discovered around Iceland.

The English joke about the continual radio warning, "Bad weather approaching from Iceland," and implore her to stop exporting cyclones—to send eider down instead!

One hundred and forty lighthouses around Iceland's shores aid mariners of all nations who ply the perilous North Atlantic.

The new University of Iceland, with an enrollment of 600 students, was built by a people who like to take a chance. In 1933 the Government authorized a national lottery to collect a building fund, sold 75-cent tickets, and each month paid lucky winners $25 to $15,000.

The educational gamblers have built a modern campus consisting of a main building, a dormitory, and three other halls.

An unusual source of revenue for the university was a downtown movie theater operated by the faculty. When we were there the cash registers were ringing to the tune of a repeat run of *For Whom the Bell Tolls*.

Practically everything about the university was made in Iceland. The reddish lava stone and granite walls are studded with polished sea shells. The entrance dome, blue as the sea, sparkles with Icelandic onyx and iridescent mother-of-pearl. The beige faculty lounge, with large view windows overlooking the lake where skating children whirl through their figure eights, is curtained and upholstered in wool woven locally.

The chapel, setting for a gemlike altar, boasts a miniature theater switchboard panel.

© Fotograf Ellen Dahlberg, Pix, Inc.

Students Grow Vegetables and Flowers in Soil Heated by Volcanic Springs

Flower-loving Icelanders devote acres of greenhouse space to blossoming plants. Last year, with the help of Marshall Plan machinery, they increased cultivated land by 4,500 acres. Barley, rye, and wheat have been grown experimentally with some success. These farmerettes work a school garden in Laugarvatn.

It lights up the curving walls of cerulean blue "like the Icelandic sky in summer."

The university operates on very democratic lines, with a new chancellor chosen every three years by the faculty from among themselves. Law professor Olaf Larusson, head when I was there, is very proud of the extensive courses offered in theology, philosophy, medicine, and law. The excellent library houses the Benedikt Thorarinsson collection of books—largest in the country.

There is no illiteracy in Iceland. In the past the village parson could refuse to confirm or marry anyone who could not read and write!

Books Big Item in Budget

Today, all children between the ages of 7 and 15 in Iceland receive free instruction. Mobile schools travel through the sparsely settled farm areas. They prepare potential subscribers for the tremendous amount of reading material published in Iceland—more new books per capita than any other country in the world.

In Reykjavik five daily newspapers and many weeklies print enough copies to supply one for every man, woman, and child in the city. The Government's publishing society supplies books at cost price.

At that, each Icelander spends approximately $50 a year for books in his native language. The ones I saw on local shelves included *Sagan af Huckleberry Finn*, *Robinson Kruso*, *Hans og Greta*, and *Mýs og Menn*, by Steinbeck.

In addition to books published in Icelandic, one of which, *Independent People*, by Halldor Laxness, was a Book-of-the-Month-Club selection, many foreign books are imported. The parlors of the farmsteads often display, in addition to the Bible bound in sharkskin and silver, a well-used selection of world literature in the original languages.

The National Library bulges with some 170,000 printed books and about 10,000 manuscripts. It has a fine collection of books on chess, given by the late Professor Daniel Willard Fiske of Cornell, author of *Chess in Iceland*.

The nationwide interest in the game was evident. While we were there two players who had come all the way from New Zealand were giving exhibitions. During their six-week stay they had audiences of four hundred and more every night.

Four other Reykjavik libraries, besides the National, set the pattern for four well-stocked regional libraries, one for every quarter of the island, as well as district and parish circulating centers. And the books *circulate*, too, summer and winter.

Ewing Galloway

Steaming Spring Water Flows into Concrete Tubs at a Public Laundry near Reykjavik

Icelanders have scrubbed clothes in hot springs for generations. But grass now grows in many outdoor basins because the water is piped into buildings (page 615). Most thermal springs keep constant temperatures the year round. These waters have been used since 1930 for central heating in homes.

In this northern land, where the midnight sun provides perpetual daylight from late May until the beginning of August, when avid readers find a book they "just can't put down," they can read all night without even turning on the light.

An Icelander does not spend all his time, however, with his nose in a book. He is an ardent sportsman who travels miles to get to the best "slide snow" on the north coast. Some even ski the glaciers, except in spring when the thaws make them too dangerous.

The Icelander joins his friends in the lively *viki-vaki*, a square dance similar to our own. He is also expert at *glima*, scientific wrestling (page 623), one of the oldest national sports. The object is to throw your opponent to the floor on his back, rather than grapple with him on the floor American style.

A throw is accomplished by quick movements, most of them with the feet. These are called "tricks," of which about twenty-two have special names. Glima differs radically from our professional wrestling in that it requires suppleness, skill, and coordination, rather than grunts, groans, and grimaces.

When we began sight-seeing in earnest, we drove a few miles outside of Reykjavik one day. There we saw several women, in bandannas and slacks, trundling bundle-laden wheelbarrows to a small wooden building set beside a bubbling hot spring. They were on their way to the public laundry, maintained by the city and utilizing the near-by boiling water on tap all the year round (above and page 615).

The building was completely furnished, with stationary tubs, drying rooms, and a snack bar. In the washing room I found an eerie half-world of steam, so dense that it was difficult to see the women bent over the rinsing boards or beating and brushing their laundry clean on rough wooden tables.

Bananas Grow in Hot Springs' Heat

Snow crunching under our tires, we stopped a few miles farther on at a greenhouse to pick an armful of long-stemmed daffodils. Hot springs, assisted by a battery of 1,000-watt electric bulbs, were responsible for the warmth of the nursery.

In a playpen near a clump of flowering hydrangeas a chubby, blue-eyed baby dressed in summer overalls played contentedly, oblivious to the cold outside.

The first spring-heated greenhouse was built nearly thirty years ago. Since then hundreds of tons of flowers, tomatoes, cucumbers, grapes, melons, and even tropical bananas have been grown under glass (opposite).

From the car I saw bright-eyed, long-fleeced descendants of the hardy sheep brought in by

the early Norsemen. They were the clue to how one-third of all Icelanders live.

Outnumbering the people nearly three to one, sheep are the mainstay of the country's agriculture, providing the farmer with food, clothing, and cash. Loosed to fend for themselves during most of the year, the flocks are driven down the valleys into huge, communal, lava-stone sheep-sorting corrals in early fall.

September 20th is usually round-up day, and is one of the great occasions that keeps the shepherd down on the farm. He counts his wealth-on-the-hoof, drinks a little wine, dances with his neighbor's wife, and sends his children off to make new acquaintances.

The Icelandic farmer leads a hard life. Less than one percent of the land is cultivated. To wrest potatoes, turnips, and rhubarb from it requires infinite back-breaking work and an island-wide Government-aided cooperative association.

Farmers suffered for nearly a century from the results of the most devastating volcanic eruption their country ever endured. In 1783 a tremendous fissure 20 miles long split the earth southwest of Vatna Jökull, forming more than a hundred cones, each with a crater.

For months explosions rocked the island, throwing out an immense quantity of lava and ash—enough material, it has been estimated, to build a mightier mountain than Mont Blanc, Europe's highest.

The molten lava laid waste flourishing districts. Ash covered the country; vegetation was destroyed. Seventy percent of the livestock was lost, and 20 percent of the people died in the famine which followed.

Hay is the principal crop today. Drained low-lying farmlands produce two or three cuttings during the short summer season (pages 620 and 630). Fertilized with rich fish-bone meal left over from the previous season's catch and warmed by the long hours of sunlight, the grass grows rapidly.

Native Pony Is Iceland's "Jeep"

At harvesttime each remote farmhouse seems to be flanked with perambulating haystacks equipped with four slender legs. They turn out to be the indispensable little Icelandic pony, bearing huge bundles of hay.

No visit to Iceland is complete without making the acquaintance of the gentle, surefooted, faithful, obedient, native pony, 4 to 5 feet of perseverance and intelligence (pages 626 and 630).

He carries Iceland on his back at work and at play. He fords powerful and swift-running rivers one day and proudly wears his owner's colors at the frozen race track the next. No work is too difficult for him, and he costs practically nothing to keep.

The Icelandic pony lives on what he is able to graze for himself in the summer, with perhaps a little seaweed for garnish. In winter he requires no shelter, since his coat grows long and shaggy. I saw ponies grazing unconcernedly in a blizzard, pawing the snow aside to get at the grass, or perhaps to uncover a dried codfish head provided for dessert.

In the old days, the Icelandic farmhouse was built of porous lava stone with a turf roof. It gave the impression from the outside that anyone taller than a child would have difficulty in doing much upright living in it. Actually, for warmth, the walls were sunk into the ground as much as four feet (page 622).

The modern farmhouse is made of concrete and often is equipped with its own electric plant, built at home and utilizing the power of the nearest waterfall. The house is immaculately clean, even to the snowy bed linen with *Dreymi thig vel* (Dream thee well) embroidered on the quilt.

7,000 Pounds of Fish Per Person

If Iceland's land is poor, its sea is rich. It yields a bountiful harvest, amounting in normal years to approximately 7,000 pounds for each person in the nation.

On their home fishing grounds the Icelanders compete with 11 other nations (page 616). During the winter nights, some of the fishing banks look like floating towns, lights bobbing on the ships packed side by side.

The Icelandic fisherman's technique has progressed greatly since the 9th century, when rowboats and hand lines limited him to fjords and the nearest offshore banks.

Today airplanes are pressed into service to scout shoals for an extensive fishing fleet consisting of motorboats and modern steam trawlers equipped with echo sounders, refrigerated holds, and direction finders. Powerful radios on board are tuned continuously to market reports so that the right haul may be fished for at the right time. They use every navigational aid, and no minute is wasted.

At special times in midsummer, when literally layers of herring surge in thickly packed shoals to feed on billions of minute organisms, Icelanders in small boats surrounding the mass have hauled in as much as 1,500 barrels in one cast. An ordinary day's catch is 1,000 barrels.

For the past six years fishing has been poor off the northwest coast, where most of the herring normally are taken. Dwindling catches have meant a considerable loss of foreign exchange for the Icelandic Government. Prospects, however, were better this past summer, when early reports indicated that the herring had returned to their old grounds in large numbers.

Ninety percent of all Iceland's exports are fish and fish products. Last year the volume of these shipments decreased by one-third.

One of the greatest world centers for herring is the little town of Siglufjördhur (pages 618 and 619). During good seasons its normal population of about 3,000 swells to nearly 10,000, and there are often 200 ships crowding its harbor at the same time.

The tiny village has five large factories where oil and meal are made from the catch. Less than an hour passes between the time the fresh herring leaves the ship's hold and its conversion into meal for fodder or fertilizer, or oil for soap, margarine, and explosives.

Some fish, especially cod, haddock, and plaice, are exported wind-and-sun dried (page 601), or quick-frozen, to the European markets. Reykjavík has one of the most modern fillet plants in the world, with compressors and freezing units purchased from the United States.

During the war, Iceland's fish provided a great deal of the protein needed for the United Kingdom's food program.

609 © Fotograf Ellen Dahlberg, Pix, Inc.

Bread, Buried in Hot Sand, Bakes at Laugarvatn

Electric stoves, refrigerators, and washing machines are common in Icelandic kitchens. Extensive peat bogs yield fuel for rural districts. Using subterranean heat, this girl baked her bread in 24 hours.

More cod comes from the Iceland fisheries than any other one place on the globe. In long-line fishing many thousands of hooks are baited and dropped into the water at one time.

A Premium Grade of Cod-liver Oil

More than 200,000 large cod have been caught in one day by long-line fishing off the Westman Islands (Vestmanna Eyjar). In unusual cases there have been fish on every other hook of a line one and a quarter miles long.

The sun-rich Icelandic cod-liver oil spooned out by conscientious mothers all over the world brings a higher price in the market than that from any other fishing banks.

Some Icelanders are grateful to the cod for far more than the prosperity it brings the island. It is really responsible for the fact that, in a country that enforces a strict state liquor monopoly, a citizen can quench his thirst with a glass of Spanish wine whenever he has a mind to do so.

In 1915 when the sale of alcoholic beverages was prohibited, there were repercussions from Barcelona.

"If you do not buy our wine, we cannot buy your fish," was the ultimatum.

Spain, a Catholic country where fish replaces meat on the table on certain days of the year, was Iceland's best customer. Her threat of a high import tax was so great that in 1922 Spain had her way. Spanish wine

↑ **A Geyser Spouts a 150-foot Jet of Hot Spray**

Some geysers can be coaxed to perform by dumping soap in craters.

Geysir, Iceland's most famous gusher, gave its name to erupting wells throughout the world. The English word "geyser" comes from the Icelandic *geysir*, meaning "to rush furiously."

← Icelanders can swim the year round in some 75 tanks kept warm by thermal springs.

School children are required by law to learn to swim. They have no lack of opportunity; hot springs gush from rock fissures, sulphur beds, ice fields, and even the sea bottom.

Some of these outlets make excellent bathing tanks. One, the sod and stone basin in Borgarfjördhur, dates from the 13th century. There Snorri Sturluson, Iceland historian, used to treat his friends to hot baths.

These outdoor enthusiasts enjoy summer's long daylight hours beneath ice-fringed Mount Esja near Reykjavik. A few of them will continue swimming during winter's snows.

U. S. Army Signal Corps, Official

again flowed in Iceland. Prohibition was superseded in 1935 by a state monopoly.

We were served, on several occasions, the locally made *brennivin* (burnt wine), which the American soldiers called "black death." It was brewed, they were sure, by a process of nuclear fission. Then there was the colorless, faintly anise-flavored Icelandic *aquavit*.

The Icelanders are justly proud of their Government—a democracy with strong socialistic leanings. They can trace their progressive measures back more than a thousand years, to the darkest ages when other European nations were ruled by despotic monarchs.

Iceland had trial by jury and a people's parliament that assembled on the open lava plain of Thingvellir 300 years before the English Mother of Parliaments convened.

This "Grandmother of Parliaments" even had a smooth-running, effective OPA in 930. No trader could sell his wares until the local chieftain had approved his prices.

Every year inflation or deflation was checked by public assembly deciding the value of various commodities: how many fish could be exchanged for one *alin* (24 inches) of homespun cloth; how many head of sheep for a cow or a horse; and how many days of labor for a lodging.

In the 13th century Iceland acknowledged King Haakon of Norway as her nominal head. She came under the Danish crown in 1380, not severing that tie completely until 1944. At that time 98 percent of all eligible Icelanders, including the women, who had had suffrage since 1915, voted to sever the union with Denmark. Nearly all who voted favored establishing an independent Republic.

Today's constitution is based on the United States Declaration of Independence and the French Rights of Man. Iceland has a President, six Ministers (equivalent to our Cabinet), and 52 members of a Parliament corresponding to our Congress.

The present Parliament consists of seven Social Democrats, backers of labor unions; nine Communists, who ask for government ownership of utilities and means of production; 17 Progressives, who are agrarians, favoring cooperatives; and 19 Independents, their platform calling for financial and political independence, free trade, and individual initiative.

"Same Work Mr. Roosevelt Did"

I found that some Icelanders had difficulty in remembering the title of the Honorable Sveinn Björnsson, head of their state. "You know what it is," an earnest taxi driver urged me. "He does the same work your Mr. Roosevelt used to do."

Mr. Björnsson's work was being President!

There is no Vice President. If the President dies, three men replace him until a new President can be elected. The power falls to the Prime Minister, Speaker of the Parliament, and the President of the Supreme Court.

In many ways Iceland offers an excellent pattern for successful and enlightened government.

When questions of great importance occur, such as those dealing with prohibition and compulsory national service, Parliament may submit them directly to the people for an expression of opinion.

Nobody is ostracized for his political opinions. Everyone is given credit for believing as he does for honest reasons. Occasionally, each member of a large family belongs to a different political party.

Christianity Conquered Ancient Gods

On Sundays nearly all Icelanders go to the national church, which is Evangelical Lutheran, but there is complete religious freedom.

This has been so since the year 1000, when the merits of Christianity and paganism were publicly debated before a great gathering at Thingvellir, and the old Norse gods lost.

Christianity won over a group including Thor and Idun. It was Idun who kept a box of apples which the gods, when they felt old age creeping on them, had only to taste to become young again.

Heimdallur, the watchman of the gods, was also among those defeated, despite the keenness of his ears. He could even hear the sound of grass sprouting on earth and wool growing on a sheep's back.

The decision of the ancient chieftain Thorgeir ended the prolonged debate and days of tortuous deliberation in his tent. To insure the advantages of only one set of laws for the country, paganism was to be discarded.

Every man was to be baptized, but it would be permissible to bow down to the heathen gods within one's own home.

A typical convert was Helgi the Lean, who renamed his homestead Kristnes, in honor of Christ. In preparing for perilous sea voyages, however, for double insurance he sacrificed to and worshiped Thor.

Icelanders also dip into the state treasury for medical aid. Health insurance is compulsory for all between 16 and 67. In case of illness, the insured bears two-thirds of the expense, the Government the other third. Complete hospitalization is also guaranteed. Here the Government pays three-fourths of the cost of medicine and a specialist's care. Excellent state-paid physcians are on call at all hours of the day and night.

Old age is the most prevalent cause of death in Iceland. The saying goes that this is

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Ansco color by Glenn Algird

Modern Icelanders, Fair and Athletic, Trace Their Lineage to the Vikings

Norsemen colonized the island a thousand years ago. Svana Magnúsdottir, a Girl Scout, typifies the Viking strain among Iceland's 142,000 citizens, most of whom have blue eyes and light complexions.

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Kodachrome by Göran Algård

Akureyri, the Island's Second-largest City, Lies on a Sheltered Fjord. An Ultramodern Church Dominates the Setting

Woolen mills, fishing, and trade support Akureyri's 6,700 residents. Only the capital city of Reykjavík, with 53,000 population, is larger. Twin towers mark the Lutheran Church, where many American soldiers worshiped in World War II. Encircling mountains shield Akureyri from Arctic gales.

This Housewife Never Lacks Hot Water on Washdays

Scalding water from hot springs is always on tap in the public laundry near Reykjavik. Piped into the city, the water heats homes and offices.

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Iceland's Leading Churchman Joins His Wife at Coffee

Bishop Sigurgeir Sigurdsson heads Iceland's State church, the Evangelical Lutheran. His wife's gold-embroidered dress is the national costume.

Ansco colors by Göran Algård

Iceland's Herring Fisheries Attract Vessels from Many Foreign Nations

Fleets from Norway, Sweden, Russia, and eight other countries compete with Iceland's own in the herring harvest. From the cold, deep waters also come cod, haddock, plaice, and rosefish.

In good seasons, when herring swarm in tightly packed shoals to feed on billions of minute organisms, a ship can fill 1,000 barrels daily. Catches of 1,500 barrels in a single net have been recorded.

Such easy hauls are becoming increasingly rare. For the past six years fishing was poor off Iceland's northwest coast, where herring formerly gathered in solid masses over large areas. Their disappearance meant a considerable loss of foreign exchange for the island, which normally depended upon fish and fish products for 90 percent of its exports.

Some scientists think the herring abandoned the old feeding grounds because of a change in ocean currents and depleted food supplies. Last summer, however, the fish returned in considerable numbers. Icelandic fleets enjoyed a good season in 1947 off the southwest coast, in an area where the fish never before had been caught in quantities.

This Bergen, Norway, vessel, hundreds of empty casks rising above its afterdeck, keeps a rendezvous with a Norwegian destroyer (foreground). Officers on the bridge are about to deliver mail to the fishermen.

© National Geographic Society

Kodachrome by Göran Algård

Swedish Fishermen, Cruising Icelandic Waters for Herring, Fill Wooden Troughs with a Silvery Horde

When herring are detected, crewmen push off from the mother ship in small boats to set purse seines or gill nets. The catch, marked by anchor buoys, is pulled aboard by winches. Cod and plaice are caught by trawling. Foreign vessels, barred from landing their fish in Iceland, carry equipment for salting and curing.

Left: Icelandic fishermen, though often youthful, are skilled technicians. Ships use echo sounders, direction finders—even airplanes—to scout for schools.

© National Geographic Society

Ansco color by Chester Kraushold

Ansco color by Göran Algård

↑ **Siglufjördhur, the Nation's Herring Capital, Processes Fish for Market**

Herring runs mean boomtown activity for Siglufjördhur, on Iceland's northern coast. In good seasons its normal population of about 3,000 zooms to nearly 10,000, and 200 fishing vessels often crowd its harbor at a time.

Choice fish are spiced, sugar-cured, or salted for foreign export. The village's five State-owned factories convert the rest of the catch into oil for margarine, soap, and explosives, and meal for fodder or fertilizer.

Though Siglufjördhur remains one of the world's leading herring centers, it was hard hit in recent years by dwindling catches off the northwest coast. The 1950 yield in that area totaled only 35,000 tons, an all-time low. Since fishermen had to roam farther afield in search of herring, Iceland's Government purchased a specially equipped vessel to process part of the catch at sea.

Women, seasonal employees of private companies, clean herring along Siglufjördhur's water front. The fish are then packed in barrels.

→ Only part of the catch is shipped headless and gutted. Certain markets prefer whole fish. These workers cut V-shaped notches beneath the gills, permitting salt to penetrate for curing.

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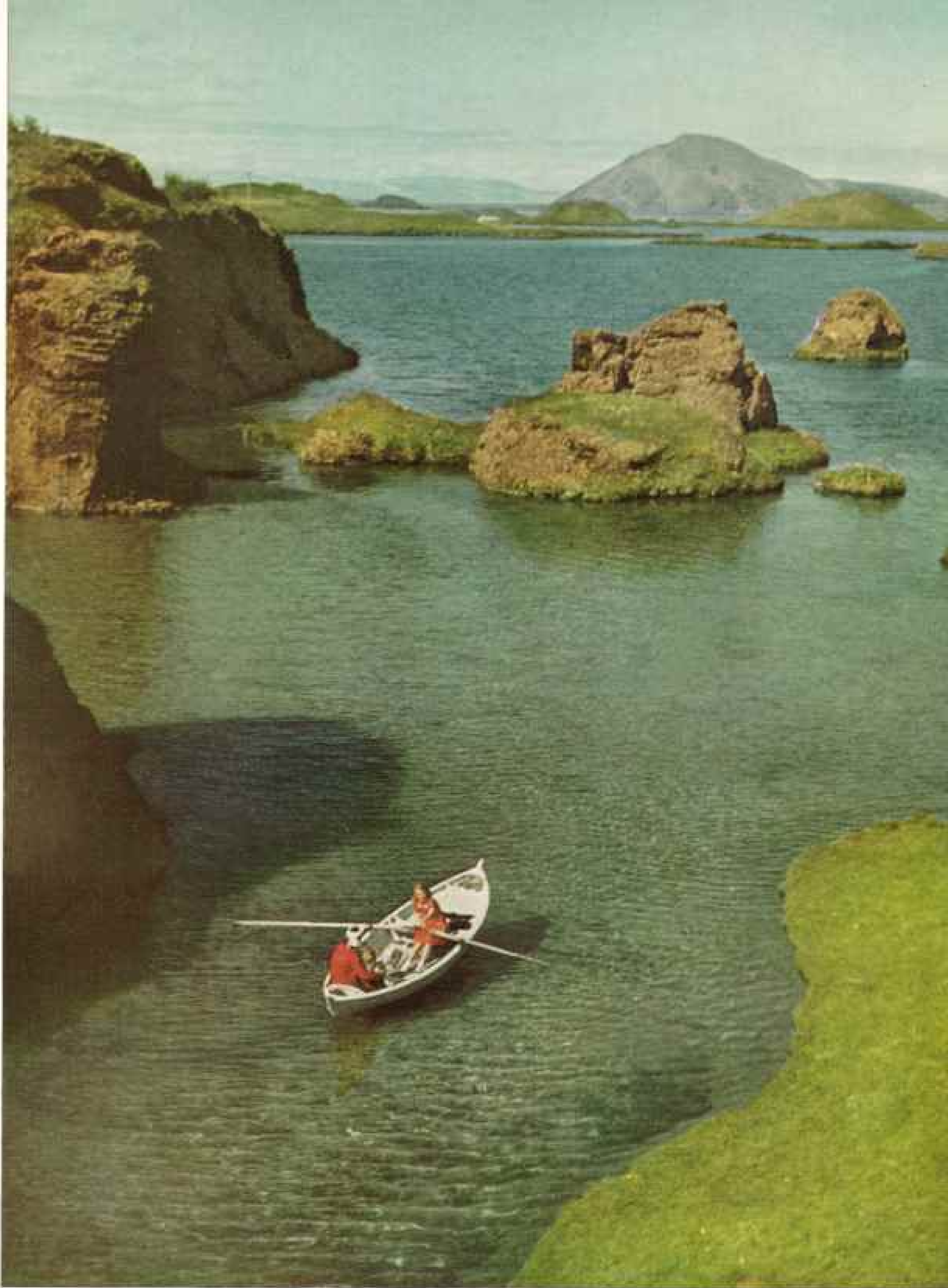
↑ Cool Summers Limit Agriculture; Hay Is the Main Crop

Nearly all of the island's cultivated land is devoted to hay for livestock feeding. Farmers also harvest grass from wild meadows unsuitable for tilling. Market gardens are small, yielding such hardy crops as potatoes and turnips.

↓ Pansies Bloom under the Midnight Sun in a Reykjavik Garden

From late May until early August the island enjoys perpetual daylight. Gulf Stream warmth creates a climate like that of southern Canada. Outside Reykjavik in greenhouses heated by boiling springs grow tomatoes, cucumbers, melons—even bananas.



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Kodachrome by Göran Algård

Volcanic Islets Capped with Grass Rise from Mývatn's Shallow Depths

Molten lava, pouring into the cool waters, congealed into humps and hillocks resembling petrified sponge. Mývatn means "Mosquito Lake." It is one of the few places in Iceland where the insects thrive.

© National Geographic Society

Ansco color by Göran Algård

A Blanket of Turf Keeps This Tiny Barn Warm in Winter, Cool in Summer. Part of the Building Rests below Ground Level

In earlier years the Icelandic farmhouse and barn were built of lava, roofed with turf. Most rural buildings today are concrete. A near-by waterfall powers the farmer's own electric plant. For better insulation, the walls of this old-style barn were sunk four feet deep.

Icelandic Grapplers Wear Leather Handles

In *glima*, one of the oldest national sports, wrestlers grasp one another by straps. Some 30 ways of tossing an opponent have special names.

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Leading Artists May Receive Official Grants

Outstanding painters like Jon Engilberts receive awards from Iceland's Culture Fund. Certain writers and composers enjoy similar benefits.

Ansco colors by Göran Algård

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Kodachrome by Göran Algård

Tail Ropes Haul a Vanquished Titan onto the Blood-stained Dock at Hvalfjördhur, Iceland's Whaling Station

Flensers Attack a Whale Carcass with Dissecting Rods and Hooks. From Tip to Tail, Nothing Is Wasted

Moby Dick yields quick-frozen steaks, meal for fertilizer and animal feed, glycerine for explosives, and oils for margarine, soap, lubricants, and perfumes. Vitamins come from the liver, insulin and hormones from the glands, glue from the flippers. Iceland's one whaling company operates four ships chartered from a Norwegian firm. Last year 265 whales were caught in a four-month season. Hvalfjördhur (Whale Fjord), near Reykjavik, sheltered Allied vessels in World War II.

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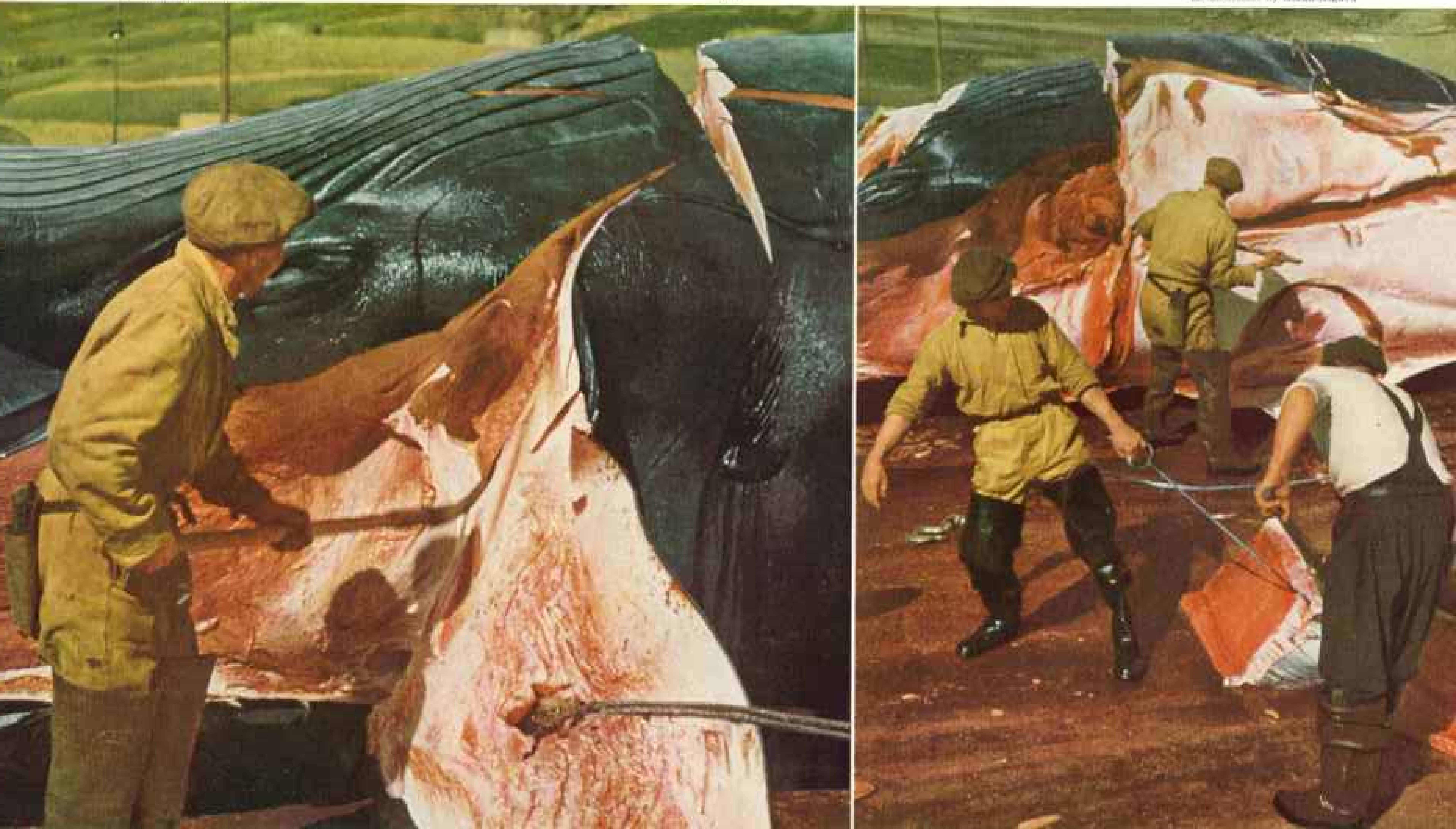
Kodachromes by Ólafur Magnússon



© National Geographic Society Ansco color by Göran Algård Kodachrome by Göran Algård

Iceland's All-purpose "Jeep," the Gentle Native Pony, Came to the Island 1,000 Years Ago with the First Settlers

Sturdy ponies have roamed Iceland's meadows and mountain pastures since Viking days. Some, in remote areas, are wild; most have been domesticated for use on farms and as transport in the rugged interior. They cost virtually nothing to keep, requiring only a little seaweed or hay when snows are deep; they repay the farmer with devotion. Great Britain formerly imported Icelandic ponies for use in mines.

Tourists Venture down a Grassy Slope to View Themselves in Keridh Crater's Dark Mirror

Iceland's face is pitted by thousands of volcanic craters. Many were formed when dying lava vents drained off molten rock from the earth's surface. Others, like water-filled Keridh (Tub) in southwestern Iceland, were shaped by violent explosions.

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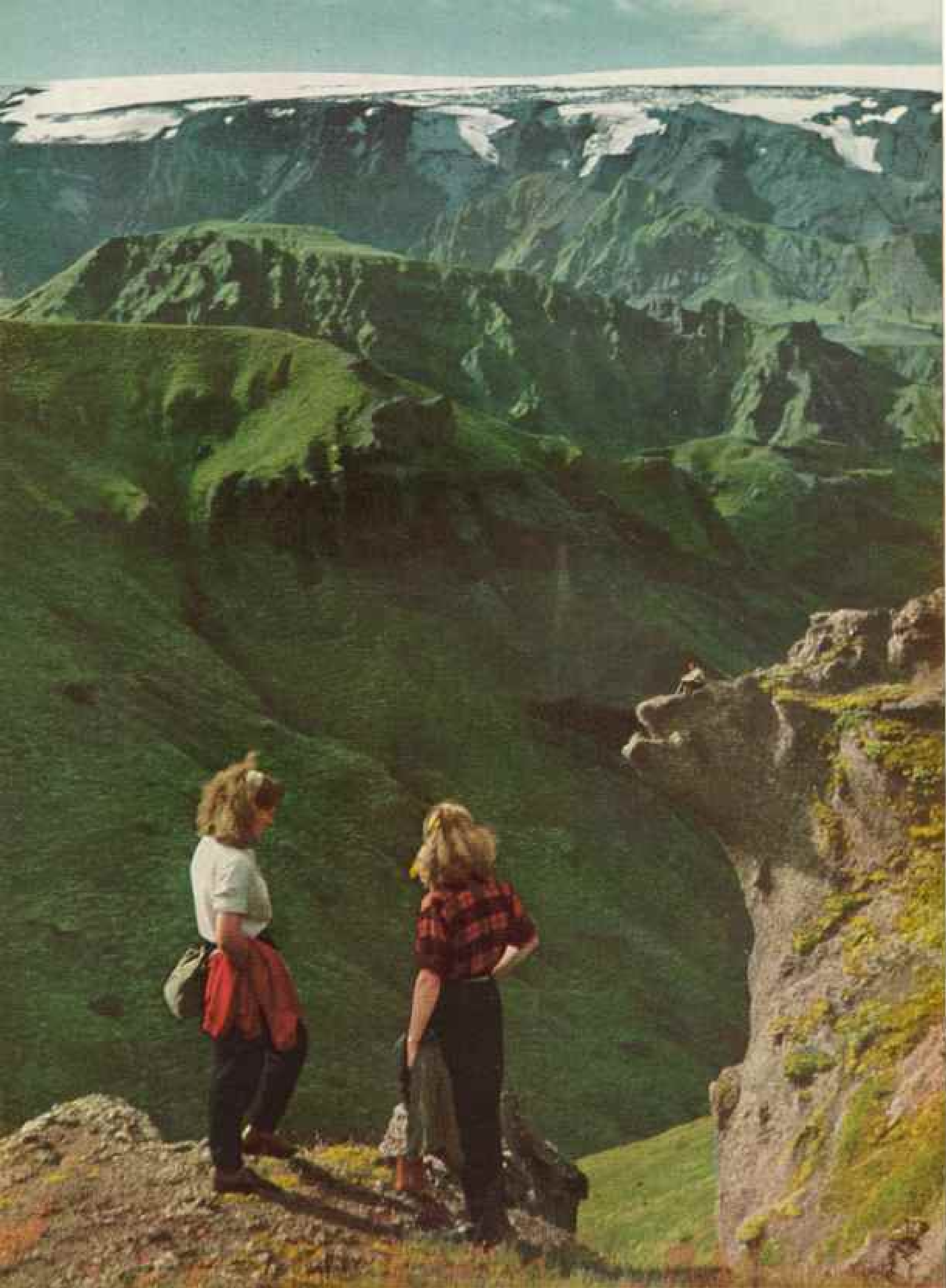
Kodachrome by Görän Algård



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Kodachrome by Giraud Alland

Gaunt Lava Hills Meet a Snow-covered Glacier High in the Interior

Much of the island consists of uninhabited volcanic highlands, awesome in their weird beauty. Grass and a few hardy plants tinge the cindery slopes with green.

because, having paid for his services, they call the doctor every time a faucet leaks or a fuse blows out!

"How much taxes would an Icelander pay who had a yearly income of $10,000?" I asked Thorvald Thoroddsen. His reply was immediate: "Eleven thousand dollars!"

Though they joke about high taxes, they are really very proud of their Government-sponsored roads which formerly were mere paths, despite their black outline on tourist maps.

Iceland Has No Railroads

Iceland does not boast even a foot of railroad track, but a visitor can circle the island by car. Busses with a seating capacity of 20 ply regularly between Reykjavik and Akureyri, the "northern capital."

Taxes also enable an Icelander to pick his entertainment out of the air. Many a long winter night is dialed away at the Government-owned radio. Each receiving set is taxed to operate the two broadcasting stations.

The fare consists of talks and lectures given by the leading men of Iceland; straight news broadcasts; foreign languages taught by experts; and music, from American jazz to symphonies.

The National Theater, newly completed, is a prize monument to sensibly planned Government taxation. It is being paid for entirely out of amusement taxes collected at movies and ice rinks.

The Dramatic Society of Reykjavik, which we saw touring the island performing *Our Town* and *Ah, Wilderness!* is all set to step onto the ultramodern revolving stage. Fitted with hydraulic lifts and the most advanced lighting equipment, the acting platform is almost as large as the auditorium.

In the last analysis, the best thing a traveler in Iceland can do is travel. He will find the country might just as appropriately have been called "Fireland," for the two mighty forces of ice and fire combine to shape this island of weird majesty. Glaciers and volcanoes exist side by side.

Vatna Jökull, on the southeast coast, is more than 3,300 square miles of immense central ice dome with icy fingers reaching almost to the southern coast.

Smouldering beneath this enormous ice mountain is part of the most active volcanic area in Iceland. The buried fires often erupt, melting and rending the solid ice above them.

Vatna Jökull's icy tentacles reach out into Ódádhahraun (Misdemeanors' Scree), one of the largest lava fields in the world.

Hundreds of gaunt craters, boiling caldrons of mud, and cinder cones make one think he is looking through a powerful telescope trained on the moon.

Still-active Hekla, one of Iceland's 120 known volcanoes, can be flown over by plane; a local company has aircraft for hire for this purpose. In former times, Hekla was thought to be the 5,000-foot chimney of hell.

During the past nine centuries it has erupted 21 times, living up to its reputation as the only outlet to the surface of the earth possessed by the Devil himself (page 602). Its name has found its way into many languages, for from it come the "Get you the Heckenfjaeld," of the Danes; and "To Hackleberg," of the north Germans.

At Mývatn I saw fantastically shaped islands, and weird castles and craggy giants formed of lava rock that look like petrified sponge. They were made when flaming lava poured sizzling into the lake (page 621).

Fifteen miles north of the water falling in white garlands over Dettifoss, lies the huge footprint of Sleipnir, steed of the god Odin. It rises from a flat lava plain, encircled by a 250-foot rock wall.

In the southwest, reached by a fairly good road, tumbles Gullfoss, the "Golden Fall." It crashes down 164 feet to shatter in foam in the midst of a lava desert. The water roars in a sudsy sheet 400 yards wide, shining with all the rainbow's colors when the sun strikes it.

Tradition says that Godhafoss, "Waterfall of the Gods," won its name when Thorgeir hurled the images of his household gods to their doom in the thundering deluge. Godhafoss rages in a grim and barren wilderness that lies close to the main road between Akureyri and Húsavik.

A waterfall in reverse is Great Geysir, which has shot a jet of boiling water into the air off and on for centuries. It has been known to reach a height of 220 feet. It is very accommodating; a 20-minute command performance can be coaxed out of it with a charge of surface-tension-relieving soap.

Great Geysir Gave Name to Natural Fountains

Such erupting fountains of hot spring water, found all over the country (page 610), were unknown to Europeans before the discovery of Iceland.

Now every tourist recounting the wonders of Yellowstone National Park speaks the tongue of Eric the Red when he says, "geyser," which means "to rush furiously."

Iceland is the camera enthusiast's paradise, where he can see great distances through the unusually transparent atmosphere.

Mount Esja, a 2,982-foot block of ice-covered lava, seen from the streets and windows of Reykjavik is a constant kaleidoscope of color under the changing play of light (page 611).

U. S. Army Signal Corps, Official

Iceland Pony, Indifferent to Fatigue, Draws a Rake Across a Lava-rimmed Meadow

Summer's abundant rainfall and perpetual sunshine make possible two or three hay cuttings in the short growing season. Since damp fields slow down sun curing, some farmers have installed air blowers. A $2,600,000 nitrogenous fertilizer plant, financed with ECA funds, will help to increase yields.

Photographers do not have to unload their "daylight" Kodachrome after supper, either, if they go to Iceland in July. American soldiers played baseball at midnight; and the Icelandic consul for Chicago, Dr. Arni Helgason, told me he came home at 2 a.m. one morning to find his neighbor industriously engaged in giving his house a new coat of paint in broad daylight.

Warrior Maidens' Armor Reflects Aurora

There is one final delight in Iceland that never fails to stir the visitor. That is the aurora borealis, dancing across the heavens with spears and curtains of light—mauve, green, and white.*

Legend says these are the Valkyries, "Choosers of the Slain," warrior maidens armed with helmets, shields, and spears. Mounted on swift steeds, they were sent by Odin to every battlefield to select brave spirits who would rally to his side against the time of the ultimate contest between the forces of good and evil.

As the Valkyries rode forth, their armor glinted with strange, flickering rays. When men saw the northern lights they knew the maidens were riding forth in their quest for heroes to conduct to Valhalla.

When our scheduled departure time arrived, I was a complete Icelandic convert. Iceland wanted to keep us, too, we think. It stormed. The snow swirled against the airport lights, and an 80-mile-an-hour wind tried to keep us from crossing the field to our big plane.

We taxied for half an hour to be sure there were no obstacles on the snow-laden runway. Finally the roar of 8,800 horses settling into harness told us we were on our way home. Thirteen hours and one minute later our bags were being inspected at La Guardia Field.

The customs officer looked at my bracelet, my eider down, and my little girl's doll.

"Is this all you have to declare from Iceland?" he asked.

"Yes, sir," I answered.

Neither the inspector nor I could possibly have set a value on the memories I carried home from the land of ice and fire. They were a store of smuggled wealth exempt alike from tax and confiscation.

* See "Unlocking Secrets of the Northern Lights," by Carl W. Gartlein, NATIONAL GEOGRAPHIC MAGAZINE, November 1947.

"Rockhounds" Uncover Earth's Mineral Beauty

By George S. Switzer

Associate Curator of Mineralogy, U. S. National Museum

YEARS ago when I first became a "rockhound," a friend and I were collecting minerals in Death Valley, California. At nightfall we built a fireplace with several large rocks, started a fire, and set some beans to heating.

Then suddenly our fireplace began to explode! We had not realized that the rocks contained colemanite, a mineral which violently flies apart into a powder when heated.

Our dinner that night consisted of a hard-to-digest mixture of colemanite and beans. Thus, in a rather explosive fashion, we added one more item to our knowledge of minerals.

Hobby Dates from Earliest Times

The world's first mineral collector probably was some savage whose eye was attracted by the beauty of a colored pebble or shining piece of rock crystal.

From earliest times men have collected attractive stones, minerals, and unusual fossils and often have looked with superstitious awe upon specimens whose origin they could not explain.

Fossilized shark's teeth long were thought to be objects which fell to earth during eclipses of the moon. Some ancient peoples even believed that certain stones brought forth young!*

Today's rock hunters, free of superstition and armed with true understanding of Nature's processes, are finding beauty hidden in the drab earth, unsuspected not only by their primitive forebears but by most people even in modern times.

Rockhounds don't just collect rocks. Despite the name of their hobby, their real interest lies in the minerals of which rocks are composed. Born of the mighty forces of Nature, sometimes deep in the earth, sometimes at or near its surface, eons ago or even in recent times, these minerals give a broad range of beauty and interest to what the average person thinks of as merely rocks.

A rock is really an aggregate of minerals. Ordinary granite, for example, is a hard, compact aggregate of feldspar, quartz, amphibole, and biotite. Other rocks may be essentially one mineral; sandstone, for example, is mostly quartz, limestone is mostly calcite (page 634).

Fossilized bones, shells, and wood also are collected by many rockhounds. Sometimes the original bone, shell, or wood gradually has been carried away bit by bit by underground water over vast stretches of time and replaced, cell by cell, with some mineral dissolved in this same water. Such fossils are unchanged in form, but have been completely transformed into opal, quartz, pyrite, or other minerals (pages 642, 651).

Hundreds of Thousands of Devotees

In the last 15 years the number of mineral collectors has grown enormously. Today, in the United States alone, they number at least 200,000; some estimates run well over a million.

Here is a hobby that has everything. It offers healthful outdoor exercise, adventure, an introduction to a new world of beauty and color, a knowledge of geography and geology, and a chance to make important contributions to the science of mineralogy.

One may enjoy minerals as jewels of rare beauty, for diamond, ruby, sapphire, and other precious gems are minerals.† Then, too, fine natural crystals of some minerals even surpass in beauty gems whose surface has been modified by cutting and polishing.

Like stamp collectors, rockhounds learn geography through their collections. Every country in the world offers minerals of special interest, beauty, or rarity.

America's great "master collection" of minerals in the U. S. National Museum, Washington, D. C., administered by the Smithsonian Institution, was gathered almost entirely by two amateurs who devoted many years and large fortunes to their hobby (pages 640, 641).

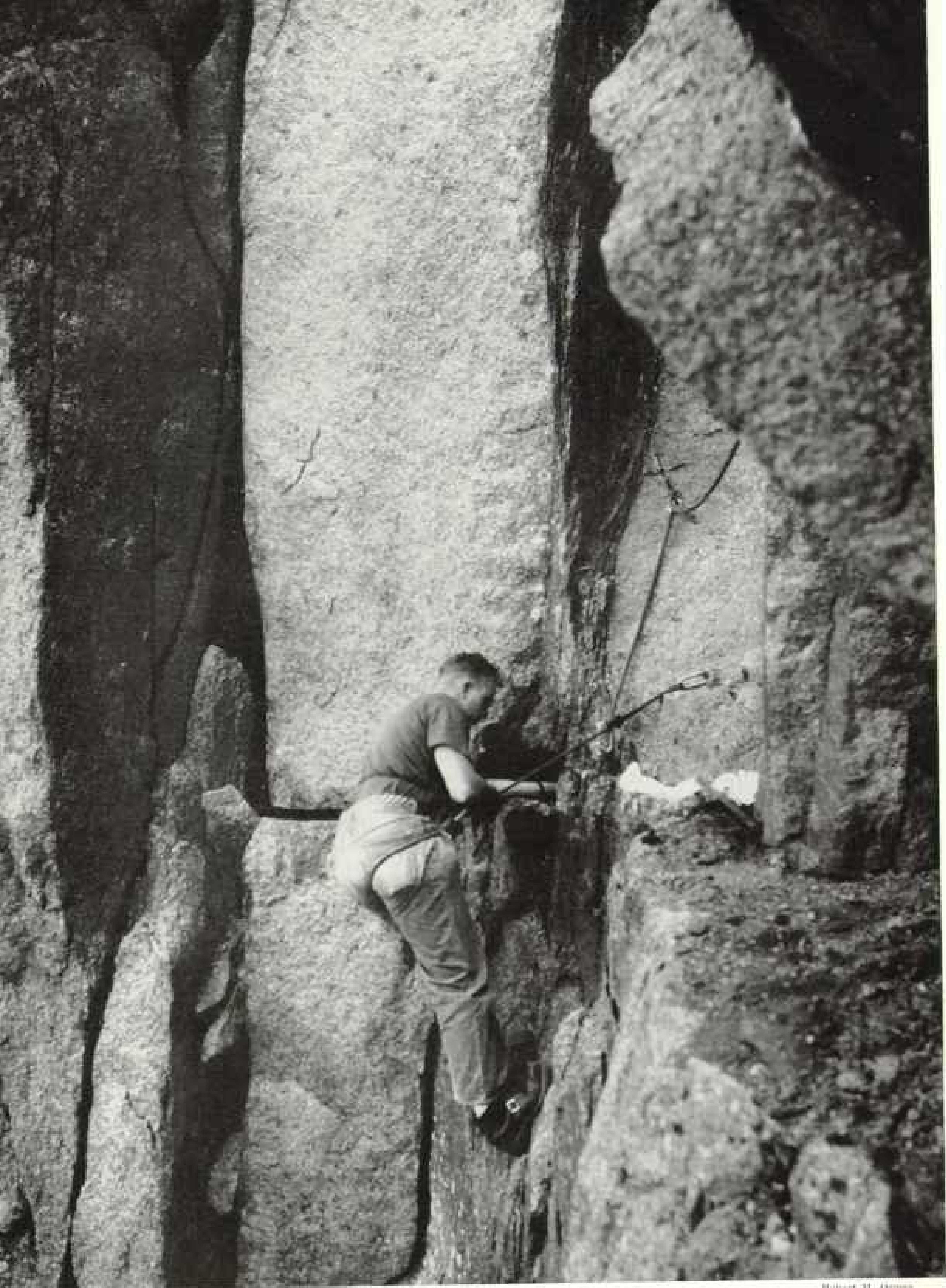
Most other important mineral collections also were gathered largely by amateurs. No branch of science owes more to the work of amateur hobbyists than does that of mineralogy.

Starting Is Easy, Equipment Simple

Since there are only about 1,600 well-defined species of minerals, a diligent collector can learn to know all the common ones and many that are rare. Discovery of a new mineral is truly a feat of which to be proud. Finding a new species is an event of far greater importance, for example, than the discovery of a new insect, for the known species of insects described to date already number around three-quarters of a million.

* See "Earth's Most Primitive People," by Charles P. Mountford; National Geographic Magazine, January, 1946.

† See "Exploring the World of Gems," by W. F. Foshag, National Geographic, December, 1950.



Robert M. Ormes

A "Rockhound," Rope-anchored to Pikes Peak, Explores a Crevice for Topaz Crystals

Mineral collecting claims at least 200,000 American devotees; some estimates place the figure above a million. Clubs devoted to the hobby number more than 300. This venturesome collector found a topaz.

Anyone can be a rockhound; he can start in his own backyard or the near-by countryside. Almost everywhere there are places to collect interesting minerals within the distance of a short walk or automobile ride, in a stone quarry, a mine, a highway or railroad cut, on a beach, a mountain, or at any place where there is an outcrop of rock. Some of the best mineral specimens collected in New York City, for example, came from subway and skyscraper excavations.

The equipment needed is simple—a prospector's pick, a knapsack, paper for wrapping specimens, and, if possible, a magnifying glass of about 10 power.

This hobby has no age limits. Many a collector, including the writer, started as a school-age "pebble pup." The Junior Rockhounds of Prescott, Arizona, is a club composed entirely of boys and girls of 7 to 15 years (page 658). Many elderly people find mineral collecting a fascinating hobby in retirement.

Clubs number more than 300, in almost every State of the Union, and hold regular meetings and field trips. Many are banded together in the American Federation of Mineralogical Societies. Conventions where collectors gather to "talk shop" and display their prize specimens are attended by thousands of persons.

Every devotee takes special pride in collecting his own specimens, but usually he also builds up his collection by swapping with fellow collectors or by purchase from dealers.

So enthusiastic a rockhound was Count Andor von Semsey of Hungary that his relatives tried to obtain a court order restraining him from spending so much of the family wealth on minerals! His collection is now in the Budapest Museum, and two minerals bear his first and last names, andorite and semseyite.

Mother Earth Plays a Prank

Experiences on field trips range from the humorous to the adventurous and even dangerous.

Once I was collecting rare minerals deposited by fumaroles and hot springs at The Geysers, in Sonoma County, California, where the earth's surface seethes and bubbles with steam and boiling water which carry mineral matter to the surface from a mass of hot rock at great depth below.

As a result, much of the ground is saturated with a solution of sulfuric acid, strong enough to eat through clothing. Unfortunately I sat on the ground several times in places where I shouldn't have. A short time later I was dodging behind trees at the approach of every sight-seer!

Dr. W. F. Foshag, Curator of Geology at the U. S. National Museum, once was collecting minerals at an abandoned mine in Mexico, where he had to climb several hundred feet down an old shaft by means of "chicken ladders," merely notched logs strung together by rope. When about halfway down the ladder, it occurred to him to ask his Mexican guide how old the ropes were. The answer was disconcerting, to say the least.

"I don't know," replied the guide in Spanish. "I have worked here only 25 years"!

Dr. Foshag had an even more exciting experience while collecting minerals deposited by hot gases escaping from the lavas of the newly born Paricutin Volcano in Mexico (page 636).*

The volcano was in frequent and violent eruption. While walking across a large open ash field, he was caught in a shower of volcanic bombs. These are more or less spherical chunks of lava which are thrown out of the crater by gas explosions to heights of several thousand feet. They fall with tremendous force.

One such bomb, about a foot in diameter and weighing 30 or 40 pounds, missed the scientist by only a few feet. It had a surface temperature of over 400° Fahrenheit and was red hot inside!

"Hair-raising" Experience

I once had a literally hair-raising experience while collecting aquamarine crystals near the summit of Antero Peak, 14,245 feet high, in the Colorado Rockies.

A particularly intense thunderstorm passed over the sharp ridge upon which I was working. I felt a peculiar prickly sensation on top of my head, and, in passing my hand over it, found my hair was standing straight on end like a hairbrush because of the strong electrical field generated by the storm.

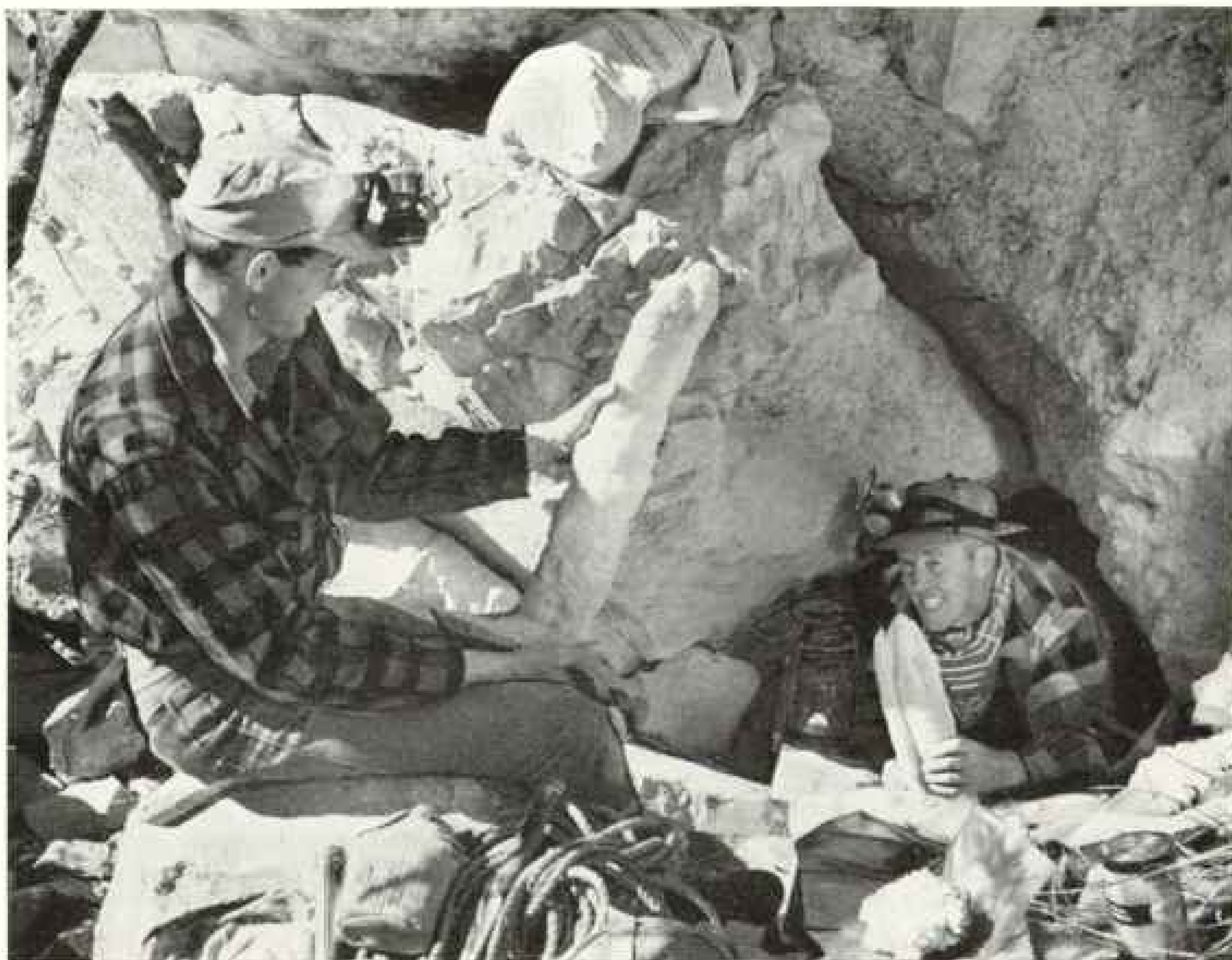
I hastily jumped to a steep snow field near by and, using a shovel as a sort of sled, slid several hundred feet down in a matter of seconds.

Later a high-voltage expert told me: "It was fortunate that you got off the ridge as quickly as you did. The fact that your hair was standing on end meant that the next stroke of lightning very likely would have hit you!"

Stone quarries are fine places to collect specimens, but they should not be entered until one is sure that there is no blasting about to start. A friend of mine learned this the hard way.

Late one afternoon he visited a large trap-

* See "Paricutin, the Cornfield That Grew a Volcano," by James A. Green, NATIONAL GEOGRAPHIC MAGAZINE, February, 1944.



National Geographic Photographer Willard R. Culver

Collectors Emerge from an Arizona Cave with "Icicles" of Calcite

Water, dripping from the ceilings of limestone caves, builds layers of calcite, the basic ingredient of limestone. Eventually the deposits grow, icicle-fashion, into weirdly beautiful stalactites and stalagmites. This cave in the Santa Catalina Mountains yielded clusters of aragonite crystals (lower right). Calcite and aragonite have the same chemical formula (calcium carbonate), but differ in crystal structure.

rock quarry near Meriden, Connecticut, in search of specimens. Seeing no one about, he scrambled up a five-foot face of rock bench across the quarry floor and continued to the main quarry face. Then he discovered why no workmen were in sight. At that moment blasts started to go off.

The first blast consisted of a long line of charges set parallel to, and about 10 feet back from, the edge of the low face over which he had scrambled only seconds before. Five successive blasts moved across the quarry floor, each about 10 feet closer to where he lay prone behind a large boulder. The last one went off only about 40 feet from him.

When he stood up and dusted himself off, he was sighted by an angry quarry foreman who told him in most forceful language that blasting is usually done either during the workmen's lunch hour or, as in this case, after they have quit for the day. Moral: No matter what time you go into a quarry, check with the foreman first! And don't forget the ever-present danger of falling rock.

Once, in collecting minerals, I used improvised skis, not on snow but on mud. Three of us visited Borax Lake, in northern California's Lake County, where borax was first discovered in California in 1856, many years before the famous Death Valley "20-mule-team" deposits were known.

"Skiing" on Borax Lake

This small lake normally has water in it, but that year, after a dry winter, it consisted of a soupy mud, many feet deep, covered by a thin crust of salts.

Since the salt crust would not support our weight, and the mud was a bottomless quagmire, we improvised skis by tying one-by-six-inch planks to our shoes. With these we moved over the lake at will, collecting salts from the surface and bringing them up from below with garden rakes.

Collecting trips range from one-man expeditions to large caravans sponsored by mineral societies. The largest to date was a group of 320 cars and more than 1,000 collectors who

assembled on the Mojave Desert near Hoover Dam to collect agates.

A good collector must have infinite patience. A fine crystal may have considerable value if taken out with care, attached to the matrix, or surrounding rock. If carelessly broken out, however, and bruised or marred in the process, it may be almost worthless.

Hours or even days may be needed to work a specimen out of the enclosing rock. I know of one collector who labored for three weeks with hammer and chisel, "drifting" or following a vein of wulfenite in the wall of an abandoned mine tunnel for a distance of 30 feet.

He reasoned that if he followed the vein he might find a place where it opened into a cavity, because in such locations unusually fine crystals are most likely to have been formed. After three weeks of backbreaking labor, he did find a cavity and was rewarded by several magnificent specimens of brilliant orange-red crystals of wulfenite, or molybdate of lead (pages 643, 646, 647).

For the creation of her minerals Nature calls on all of the giant forces at her command, including the action of water, great pressure inside the earth, or the heat of volcanoes. Most minerals are formed by various combinations of these agents.

How Minerals Are Formed

Minerals come into being through three fundamental processes: formation from solution, just as sugar crystals often form on the bottom of a jar of maple syrup; formation by the cooling of a fused, or molten, mass, much in the way that molten metals congeal and crystallize after being poured into a mold; and formation from gas by "sublimation," a process in which a gas passes directly to the solid state without going through an intermediate liquid condition.

One of the most important processes is formation from solution, with water as the chief solvent. Water dissolves substances in the earth's crust, rearranges them according to its fancy, and redeposits them as minerals. This water may fall originally as rain, or it may be "magmatic" water from the bowels of the earth which ascends to the surface as the steam of volcanoes or in hot springs.

Minerals formed by rain water are found within a few hundred feet of the surface. They form the calcite of stalactites and stalagmites in caves, the beautiful copper minerals, azurite and malachite, in the near-surface portion of copper mines, and the saline minerals such as halite (rock salt) found in arid regions like the Mojave Desert.

Magmatic waters are directly connected with large, deeply buried reservoirs of molten rock, or magma, from which comes the lava of our volcanoes. These waters generally operate deep within the earth's crust, and their handiwork is revealed millions of years later where erosion has cut away the great thickness of overlying rock.

It is these waters that have deposited minerals containing gold, silver, copper, zinc, lead, tin, and other useful metals in veins and other types of ore deposits.

Minerals formed by fusion have crystallized directly from magma. They make up the igneous, or fire-born, rocks, such as granite and similar coarse-grained, deep-seated rocks, and lavas such as basalt, products of volcanic activity. Most important of the minerals formed in this way are the rock-forming silicates, including feldspar—most abundant mineral in the earth's crust—amphibole, pyroxene, and mica.

Making Diamonds Is Nature's Secret

Formation of diamonds from carbon probably is linked to this process, but the exact details of a diamond's birth continue to be one of Nature's most closely guarded secrets. Numerous attempts have been made to "grow" diamonds in the laboratory. Trying to simulate conditions deep in the earth, Prof. P. W. Bridgman, Harvard's specialist on high pressures, subjected carbon to pressures as high as 400,000 pounds per square inch and to temperatures up to 3,600° Fahrenheit, but no diamonds resulted.

Minerals formed from vapor crystallize by passing directly from vapor to the solid state, but this process is rare. Sulfur crystals formed from hot gases issuing from fumaroles, or steam vents, in areas of recent volcanic activity are perhaps the most important example. There sulfur actually can be seen in the process of being formed.

An average sample of the earth's crust contains about 9 percent aluminum, 5.5 percent iron, but only .01 percent zinc, .008 percent copper, .004 percent tin, .002 percent lead, .0005 percent uranium, .0000006 percent gold or platinum, and most other metals in similar order of magnitude. In spite of our modern highly efficient methods of recovering metals from ores, it obviously would be impossible to work with ores of such low grade.

The only reason that we have available for use such metals as copper, lead, zinc, silver, gold, uranium, and a great many others is that Nature has performed a remarkably good preliminary concentration by segregating abnormally large amounts of these scarce elements in certain spots in the earth's crust. These are our ore deposits.

How are ores formed? Geologists think

Mineral Hunters Risk Death on Mexico's Paricutin Volcano

Dr. W. F. Foshag, Curator of Geology, U. S. National Museum, and Celedonio Gutiérrez, an Indian guide, braved a Paricutin eruption in 1944. Crossing an open ash field, they were caught in a shower of volcanic rock.

"Lava bombs were dropping all around us," Dr. Foshag recalls. "We couldn't see them coming, but we could hear their high-pitched whistles. At first we ran, but there was no place to hide. Finally we decided it was safer just to stand still."

The shower lasted five minutes. One 40-pound missile, with a surface temperature of 400°, missed Dr. Foshag by a few feet (page 633).

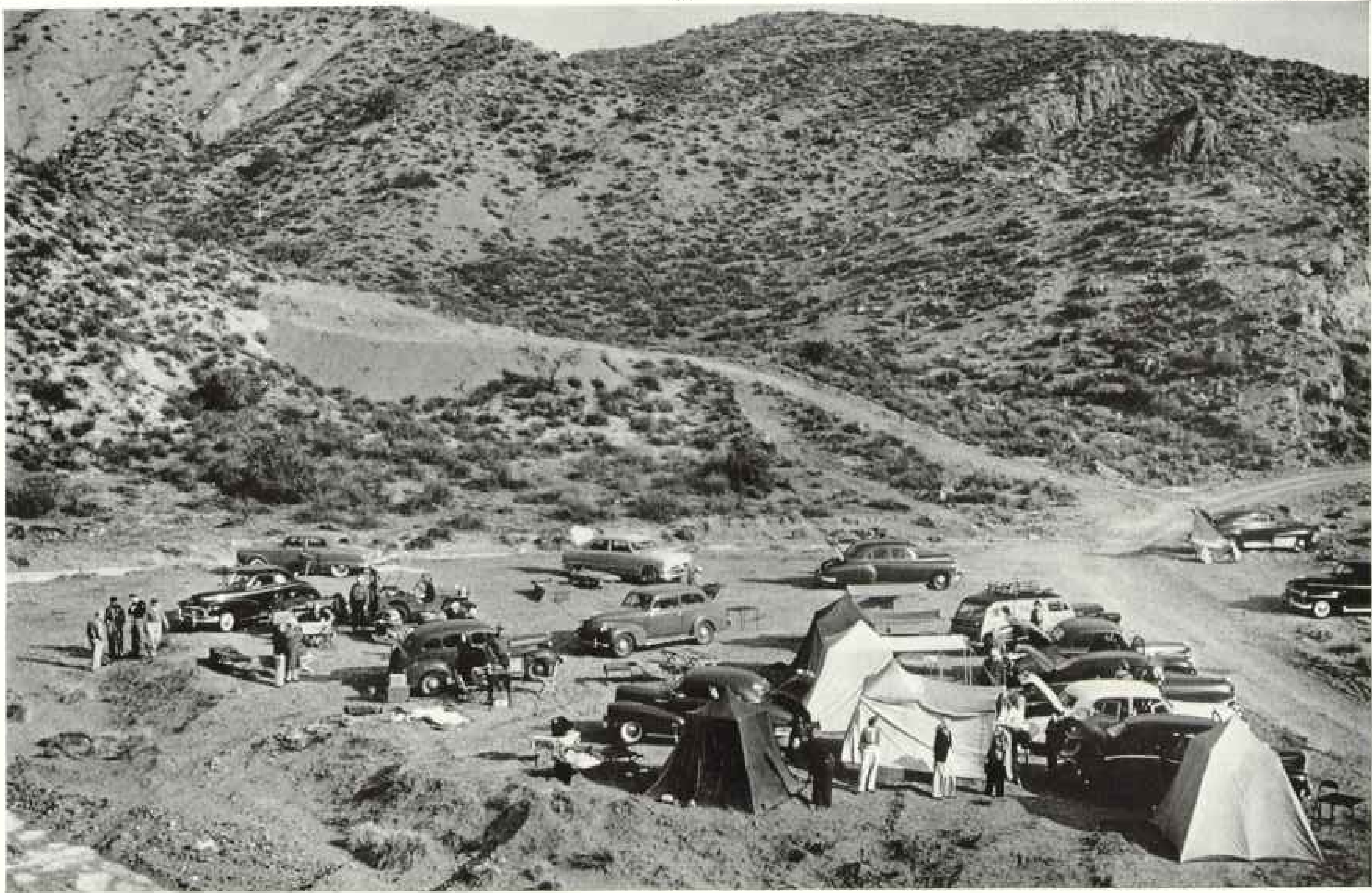
This picture was taken several days later at the crater's rim. Dr. Foshag (background) hoped to obtain sal-ammoniac crystals in the crater. Steam jets, however, prevented his approach.

Ward Smith

↓ Rock Collectors Camp Out in the Rocks

Amateur mineralogists love to "rough it" on field trips. Arriving by car, they explore hillsides and gullies by foot. Night finds them gathered by fires, singing songs and telling tales. One outing, a Mojave Desert agate hunt, drew more than 1,000 rockhounds in 320 automobiles. This Los Angeles group, seeking gypsum and other minerals, camped near Saugus, California.

National Geographic Photographer Willard R. Culver



that as a mass of molten rock cools deep within the earth's crust, the common silicate minerals crystallize out first, leaving a liquid that becomes progressively richer in materials such as copper, lead, or gold. Finally the cooling rock liquid, containing heavy concentrations of these elements, fills cracks or crevices known as veins, which become our present-day deposits.

Indians Worshiped Copper Boulder

One of the largest and most noteworthy mineral specimens in any collection in the United States today is the famous Ontonagon copper boulder in the U. S. National Museum. It came from near Michigan's Keweenaw Peninsula, in the Lake Superior region, formerly one of the most important copper-producing areas in the world.

This specimen of nearly pure native copper weighs about three tons. Not only is it of interest for its size, but it could tell a fascinating story. It was worshiped by superstitious Indians for years, was the goal of mining adventures while the flag of England still flew over this Great Lakes region, and was sought by explorers and scientists on hazardous expeditions.

About the middle of the 17th century, Jesuit missionaries and French explorers around Lake Superior found among the Indians pieces of copper weighing 10 to 20 pounds. In 1667 a piece of copper weighing 100 pounds was brought to Father Claude Dablon, a Jesuit, and was reported to have come from the Ontonagon River.

In 1819 Gen. Lewis Cass's party visited the boulder. His men were able to move it only four or five feet, and another party two years later had no better success.

Meanwhile, Julius Eldred, a hardware merchant of Detroit, heard about the boulder. For 16 years he schemed and planned how he might remove it to civilization.

In 1841 Mr. Eldred led an expedition to the mouth of the Ontonagon River and bought the boulder from the Indians for $150. The party then went 26 miles upstream to a point on the fork of the main river where the boulder was situated. They managed to raise it on skids, but could not move it, and had no better success the next summer.

Moved on Portable Railway

In 1843 Mr. Eldred went from Detroit with materials for a portable railway and car. Arriving at the boulder, he was chagrined to find it in the possession of a party of miners. He had to buy it again, this time for $1,365!

It took a week for the party of 21 persons to get the boulder up the 50-foot hill near the river; then they moved it on the car and wooden railway track for four and a half miles through dense forest and across deep ravines to the main stream, thence to Lake Superior.

Here Mr. Eldred was confronted by an order from the Secretary of War seizing the boulder and allowing him an amount not to exceed $700 for his costs. He appealed to Congress and finally received $5,664.98. The present-day value of the boulder for its copper content would be about $1,500.

Eventually the boulder was carried to Washington, D. C., by way of Buffalo, the Erie Canal, and New York City. Sometime after 1855 it was taken to the National Museum.

Other copper masses of immense size were encountered from time to time in the Lake Superior mines. The largest, found in 1857, measured 45 by 22 by 8 feet and weighed about 420 tons.

Although of great value, these huge masses of nearly pure metallic copper posed unusual problems in mining, because the toughness of the metal made it difficult to break them down to a size that could be removed from the mines.

Large masses of other pure native metals have been found in various localities, such as a 190-pound gold nugget from Victoria, Australia (present-day value nearly $80,000), a 200-pound mass of gold in a quartz vein from New South Wales, Australia, a 22-pound nugget of platinum from the Ural Mountains, worth about $25,000 today, and huge masses of pure silver at Cobalt, Ontario, of which a 1,640-pound sample is preserved in the Parliament Building in Ottawa.

Minerals from Outer Space

Outer space also is a source of minerals. Constantly arriving on earth are the meteorites, the rock fragments of some shattered planet believed to have moved once in an orbit between Mars and Jupiter. When it broke up, this planet yielded the group of celestial bodies we now call the asteroids, as well as clouds of much smaller particles.

Astronomers estimate that hundreds of millions of these particles enter the earth's atmosphere every day, and that several millions are big enough to form visible "shooting stars," or meteors. Most of them, in just a few seconds, are heated to incandescence by friction with the air and consumed.

A few meteors are large enough to reach the earth without being burned up, and we call these meteorites. It is estimated that they fall at the rate of about one metric ton a day.

Meteorites long were believed to be supernatural, and when one was seen to fall, with the accompanying flashes of light and loud explosions, it created great fear. The earliest

National Geographic Photographer Ernest J. Cottrell

Young Museum Visitors Join the Author in Inspecting a Famed Copper Boulder

This three-ton lump of native metal, once worshiped by Indians, was discovered in Michigan's Lake Superior region in 1766. Several expeditions tried in vain to move it. In 1843 Julius Eldred, a Detroit merchant, carried it off by portable railway and raft, only to have his prize seized by the Secretary of War (opposite page). The National Museum, custodian of the boulder, values its copper content at about $1,500. Here Dr. Switzer indicates chisel marks, probably made by some early explorer.

authentic meteorite of which portions are still preserved is one which was seen to fall at Ensisheim, Germany, on November 16, 1492, a little more than a month after Columbus discovered America.

The first meteorite seen to fall in the United States, at Weston, Connecticut, in 1807, was reported by two Yale professors, Benjamin Silliman and James L. Kingsley. Of this report Thomas Jefferson, it is said, remarked that it was easier to believe that two Yale professors would lie than that stones should fall from heaven!

Not until the early 1800's was it finally accepted that meteorites actually come from outer space, in spite of the fact that some primitive peoples considered meteoric iron sacred because it came from the heavens. Some of the ancient names of iron mean "metal from heaven."

But most meteorites are not iron; in fact, about 93 percent of all those known are of the stony type. They are not dissimilar to many earthly rocks in appearance, except for a thin brown crust of fused stone, the result of heating as the meteorites sped through the atmosphere.

Fewer than 1,500 separate meteorite falls

are known, and not many of these were actually witnessed. Perhaps if rockhounds in the field would keep meteorites in mind while collecting other specimens, new finds would be made more frequently. Since there are relatively few known falls, the discovery of a new meteorite is a matter of considerable importance.

Most minerals in meteorites are the same as those found in terrestrial rocks, including nickel-iron, diamond, graphite, magnetite, quartz, olivine, pyroxene, and feldspar. But some rare minerals never found on earth are known only in meteorites, such as cohenite and schreibersite.

230 Possible Crystal Patterns

Nearly every mineral, when allowed to form without external interference, will assume the shape of a solid bounded by plane, or flat, surfaces. These solids are crystals. Well-formed crystals are minerals at their best and are highly prized by collectors. Most people find it hard to believe that crystals, with their mathematically exact, brilliant faces, are really the work of Nature and have not been cut and polished.

Crystals constitute the finest example of order in Nature. With very few exceptions, all minerals are crystalline—that is, their atoms are precisely arranged in orderly rows and layers, in a pattern which is repeated over and over again in three dimensions, much as the pattern of wallpaper is repeated in two dimensions.

This orderly atomic arrangement is the fundamental characteristic of crystalline materials, as opposed to the haphazard arrangement of atoms in noncrystalline substances, such as glass. Natural crystal faces are the outward expression of orderly atomic arrangement within, since all the faces must be parallel to a plane of atoms.

There are only 230 different fundamental patterns into which atoms can be arranged so as to yield a design which can be repeated indefinitely in three dimensions. These are the 230 space groups, which can be further divided into the six great crystal systems, known as isometric, tetragonal, hexagonal, orthorhombic, monoclinic, and triclinic.

These six crystal systems are characterized by the nature of the simplest set of imaginary lines, called axes of reference, that can be passed through them, and to which the individual crystal faces can be referred.

Crystals grow from the center outward because atoms are attracted by electrical forces to other atoms of the same type already on the surface of the crystal. The additional atoms arrange themselves in orderly layers, layer on layer, on the original seed, or nucleus.

Crystals may be so tiny as to be invisible even under a high-powered microscope, or they may be many feet in length. Among the largest known were the huge spodumene crystals found in the Etta Mine, in the Black Hills of South Dakota, which reached a length of about 40 feet.

Crystals assume many different shapes, depending on the number and relative size of the faces. The least number of faces possible, is, of course, four, and a four-sided crystal is known as a tetrahedron. At the other extreme, a rare mercury mineral, eglestonite, from Texas produced a crystal having 482 individual and distinct faces, all on a crystal less than 1/25th of an inch in size.

In the vast majority of cases a mineral cannot assume perfect crystal form because other crystals near by block its growth in some directions, as, for example, the crystals of the various minerals in granite.

Roebling Collected 16,000 Specimens

Of all the great collectors of minerals during the past century, perhaps the most interesting was Col. Washington A. Roebling. He gathered more than 16,000 specimens which were given to the U. S. National Museum in 1927 by his son, John A. Roebling, in memory of his father.

Colonel Roebling collected minerals even while serving in the Civil War. Among his specimens is a small piece of gold, with a neatly folded label written in his characteristic fine and perfect script: "A minute spec. of native gold from the U. S. Gold Mine on the Rappahannock, in which I slept the night before the Battle of the Wilderness."

As a military engineer, he built suspension bridges across the Rappahannock and across the Shenandoah River at Harpers Ferry. After the war, joining his father's firm, he completed the construction of the Brooklyn Bridge, a marvel of its day and the first of such great suspension bridges built in the United States.

While directing work on the bridge, he contracted the dreaded caisson disease, or bends, as a result of coming to the surface too quickly after working in the compressed air used to keep water from entering the caissons.

Though this made him an invalid, he devoted himself to mineral collecting for the next 50 years. His love of his hobby undoubtedly prolonged his life. Near the end, when his sight was failing, he remarked, "My life is over, as I can no longer see my minerals."

Colonel Roebling knew his vast collection so thoroughly that he could describe instantly the specimens representing any species. His

collection contained all but 12 of the names in the index of the sixth edition of Edward Salisbury Dana's *System of Mineralogy*—an unparalleled feat.

Smithsonian Collection World's Best

As a result of these efforts put forth by a man who collected minerals as a hobby, the U. S. National Museum now has the most extensive mineral collection in the world, of inestimable value for research.

When Colonel Roebling's collection was deeded to the National Museum, its value was conservatively estimated at $250,000. With income from a generous endowment fund that went with the collection, new specimens constantly are being purchased, so that the present value of the collection is far higher.

Another of the great rockhounds was Frederick A. Canfield of Dover, New Jersey, who in 1926 gave the Museum a collection of some 7,000 fine mineral specimens. Included in it is one of the earliest mineral collections ever made in America, begun in 1808 by Mahlon Dickerson. The most exceptional specimens in the collection are those gathered by Mr. Canfield's father from the long-famous zinc mine at Franklin, New Jersey.

This locality is a byword among mineral collectors, since in addition to producing spectacular crystal groups of many minerals, it has yielded also nearly 150 different mineral species, many of which are brilliantly fluorescent. After more than 100 years of continuous operation, this mine is nearly exhausted and is to be shut down in about two years.

Funds left by Mr. Canfield are used to add constantly to his collection.

Mineral collections such as these probably will never again be equaled, since they contain the finest specimens from localities long since depleted. These collectors also had considerable wealth for the purchase of specimens and were able to devote a lifetime to their hobby.

Most rockhounds specialize in a single phase of mineral collecting, if only because a collection quickly becomes both bulky and heavy.

Some, interested in geography, try to obtain a specimen of a common mineral, such as quartz, from every State in the Union, or perhaps eventually from every country in the world.

Excited Atoms Glow Like Coals

One of the popular specialties is collecting fluorescent minerals (pages 656, 657). Such minerals glow in the dark when viewed under invisible ultraviolet, or "black," light, revealing beauty and color that remain hidden in ordinary daylight.

Fluorescence may be explained roughly by saying that the mineral, which is made up of atoms, is in a condition of strain because of the presence of foreign atoms that are too large or too small to fit properly into their surroundings. When excited by the energy of the "black" light, this strained network of atoms vibrates and gives off visible light, causing the specimens to glow like hot coals.

Many minerals which are ordinarily dull and drab looking are transformed by fluorescence into dazzling splashes of color of nearly every hue. A good exhibit of fluorescent minerals can be truly a breathtaking sight.

One method of identifying minerals in rocks is to pass polarized light through very thin sections with the aid of polarizing prisms in a special microscope. Unlike ordinary light, which vibrates in all directions, polarized light vibrates in one direction only. Such light brings out characteristic colors and structures used in identification (page 652).

"Micromounts" Unequaled for Beauty

Many rockhounds collect "micromounts," thumbnail-size specimens whose minute patterns and colors are visible only under a microscope (pages 652, 655). Each specimen is mounted in its own tiny cardboard box. A collection of thousands of such specimens can be stored in a cabinet no larger than a console radio.

Micromount collectors prefer crystallized material, and crystals are generally more perfectly formed when small. A good micromount, properly mounted and lighted, has no equal for beauty and perfection of form. For viewing micromounts, one needs a good wide-field binocular microscope having a magnification range of from about 10 to 60 or more power.

Some rockhounds are interested primarily in minerals of economic importance, or in the chemical, optical, or physical properties of minerals. Others specialize in collecting fossils, though, strictly speaking, these are not minerals.

Fossil collecting is especially popular in many of the Midwest States, where fossils are abundant in limestone and sandstone deposits laid down on the bottoms of ancient seas. Rocks in which minerals are found in great variety are scarce in this section.

One of the most popular specialties for rockhounds is the cutting and polishing of gems, or lapidary work. The amateur lapidary collects only minerals that will take a high polish and have sufficient beauty to be used as ornaments. From these he fashions gems of all kinds, often with a skill equal to that of the best professionals.

The rise of the lapidary movement in the past few years has been phenomenal. Less

than 20 years ago only a few firms manufactured lapidary equipment, mostly for professionals. Today there are dozens of firms manufacturing it for home use, and thousands of amateur lapidaries.

Lapidary work is also being used very extensively by the armed forces as part of their recreation, physical therapy, and rehabilitation programs for servicemen and veterans.

Some lapidaries cut mostly smooth, domed-top stones known as cabochons (page 650). Others prefer to make faceted stones, those cut with a large number of flat faces (page 655), such as the familiar brilliant-cut diamond. Still others may specialize in large, flat, highly polished slabs for making book ends, ash trays, or penholders.

Agate Popular with Lapidaries

Agate is one of the most popular materials of the amateur lapidary. A hard, tough variety of quartz, it takes a high polish and offers an almost infinite variety of colors and patterns. Unusually fine agates are found in many areas in the West and Southwest, especially California, Montana, New Mexico, Oregon, Texas, and Washington.

Individual agate collections may contain thousands of specimens, including forms such as moss, plume, iris, landscape, and others, all named for their resemblance to these things.

Many agates come from "thunder eggs," more or less spherical nodules of agate found in cavities formed in molten volcanic rock by steam and other hot gases. The agate was carried into these cavities by underground water over a long period of years. Thunder eggs were so named by American Indians, who thought they were hurled down from the craters of Mount Hood or Mount Jefferson in Oregon when the spirits of the mountains were angry.

Petrified or opalized wood, petrified dinosaur bones, jade, marble, travertine, and, of course, all the well-known gem minerals also are popular materials for cutting and polishing.

Amateur lapidaries also cut spheres and beads (page 650), make miniatures or carve cameos, or combine these with metalwork to make their own jewelry. One craftsman in Baltimore, Maryland, has created his own silver dinner service, each piece with a beautifully cut and polished agate handle.

Naming of minerals usually is left to the discretion of the namer. Most names end in -ite, although many of the ancient names, such as galena and cinnabar, do not follow this rule.

Many minerals that have been known since ancient times were named from the Greek, usually in allusion to some outstanding property. Hematite, oxide of iron, was named by Theophrastus about 325 B. C., from the Greek *haima*, blood, from the color of its powder. Scorodite, arsenate of iron, received its name from the Greek *skorodon*, garlic, because it emits a disagreeable garliclike odor when heated.

Stinkfluss was a name applied in the middle 1800's by German miners to a peculiar variety of fluorite from Wölsendorf, Bavaria. When struck with a hammer, this mineral produces a highly unpleasant odor, reported to have caused headaches and nausea among miners.

Other names come from the locality in which a new species is first discovered. Among them are coloradoite from the State of Colorado; benitoite for San Benito County, California; franklinite for Franklin, New Jersey; labradorite for Labrador; brazilianite for Brazil; and many others.

Minerals Named for Famous People

Other minerals have been named after famous people. Willemite, a zinc silicate, was named in 1830 in honor of Willem I, King of the Netherlands. Goethite, a hydrous oxide of iron, was named in 1806 for Goethe, the great German poet-philosopher. Smithsonite, zinc carbonate, honors James Smithson, founder of the Smithsonian Institution. In 1946 a new mineral from Bolivia was named rooseveltite, for Franklin D. Roosevelt. Afwillite is a contraction of the name of Alpheus F. Williams, a noted authority on diamonds.

There is an amusing story of the way in which the mineral gieseckite was named in 1813.

During the Napoleonic Wars a Danish ship was captured by the British Navy en route from Greenland to Copenhagen. In her cargo were several boxes and barrels of minerals. These were purchased at auction by a Scottish mineralogist, Thomas Allan, who knew only that the collection came from Greenland. He found among the specimens two species not known before. One he named sodalite; the other was named allanite in his honor by Dr. Thomas Thomson.

Later, in 1813, Allan learned that the collection had been made by a mineralogist named Giesecke, who had spent seven and a half years in Greenland, having been delayed by the war. Learning of the capture of his first mineral collection, Giesecke laboriously retraced his steps to duplicate it.

When Giesecke finally returned home, he found that his Greenland minerals, including two new species, had already been described by Allan, no doubt most discouraging news

after his many years of work. As a sort of "consolation prize," Allan named a rather poorly defined, nondescript-looking alteration product of nepheline, gieseckite!

Mercury from Ancient Mine

Of the 90-odd known chemical elements, only about 20 exist in the native state, including gold, silver, copper, platinum, sulfur, diamond, and graphite. Mercury, sometimes found as a pure metal in Nature, is a liquid mineral.

Gold, sulfur, and diamond have the greatest commercial importance in this group, because practically all production of these important materials comes from deposits where they are found as the pure native element.

Greatest gold-producing area of the world is the Witwatersrand in South Africa. The Belgian Congo was the source of two-thirds of the nearly 3¼ tons of diamonds produced in the world in 1950. Our sulfur is found largely in the salt domes of Louisiana and Texas.

National Geographic Photographer Willard R. Culver

Deep in a Lead-zinc Mine, a Rockhound Finds Wulfenite

This man descended 800 feet at Los Lamentos, Chihuahua, Mexico, to collect the lead molybdate. White veins are calcite.

Most of our metals come from the sulfide group of minerals, such as copper, lead, or zinc. Chalcocite, a lead-gray sulfide of copper, and chalcopyrite, a brass-yellow sulfide of copper and iron, are the sources of the copper mined in the district around Butte, Montana, sometimes called "the richest cubic mile on earth."

Magnetite Guided Early Mariners

Cinnabar, the most abundant mercury mineral, was mined by Romans at Almadén, Spain, long before Christ, and this same mine still is one of the world's greatest producers of this metal. The brassy color of pyrite, sulfide of iron, has earned it the name of "fool's gold" (page 655). The Greeks used it to strike sparks of fire. Today it is used mainly in making sulfuric acid.

Practically all our iron comes from members of the oxide class of minerals—hematite, magnetite, and goethite. Hematite, the most abundant, is found in enormous quantities in the great iron-mining districts, such as the Mesabi Range in northern Minnesota. Magnetite sometimes behaves as a natural magnet, called lodestone, from which early mariners made their first rude compasses.

Chromite gives us chromium, while aluminum is produced from bauxite. Cassiterite, the principal tin mineral, is one of the few found nowhere in the United States in large quantities. For this reason tin is a metal placed high on the "strategic list" in times of

war. Deposits on the Malay Peninsula are the world's richest.*

Quartz, oxide of silicon, is the second most abundant mineral in the earth's crust, in rocks such as granite, gneiss, sandstone, quartzite, and beach sands. In addition, quartz has important uses in the manufacture of glass, sandpaper, oscillators for the control of frequency of radio transmitters, and many others.

Chalcedony, a fine-grained variety of quartz, in its almost limitless ramifications of color and form, provides the rockhound, and especially the amateur lapidary, with a wide variety of materials, such as agate, jasper, bloodstone, carnelian, onyx, and petrified wood.

Perhaps the most important of all the oxides now is uraninite, oxide of uranium. This heavy black mineral and the bright-yellow and orange uranium minerals associated with it are the world's chief source of the essential ingredient both for the atom bomb and for peaceful uses of atomic energy. The three greatest uranium mines are in the Belgian Congo, Canada, and Czechoslovakia.

Carnotite, containing potassium, vanadium, and uranium, is one of the important sources of uranium in this country. It is mined extensively in deposits widely scattered throughout the Colorado and Utah plateau country.

Even Ice Is a Mineral

Ice too is a mineral, an oxide of hydrogen, which, in addition to its well-known forms as ice, snow, and frost, is an important rock-forming mineral in glaciers and in the icecaps of Greenland and Antarctica.

Our common table salt, chloride of sodium, is halite, one of the halide class, compounds of metals with fluorine, chlorine, bromine, or iodine. The oceans contain some 4,800,000 cubic miles of common salt. Another of the halides, cerargyrite, or silver chloride, was named "horn silver" by early miners in allusion to its brown, waxy appearance and the fact that it could be cut with a knife.

Calcite, or calcium carbonate, is the chief constituent of limestone and marble, and portland cement and lime are manufactured from it.

Kernite, sodium borate, is the most important commercial source of borax. This mineral is unique among ores because the processing of it yields nearly one-third more borax simply by adding water. Kernite is mined at Kramer, in the Mojave Desert, California, the world's largest single source of this commodity.

Nitrate deposits are extremely valuable as sources of fertilizers and explosives. The largest are in Chile's renowned Atacama Desert, an area so arid that often no rain falls for several years.

Most important of the phosphates is collophanite, chief constituent of phosphate rock, a brown to gray earthy-looking material which is our chief source of the phosphorus used in fertilizer. In the United States it is formed in Tennessee, Wyoming, Idaho, and along the Atlantic coast from North Carolina to Florida.

Gypsum Windows for Beehives

Most common of the sulfates is gypsum, a calcium sulfate containing water. When powdered and partly dehydrated, this mineral becomes plaster of paris. The Romans placed windows made of clear cleavage flakes of gypsum in their beehives so that the bees could be seen at work.

Silicates are metals in combination with atoms of silicon and oxygen, some with and some without water. The most important of the silicates are feldspar, pyroxene, amphibole, and biotite, for these minerals, plus quartz, compose more than 90 percent of the earth's crust to a depth of 10 miles.

The micas are characterized by their flaky, or micaceous, structure. Muscovite, one of the micas, in addition to being a common constituent of many types of rock, sometimes forms in large crystals and is split into thin sheets from which a large variety of articles are cut for use as electrical insulators. At one time it was commonly used in stove fronts and known as isinglass.

There is space here to mention only a few of the more interesting of the 1,600 different species of minerals. Uncovering their beauty, any rockhound is sure to find opening before him a new world of interest and fascination.

* See, in the National Geographic Magazine: "Bolivia—Tin Roof of the Andes," by Henry Albert Phillips, March, 1943; "Metal Sinews of Strength," by Frederick G. Vosburgh, April, 1942; and "Tin, the Cinderella Metal," by Alicia O'Reardon Overbeck, November, 1940.

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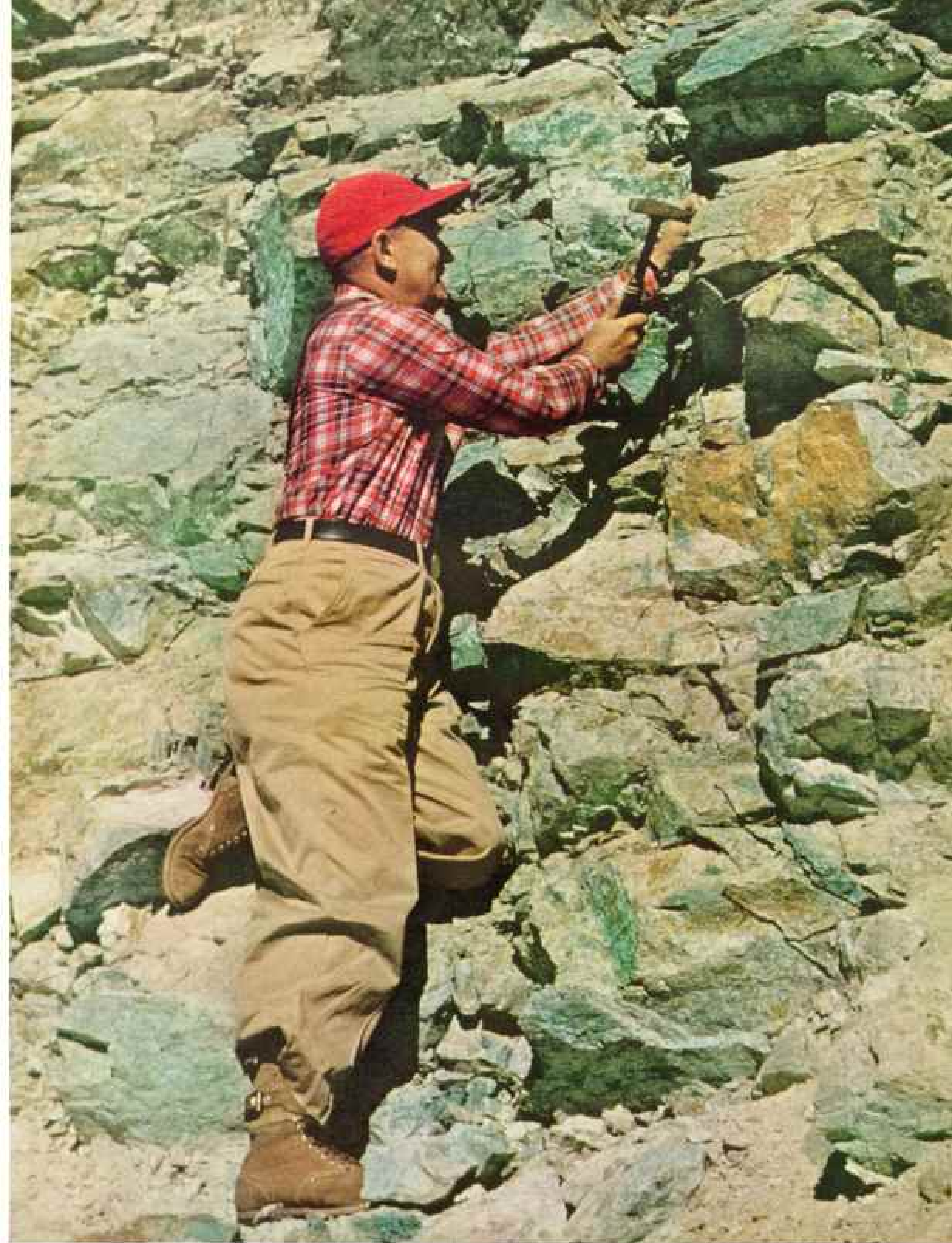

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Kodachrome by Willard R. Culver

Digging for Hidden Beauty: A Copper Mine Yields Blue-green Chrysocolla

A rockhound chips specimens of the semiprecious mineral (page 650) at the dump of the Inspiration Copper Company, Miami, Arizona. Copper and silica, deposited by underground water filtering through copper ore, form chrysocolla. Pure chrysocolla is too soft for grinding or polishing. Mixed with harder quartz, it forms a beautiful stone often mounted in costume jewelry.

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Ektachrome by Willard R. Culver

Minerals, Separated from Drab Earth, Shine in a Galaxy of Rainbow Hues

Like stalactites in caves, green malachite (top row, center) forms by the slow drip of water. Brazilian amethyst (second row, second from right) is a cluster of hexagonal pyramids. Wulfenite (third row, second from left) forms in paper-thin plates so fragile that, when the author acquired it in California, he dared not ship it by ordinary means. Instead, he expressed his luggage to make room in his car and carried the specimen to Washington, D. C., to be displayed with these other minerals at the National Museum.

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Birthplaces of These Minerals Range from Earth's Surface to a Mile or More Deep

Their age varies from a few centuries to nearly a billion years. Sulfur crystals (upper left) solidified from gases in a Chilean volcano's crater in comparatively recent times. Crystals of wulfenite (upper right) were formed several hundred feet below the surface. Rhodonite (lower left), a manganese silicate, created thousands of feet down under great heat and pressure about 800 million years ago, was brought to the surface by upheavals and erosion. Lower right: Malachite from Tsumeb, South-West Africa.

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Near Deming, New Mexico, a Bulldozer Turns the Earth. Rockhounds, Following, Pay by the Pound for Agates They Find

Licking a Rough Agate Shows How It Will Look When Polished. She Chips a Stone for Future Costume Jewelry

Wetting brings out an agate's pattern and tells the collector whether a specimen is worth grinding and polishing. Some agates are worn in rings, bracelets, or brooches. Many, when polished, reveal designs resembling flowers, plumes, or landscapes (pages 648, 654). Leading United States agate deposits are in California, Montana, New Mexico, Oregon, Texas, and Washington. Brazil produces most commercial agate.

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▲ Rough Rocks Become Delicate Cabochons

This name is applied to any stone ground to the rounded shapes, without facets, shown on the card. These are made from chrysocolla. Raw material is cut up with a diamond saw, and the smaller fragments are then shaped with an abrasive wheel (pages 645, 654).

◄ Rock Globes Reveal Intricate Patterns

Clyde A. Scott, San Diego, California, a retired mining engineer, specializes in finely ground and polished spheres. He displays (left to right) lepidolite, Brazilian rose quartz, Wyoming jade, Nevada wonderstone, a volcanic rock which weathers into alternate stripes of red and buff; Mexican onyx, and petrified palm wood. He holds a block of jade.

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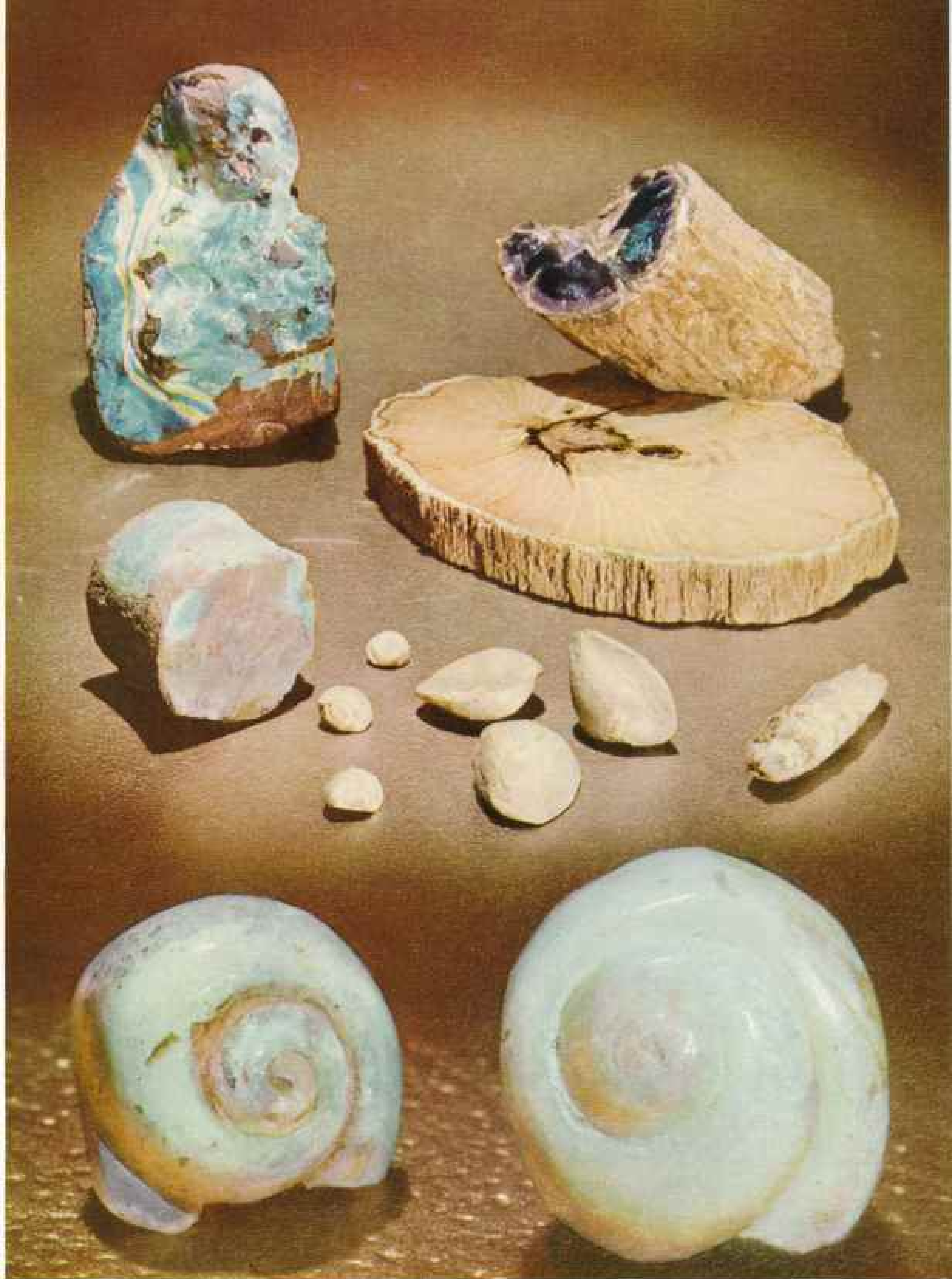

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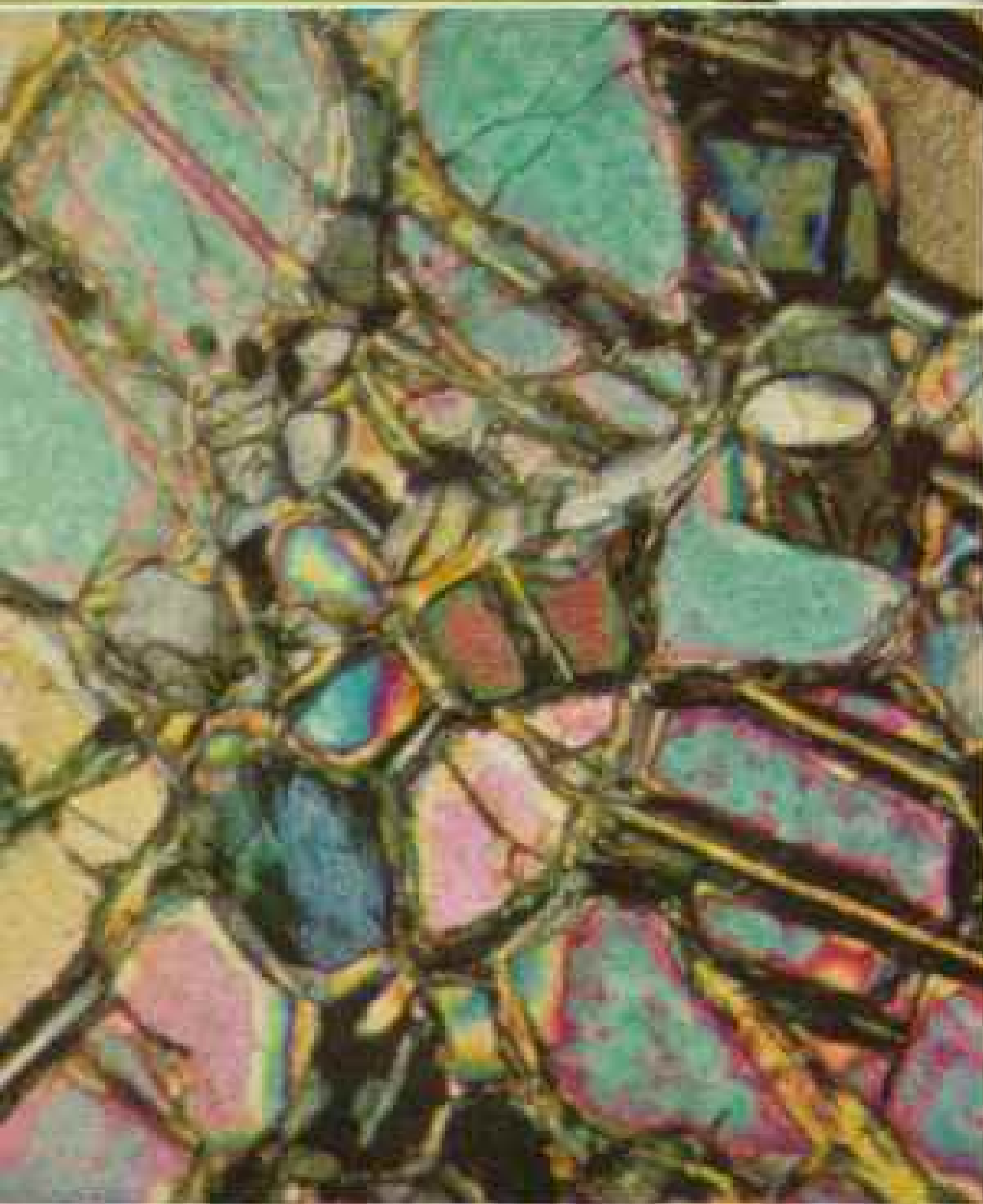
Opal Glows with Elusive Lights and Lends Pastel Tints to Ancient Fossils

Upper left: Black Australian opal. Wood fragments (upper right); bone, shells, and cedar cone (center), and snails (below) are opalized fossils. Although now composed entirely of opal, their outward forms are unchanged.



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Minerals Through the Microscope: Olivine (Left) and Hornblende Reveal Complex Patterns

Rock sections, 1/1000 of an inch thick, are magnified 100 times to show structure. Here staff photographer Culver works with camera mounted over microscope. Polarized light shines through specimens from below.

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↑ Rockhounds Pan Gold for Fun, Not for Profit

Hopefully this man peers at gravel scooped from a stream bed in La Placerita Canyon, near Newhall, California. With luck and a day's backbreaking work he will add a few bits of gold to his mineral collection. His method is still used by some prospectors.

↓ Pyrite, Almost Worthless, Rivals Gold in Glitter

The crystal of "fool's gold" (left) from Elba contains about 12 cents' worth of iron and sulfur. Beside it stands the National Museum's 7-inch, 6-pound-plus California gold nugget, one of the largest ever preserved. Melted down, it would fetch about $2,500.

In Lapidary Class Rockhounds Learn to Polish Gems

Stones, fastened to dop sticks with sealing wax, are held against sanding wheels. Later come finer abrasives and a final buffing by felt-covered wheels to produce a high gloss suitable for jewelry.

Under expert tutelage, such groups turn rough fragments of jade, tourmaline, agate, and other minerals into handsome gems.

This growing hobby now claims more than 200,000 followers throughout the United States. Clubs number about 325. Some high schools have added courses in lapidary work; several hold night classes for adults.

The San Diego society's 200 members include mine owners, mineral dealers, and amateurs. They range in age from 8 to nearly 70. Classes are held five times a week. Once a month the rockhounds attend lectures and go on field trips to collect more stones.

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Only a Powerful Magnifier Reveals the Beauty of "Micromounts."
A Rockhound Uses a Rotating "Lap" to Grind Gem Facets

← Miniature mineral fragments are selected for their unusually fine crystals, more nearly perfect than larger formations. Thumbnail-size micromounts are kept in rough form, never cut or polished. Each stone is mounted in a separate small box with a lid. At left, a stone is ready for viewing under a wide-field binocular microscope which reveals patterns and colors invisible to the naked eye.

↓ A rough stone is mounted on a facet head, which can be set at various cutting angles. The operator holds the stone against the whirling disk and feeds in moist abrasive powder with her left hand. Diagrams in the book guide her in cutting the facets of the gem.

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↑ Daylight Fails to Release Rocks' Flashing Spectral Hues

These specimens of willemite, a zinc silicate, came from Franklin, New Jersey, only place in the world where the mineral is found in sufficient quantities for zinc smelting. White spots in the smaller rock are calcite, principal ingredient of limestone and marble.

↓ Drab Stones Change to Brilliant Jewels in Ultraviolet Light

Willemite becomes green, calcite red. Blue spots are caused by imperfect filtering of ultraviolet rays. Energy from these rays makes atoms vibrate, emitting colored light. Fluorescence aids in mineral identification by disclosing characteristic hues.

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↑ Rainbow Colors Hide Within These Prized Collectors' Items

Fluorescence is not present in most minerals; in others it exists only in specimens from certain localities. Cumberland, England, yielded the lavender fluorite. Tan and white common opal came from Nevada, and white calcite from New Jersey.

↓ Fluorescence Works Its Magic; Rocks Glow Like Neon Lights

Calcite turns a fiery red, fluorite an intense blue. Pastel green mingles with blue in opal's depths. Mineral colors differ under fluorescence because atomic vibrations send out varying wave lengths of light. Invisible ultraviolet rays "trigger" this reaction.

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Junior Rockhounds of Prescott, Arizona, Aged 7 to 15, Hear President Martin Hoffman Discuss a Specimen

This club of about 40 boys and girls operates without adult assistance. On field trips, members gather stones for their collections. Large specimen beside the books is Oklahoma barite rose. The lamp on the table is used for examining fluorescent minerals.

Red-brown Copper Gives No Hint It Comes from Bright-blue Azurite. Unlocking Uranium's Vast Hidden Power Ushered in the Atomic Age

↓ Arizona azurite, a mixture of copper, carbon, oxygen, and hydrogen, is one source of copper sheets and tubes, but most of the metal comes from brassy or gray-colored ore.

→ Nations are combing the earth today for uranium, source of atomic energy. This specimen is a mixture of four uranium-bearing minerals: curite, kasolite, soddyite, and torbernite. The bomb, a Navy incendiary, merely symbolizes the atomic weapon.

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Stones for the "Friendship Fireplace" Came from Rockhounds All Over the Nation

Mr. and Mrs. J. H. Leasure improved their El Paso living room with 192 specimens sent to them by friends and fellow collectors. Lengths of petrified wood frame the fireplace. Large white stones are onyx; polished ones are agate. Included also are a piece of gold ore from the Homestake Mine of South Dakota, Indian artifacts, a fossil dinosaur vertebra, fragments of extinct mastodon tusks, and petrified clams, snails, and oysters. Blue stone below mantel at left is smithsonite, named for the founder of the Smithsonian Institution.

New Guinea's Paradise of Birds

By E. Thomas Gilliard

Assistant Curator of Birds, American Museum of Natural History

On a zoological expedition to New Guinea, we were told, we should be sure to take along a good supply of soccer balls.

In the mountainous interior of this, the world's second largest island, a soccer ball would buy more food and hire more labor than all the financial resources of the American Museum of Natural History. Among the natives who live there, many of whom have never yet seen a white man, the coveted American dollar is worthless.

Other useful currency, we were advised, would be red powder paint, glass beads, stick tobacco, newspapers (any age), and shells, especially gold-lip oyster shells.

With these we would be able to buy from the natives not only hours and weeks of muscle power but skilled help in finding the birds, insects, plants, and mammals we were seeking. To earn half a thimbleful of red beads, a native naturalist would search hours in the jungle for a rare bird specimen. To win a couple of gold-lip shells he would carry a heavy pack for two-and-a-half months.

Our advisor, one of the few men in the world competent to supply the information we needed, was an Australian explorer named Ned Blood. He had spent a number of years collecting birds in the New Guinea heartland for the Taronga Zoological Park in Sydney. Besides hints on equipment, he told us that the best months for traveling in the mountains would be the cool, dry season from April through mid-August.

Airlift to the Stone Age

At 8 in the morning on April 17, 1950, Ned and I took off from Lae in a little twin-motor De Havilland for the mountains of New Guinea. Our engines strained under a pay load of 1,200 pounds of paraphernalia, including guns and 5,000 rounds of ammunition, still and moving picture cameras, 15 gallons of embalming fluid, and 10 pounds of arsenic.

This was the beginning of a trip which was to take me, with two companions who joined me later, into unexplored forests of the high heart of the island. Before it was finished, we would spend 103 days in the field collecting more than 3,500 specimens of birds, mammals, plants, and butterflies.

Our special objects were certain rare mountain birds, particularly the male of the ribbon-tailed bird of paradise, *Astrapia mayeri* (page 677). This bird, with a brilliant green body and a slender white tail more than three feet long, is one of the most spectacular in the world. Until 1948 no live males had ever been seen outside central New Guinea, and specimens are still extremely rare.

We flew that morning high over the great braided Markham River, heading generally northwest and inland toward the valley of the Wahgi River. This valley, about 75 miles long, has been farmed for many hundreds of years by the more than 75,000 Stone Age aborigines who live there. Only a comparatively few years ago their very existence was unknown to the outside world.

New Guinea, 1,500 miles long and 400 miles wide, sits in the shape of a gawky vulture astride Australia's back, its ugly beak facing west and opened as if to devour the Celebes, Borneo, and Singapore. Its western, or head, half is governed by the Netherlands, its tail half by Australia. Running west to east, from beak to tail, is a spine of formidable mountain ranges. Despite work by a host of naturalists, scarcely more than the head, neck, and shoulders in the west and the ungainly tail in the southeast had been explored.

The Girl Who Lived in Shangri La

Many Americans became familiar with the shape of New Guinea during World War II, when the Japanese attacked it. I saw parts of it when serving with the U. S. Army. Later, in 1945, an American C-47 transport plane crashed in the central mountains. One of three survivors was a pretty WAC corporal, Margaret Hastings. Her story of weeks in a lofty "Shangri La" peopled with tall, pig-raising tribesmen was spread around the world by radio, newspapers, and magazines.

Actually, New Guinea's tribesmen of this area had been "discovered" more than a decade earlier by Michael Leahy, explorer-prospector extraordinary, who in his search for gold roamed hundreds of miles through the mountainous interior and found the great Wahgi Valley. Later, in 1938-39, the Richard Archbold Snow Mountains expedition studied the interior around Mount Wilhelmina, farther west, for bird and mammal life.* Now, with luck, I was to push the exploration of this naturalist's mecca a step nearer completion.

In our plane that morning we followed in an hour and 10 minutes the 250 tortuous trail miles Leahy traversed in making his initial discovery. The Wahgi rises on the eastern slopes of Mount Hagen, the wide-based

* See "Unknown New Guinea," by Richard Archbold, National Geographic Magazine, March, 1941.

Ned Blood from Camera Clix

New Guinea Man, Clutching Primitive Weapons, Watches the 20th Century Move In

More and more planes roar into his Wahgi Valley, bringing *kundu* (light-skinned) strangers, who trap birds they don't eat and search stream beds for useless specks of bright yellow sand (gold). This archer can remember the days before they arrived.

12,500-foot peak where we planned to set up our main field camp. From there it winds languidly through the relatively flat lands where the natives raise their crops—sweet potatoes, corn, pigs, fowl, and tobacco.

Airstrip, Jeep, and Flying Sheep

After scraping across the divide at 10,500 feet in our antiquated aircraft, we could look down on these native gardens. They formed a patch quilt of neatly tended square plots, each framed by straight-walled, sharp-cornered ditches. This is a high, healthy environment, 5,000 feet or more above sea level.

Halfway up the Wahgi, the lumbering aircraft set us down on a grass strip under the towering peaks of the Bismarck Mountains. Here, in the middle of the wilderness and easily approachable only by airlift, bustled a miniature oasis of civilization. It was equipped with electricity, a jeep, a fish pond, and even running water provided by a hydrau-

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Drawn by H. E. Eastwood and Irvin E. Alleman

New Guinea's Mountains and Valleys Are Still Largely Unexplored

During 103 days of collecting, the author found more than 20 unknown birds, climbed a 15,400-foot peak never before scaled, and visited pockets of aboriginal cultures no white man had ever seen before. Mr. Gilliard ranged the Kubors, Mount Hagen, and Mount Wilhelm. Upper portion of map shows his exploration area.

lic ram. Around it were thatched native houses and flocks of healthy sheep, carried in by plane from Australia (page 670).

This was Nondugl, established in 1947 by Ned Blood with the backing of E. J. L. Hallstrom, Australian manufacturer, naturalist, and philanthropist.* Through shipments of livestock and plant seeds to the Wahgi, native agriculture and diet are improved; from Nondugl, in return, many rare animals and birds have been sent to the Taronga Zoo.

At Nondugl, under Blood's direction, has been gathered the greatest collection of birds of paradise ever seen by man. Many have been conditioned to cage life, then transported by air and coastal steamer to Sydney. Though commercial shipment of birds of paradise has been banned by law since the 1920's, the Government still permits a limited number to be taken out for scientific study.

* See "Sheep Airlift in New Guinea," 16 ills., National Geographic Magazine, December, 1949.

E. Thomas Gilliard

Shell-crowned Hunters Display the Morning's Catch of Cuscuses

These marsupials, called *kapul* by the Mount Kubor tribesmen who caught them, hang by prehensile tails and carry their young in pouches, like our own possums. The house belongs to an American missionary.

In the next two weeks I conducted a school at Nondugl. Its purpose was to train field assistants, young blades of the Wahgi tribes, in the techniques of making scientific specimens of birds, mammals, insects, and flowering plants. We learned to communicate information, scientific and otherwise, in a hodgepodge pidgin.

When this was finished, we were ready to jump off into the blue. During the next three months, day after day, I was to move with my heavily laden carrier line over countless miles of native tracks.

The line, sometimes numbering 100 men, traveled slowly. Some days we covered 20 miles, other days only half that distance. We might spend hours bogged down at the edge of a dangerous vine bridge (pages 674, 675). If we found a good spot for collecting, we would stop for a day or a week or longer. But always we moved deeper into the Kubors, the Hagen Range, and finally to the summit of the great Bismarck Mountains.

The trails we followed were deeply worn by centuries of plodding bare feet. From high above they sometimes look like roads; pilots flying over New Guinea have reported that one can drive from end to end of the Wahgi Valley. Actually, you can go only a short distance in any direction without having to walk, crawl, or cling like a monkey. Even pigs must be carried much of the time.

Jungle Train—One Mile Long

Organization of the carrier line is one of the more interesting parts of a jungle expedition. Ours was set up in a way that had much to do with our success in getting specimens.

First, all equipment, valuables, trade goods, weapons, ammunition, medicines, and notebooks as well as housing, clothing, food, and scientific specimens must be divided more or less evenly into packs averaging 40 pounds, light enough for one man to lift and carry all day. These bundles, holding all our belongings, must be entrusted to wild strangers strung out over the tortuous trails sometimes more than a mile behind us. At any time a carrier may fall or drop and break his load of gear; or he may suddenly abscond with it. Dispersion of vital equipment in small lots is essential.

Maintaining a definite order in the parade also is necessary. Up ahead goes the leader with compass, maps, weapons, altimeter, note-

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The Author Politely Admires His Lab Assistant's Dangling Shell Nosepiece

This villager was one of several trained by Mr. Gilliard to help prepare scientific specimens. *Harpyopsis*, largest New Guinea eagle, rests on the scientist's lap. Forty-odd bird skins dry on the left.

book, and other light but important items ranging from a supply of matches, stick tobacco, and glass beads to iodine and foot plasters.

Immediately behind him come men bearing guns necessary in securing specimens (page 666). Although the collector naturally dislikes killing beautiful birds, in a region such as this he must necessarily shoot the majority of the species he sets out to collect. This is essential if the birds are to be identified, classified, and studied. It is partly on the basis of these studies that laws may be formulated to conserve the various species.

It is such surveys, begun practically in the Dark Ages, that give us our modern knowledge of birds. Only in remote areas do unknown species still remain to be found and named. The total of species for the world will be about 8,700, including 40 or so which authorities predict remain to be discovered. We must add to these, however, a much larger number of geographic races, or subspecies, as yet unknown.

One of our guns was a high-powered, smallbore rifle accurate at 200 yards. Though rarely used, it always had to be kept within immediate reach to shoot large forest species such as the great *Harpyopsis* eagle. More often fired were the 16-gauge double-barreled Parker shotguns and an inexpensive single-barreled 410-gauge.

Most of the collecting is done with the Parkers, rendered extraordinarily versatile by means of reduction barrels turned from brass in the Museum workshop. With these, the Parkers, though chambered for 16-gauge shells, can shoot smaller 410's or even minute, tightly loaded 32-caliber cartridges. These bullets, loaded with the smallest-sized shot, can bring down the most fragile birds with an absolute minimum of damage to their delicate plumage.

Cameras Are Always Loaded

Next after the guns in the carrier line come the cameras. Unlike the guns, which are carried unloaded, the cameras are always ready to fire. The 16-mm. camera is mounted on its tripod and shouldered like a rifle; the Graflex box can be flipped open and a picture made in 25 seconds.

These lead carriers, besides bearing vital and breakable equipment, are also the men who have been trained as scientific preparators. Behind them come a dozen or so

The Fence Guards a Hillside Farmyard Against Rooting Pigs

This 400-foot gorge marks the entrance to a populous valley in the Kubor Range, where the expedition found people who had never seen a white man.

The grassy slope has been cultivated by generations of farmers. Dead trees at upper left mark the pioneer fringe where new land is being cleared by cutting, burning, and bark-ringing.

Inside the fence, made of casuarina staves and vines, grow bananas, sweet potatoes, and sugar cane. Pigs run wild in the forest and grass, but each farmer can find and recognize his own.

Here Ti, the gun carrier, halted the line of bearers while the picture was being taken. Back-borne cameras, nets, specimens, and boxes of food brought up the rear.

E. Thomas Gilliard

Builders Throw Up Jungle Quarters in Half a Day

Using stakes, vines, and leaves, these boys erected the house in which the author lived during his stay at Mount Hagen (page 686).

With reasonable care, the shack will last a couple of years. It was built extra large to hold wall shelves and three cots, still leaving room for the fire, which was kept burning day and night to ward off the chill of 8,300 feet of altitude. Small boys (right), huddling together to keep warm, wish they could get next to a fire right now.

Kyber, the construction boss, in sweater and *lap-lap* (cloth kilt), stands inside the structure. An intelligent student, he learned pidgin English, mastered field taxidermy and camp management.

The ax carrier (left foreground) handles a rafter to support the roof of pandanus leaves and canvas. When all the rafters are in place, the center pole will be removed.

E. Thomas Gilliard

men (their number grows as we progress), who bear the precious fruits of our labors—the scientific material already collected. Theirs, too, is a fragile load. Imagine, if you can, moving 10 or 20 miles a day through a wilderness carrying pressed flowering plants between layers of paper board, large skins of eagles, immensely long-tailed birds of paradise, and hundreds of delicate butterflies in individual glassine envelopes.

Bulk weight—tarpaulins, tents, lister bags, drinking water, fuel for light, ammunition, rock salt in 50-pound bags, bedding, food, etc.—make up the last third of the line. At the tail end comes the rear guard, two trusted natives carrying bush knives and shotguns. Just ahead of them trudge two boys with the medical gear. Injured personnel always show up in the rear.

Behind the carrier line proper there usually trailed a ragged tail of spectators and hangers-on. Most of the spectators were men from the villages through which we passed. Stimulated by the excitement we created, they dressed themselves in full regalia, with shells and plumes and paint, and joined the parade for a few miles through the jungle.

The hangers-on pursued us more furtively and kept their distance. They were girls—"young fella Marys"—dressed in their party best, who had somehow become enamored of one or another of the carriers and could not bear to see him vanish into the jungle.

Courtship in the New Guinea highlands runs a narrow course between romance and commercialism. It is true that women are bought and sold; a good prospective wife is worth up to 15 "things," usually eight or so large shells and as many pigs. It is also true that polygamy is common and that a man's three to seven wives are virtual slaves. Their duties include working his land, tending his pigs, cooking, and rearing his numerous children.

Nonetheless, the young girl retains certain prerogatives. Though she is to be sold, she may use her womanly guile and blandishments to select the purchaser. Once she has aroused his interest, she clings to him tenaciously while he strives to save sufficient funds to buy her from her father.

How Natives Greet Their First White Man

Such was the team which traveled into the big bush. On the first section of the survey, heading southwest into the great Kubor Range, I led the expedition alone. My last contact with a white man here was at Kup Mission, pioneered by youthful Father Michael Bodnar, of Pittsburgh, Pennsylvania, whose help was of greatest value. As we followed the ancient, deeply worn trails into the mountains, I found myself leading my line into populous valleys where no white man had ever been before.

The beauty and complete naturalness one finds among the fierce but friendly people who live there are qualities of great attraction. I shall never forget my squirming and complete embarrassment when a group of them converged on me as if racing toward a god of some sort and embraced me by bending and kneeling, then lunging in and lifting me high overhead in a manner most paralyzing and personal. On the side lines others held up their right hands as if wilted and flipped them sideways, repeating in singsong, "Aya, aya, aya" (page 684).

It was from these people that I recruited my hunters, all of whom were amazingly fine marksmen with both arrow and spear. With slender three-pronged arrows, heavily barbed and fastened to long straight reeds, they kill small birds for food in great numbers. They also eat small kangaroos, fish, frogs, rats, grubs, and even mushrooms.

The highest villages I saw in this generally high country were at roughly 8,000 feet in the Chimbu Valley region. In both places the natives live in low-roofed, earth-floored, rectangular grass-thatched houses. Each is about the size of a one-car garage, with side walls three feet high fashioned from split casuarina staves driven into the ground.

An entrance three feet wide in the center front provides the only light and air. About four feet inside a fire burns constantly. There are no chimneys; smoke filters out through the grass roof. Between 5 and 15 natives live in such a house.

A Spoonful of Salt for a Bushel of Food

Travel in the wild portions of New Guinea is vastly easier than in many other equally wild countries because food is plentiful. In the Wahgi region it was our custom to "sing out" to the local chief. On hearing our needs, he would cup his big hands about his mouth and bellow out a barrage of rolling notes.

The wives then went into the fields, gathered food, and brought it to us. We paid for it with rock salt, a commodity so valuable that natives travel long distances to harvest small amounts from volcanic springs. When we paid a tablespoonful of rock salt for a bushel of sweet potatoes or a 30-pound fagot of tender sugar cane, they chuckled with glee at the hard bargain they had driven.

I was amazed to discover that these intelligent people had a comprehensive knowledge of the local flora and fauna. All men of chief rank knew the individual names, songs, and life histories of nearly every species of bird and mammal in their realm.

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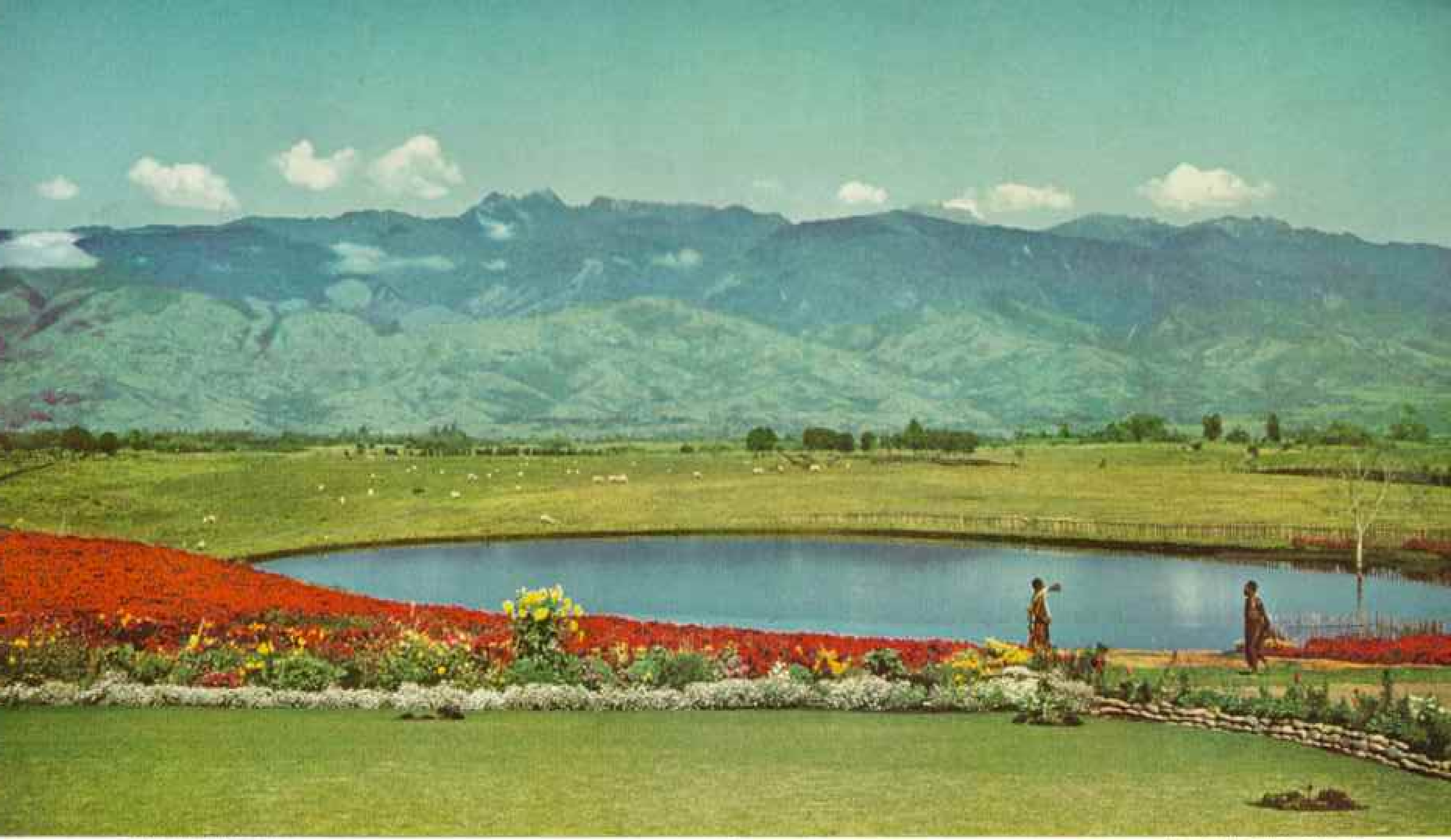
↑ Bushy-haired Mount Hagen Man Catches a Rare Bowerbird Alive

Cnemophilus macgregorii was one of the rare birds collected in 1950 by the Gilliard expedition to New Guinea for the American Museum of Natural History. Differing widely from its nearest relative, this specimen had blood-orange back. Its life history is unknown.

↓ "Young Fella Marys" Paint False Eyes and Weight Lashes with Fur

In polygamous New Guinea, three to seven wives tend a prosperous farmer's pigs and children. Girl with nose stick wears cowrie-shell headdress and plays a bamboo mouth harp. Armbands of woven orchid stems are worn until they have to be cut off.



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Sheep Flown from Australia Graze a Parklike Oasis in the Heart of Stone Age New Guinea

To Nondugl, wildlife station in remote Wahgi Valley, come aborigines to marvel at white men's dogs, peacocks, sheep, jeep, and radio station, all brought in by airlift. The preserve was created by E. J. L. Hallstrom, Sydney industrialist and naturalist, and manager Ned Blood.

Wahgi Highlanders Carry Stone Ceremonial Axes and Imported Steel Hatchets

→ Government recognition of the chieftain's authority is the medal on the forehead. His skirt is woven bark. Shells are mother-of-pearl, cowrie, and bailer. Razor-sharp stone ax is used for battle and ritual.

↓ Bird of paradise and cockatoo plumes adorn the possessor of a pandanus-leaf raincoat, which he bears folded under an arm.

For 15 "things," such as shell, pig, ax, or carcass of tree-climbing kangaroo, the highlander can buy a wife.

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↑ **Bismarck Mountain Men Hunt with 3-pronged Arrows Shot from 5-foot Bows**

Men's bark caps, crammed with bushy hair, serve as helmets in ax battles. One fellow (right) sticks hatpinlike scalp scratchers in his cap. These fierce people killed several Europeans in pitched battles in 1934.

← Mountain sedge and flowering vine are carried by the girl. The boy holds one of the Timaliidae.

↓ Rewards for rare bits of jungle life brought all sorts of flowers, insects, birds, reptiles, and mammals into the scientists' camp. A few beads bought a plant. When bead money ran low, the author paid collectors with used flash bulbs strung on ribbons. Among these people the dollar was worthless. This girl offers young pandanus trees, which, when mature, will provide fruit.

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↑ Wahgi River's Vine and Bamboo Bridge Sags but Does Not Sway

Mountain natives, unable to swim, fear water. Consequently, each river-edge clan maintains a repair crew to keep its bridges open. Foot trails to these spans are so deeply rutted they appear to be centuries old. Some bridges attain lengths of 100 feet, and a few liana ropes span 130 feet. Bamboo platforms elevate this structure high above water. Users must climb 20-foot ramps. The author's porters distrusted strange rope bridges.

↓ A woman weeds the family garden plot. Principal crop is sweet potatoes.

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↑ Face the Camera While Eating? Modesty Forbids

These two photographs were made in 1948 during the author's journey to the Kokoda Track, the bloody battle route over which the Australians drove back a Japanese column marching across the Owen Stanley Range to attack Port Moresby early in World War II. Through country such as this Stone Age man blazed a trail from sea to highlands. For centuries he has been followed by native traders bearing pearl shells, slaves, skulls, and bird of paradise plumes.

Mr. Gilliard's 1950 expedition was inspired by an account of Wahgi Valley's marvelous bird life given to him by James Derbyshire (back to boulder), a longtime resident of New Guinea and an authority on the Owen Stanley Range.

These Papuan carriers have acquired their own brand of manners. Mealtime etiquette prescribes that they turn their backs on white men as a mark of respect.

← Prolific flora of the high Tropics bordering the Wahgi trail is evidenced by these samples—staghorn ferns, orchids, and umbrella tree (overhead).

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Surprisingly, they had the highest respect for the work of the naturalist. They seemed to regard this breed of white man as the sanest of the curious assortment which had so recently descended from the sky—saner, for instance, than the men who spent hours sifting the river beds for useless flecks of gold. This was a refreshing change from the view of civilized people at home toward the character who races over the landscape trailing a butterfly net.

We profited greatly from this understanding attitude. Local natives quickly joined in the spirit of the expedition and brought us rare specimens. For example, one chief ran 15 miles at breakneck speed carrying a little spine-tailed animal which turned out to be one of the rarest mammals known. It was an earless water rat, *Crossomys moncktoni*, much sought by naturalists in New Guinea. The only other one known to exist was found in the highlands behind Port Moresby in 1907. It has been stored in the British Museum for many years.

During the first part of my stay in the Kubors such assistance was especially valuable, since I was alone and could not stray far from base camp. Teams of natives led by a No. 2 boy appointed by the local chief would disappear for days at a time, only to emerge when they had acquired birds which they knew I did not already have. They climbed to altitudes of 11,000-13,000 feet and there collected a number of birds unknown to science.

For the first 20-odd days of the expedition I depended heavily on such local help. Then, on May 19, my assistant, Robert Doyle, flew in from Australia and, less than a week later, came trudging into my base camp in the Kubors.

Doyle, born in Brisbane and a veteran of 13 years of exploring and prospecting in New Guinea, now owns a coconut plantation on the coast of Bougainville and also operates a gold mine on the same island. When he heard from Ned Blood about the American Museum's expedition, he decided to take a vacation—exploring in New Guinea.

With Doyle to take charge of the base camp, I was able to make some more extensive field trips in the upper altitudes of the Kubors before we moved on together to our main objectives, Mount Hagen and the ribbon-tailed bird of paradise.

The Ribbon-tail Is a Controversial Bird

The ribbon-tail, besides being one of the most beautiful birds in the New Guinea highlands, has also been one of the most controversial.* The controversy centered chiefly around this question: Does the ribbon-tail mate and hybridize with another bird of paradise, the Princess Stephanie? The adult male of the Stephanie resembles the ribbon-tail, with one important exception. While the long tail plumes of the ribbon-tail are white, the Stephanie's are black.

The argument began when a few specimens of ribbon-tail were found with tails half white and half black, or a third white and two-thirds black.

The point is an important one to ornithologists, partly because it relates to the complex and highly standardized courtship rituals which the birds go through at mating time. These rituals, varying from one species to another, often fail to prevent hybridization.

So hot did the argument become that in 1950 it was suggested that all of the meager evidence available be gathered and analyzed before a board of authorities at the Tenth International Ornithological Congress in Sweden.

The Answer to the Riddle?

I think I found the answer to this famous riddle. On Mount Hagen we found the ribbon-tail living in great numbers in the 7,500-10,000-foot zone. In fact, in the deep virgin forests we were startled to find that, except for the prolific swiftlets, the ribbon-tail was the most common of birds.

To display their gorgeous and shimmering plumage, birds of paradise sometimes choose clearings on the ground in deep forests, but more often select branches high in the trees. Favorite branches are used so frequently they become skinned with wear. Usually the birds, including ribbon-tails, pick trees commanding vistas of forest and valley; favorites are dead trees at the forest's edge where there is no foliage to obscure the view from admiring females.

However, as I hunted through the forest of Hagen day after day, observing many birds of paradise, I did not see a single adult Stephanie. Moreover, it would have been hard to miss one if it had been present. With its brilliant green, yellow, and black plumage, the adult male Stephanie cannot be mistaken for any other bird in the world.

In the absence of this important ingredient, hybridization seems highly unlikely. Recent study of the species in New York indicates another answer to the variegated tails: they are simply signs of juvenility. Some birds of paradise are known to take four and perhaps as many as six years to develop their full adult finery. It seems likely that the ribbon-tail starts life with a dark tail, which

* See "Strange Courtship of Birds of Paradise," by Dillon Ripley, National Geographic Magazine, February, 1950.

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Skewered Skulls Prove the Hunter's Skill

New Guinea men mount groups of skulls near the fire pits in their houses, just as North Americans hang moose heads above mantels. Rumor says that human skulls once decorated the trophy sticks; now only animal heads are shown.

So excited was I over the first specimen of this bowerbird to be brought into base camp that with great ceremony I paid the equivalent of a year's wages for it. Ordinary payment for a bird, until now, had been half a thimbleful of red beads.

A Fortune for a Bird

A year's wages consisted of a steel ax (four months' labor), two gold-lip shells (two-and-a-half months), a large Sheffield table knife (one week), a Collins machete (one month), and assorted matches, small shells, newspaper, stick tobacco, beads, salt, and a 6-inch wood-framed mirror.

My motive in making this outrageous payment, which visibly staggered the 70-odd native onlookers, was to stimulate the gathering of specimens. Our time on Mount Hagen was now getting short.

A popular but unfortunately false conception of the tropical and subtropical jungle is that it teems with animals; that the trees resound to the screams of monkeys, the bugle calls of birds, the incessant buzzing of insects, and the hissing of ferocious reptiles. This colorful picture, wherein one must prod every vine gingerly to see if it will crawl away, is based more on fiction than on truth. For days on end I have hunted high mountain forests for birds, walking mile after mile, trying desperately to obtain more than a meager six or eight birds in a day. To keep new specimens coming in, the collector must use every trick at his command.

In early July another event helped speed up the job of bagging, preserving, and classifying our game. Heralded by an echoing crescendo of native yells far down the trail, the third partner in our expedition arrived from Nondugl. He was William Lamont, sportsman, hunter, veteran of two World Wars, and long-time resident of New Guinea. He and I had worked together on another expedition two years earlier. To join the present one he had chartered a plane, flown in as far as he could, then walked the rest of the way, hiking the last 60 miles, mostly uphill, in two days (page 687).

For the next three weeks, Doyle, Lamont,

slowly turns white during a long adolescence.

As exciting as finding the ribbon-tail was the discovery, deep in the forest, of the dance ground of the *Archboldia* bowerbirds. Members of this species choose a spot overgrown with tall ferns and make a clearing roughly oval in shape and about four feet long. The floor of the bower is padded with dried fern fronds. In this arena males and females apparently meet daily to dance, cavort, and pursue their specialized courtships.

E. Thomas Gilliard

Wreckage of a Wartime B-17 Sparkles on Mount Wilhelm's Rocky Shoulder

Thirteen Americans were killed in 1944 when the plane crashed against the 15,400-foot mountain. Fragments were scattered across half a square mile. Here the author examines a propeller and a bone.

and I held down camps thousands of feet apart on the south flank of this great mountain. Hunting was done from a hut built at 11,300 feet, 200 feet above the tree line.

At this altitude there are fogs, chill winds, and occasional frosts. We equipped the natives who stayed at the high camps with rain capes, blankets, shirts, *lap-laps* (cloth kilts), and woolen sweaters. Unfortunately, many of the men seemed to regard these as too valuable to wear and carefully stored them away.

One night at 2 a.m., in a driving wind, I inspected their sod house and found them practically nude, as always, rolled in tight knots and shivering noticeably in the beam of my light. All were wide-awake, but seemed to be in a torpor; even the smoky fire had been allowed to die. Thereafter I assigned one native to sleep all day and tend fire all night.

Off to the Bismarcks to Find a Duck

One species of bird I sought was not to be found on Mount Hagen or in the Kubors. This was a rare duck, *Salvadorina*, which has been the object of several expeditions sent halfway around the world. As a likely hunting ground I chose Mount Wilhelm, in the Bismarck Mountains. Standing 15,400 feet high, tallest peak in eastern New Guinea, this mountain has two lofty crater lakes which I hoped might provide a habitat for these extremely rare birds.

To get there we enlisted the aid of Robert Gibbes, one of Australia's most decorated war flyers and now a skilled professional bush pilot.

Only a daring and skillful pilot would attempt the trip from Wahgi to Mount Wilhelm. The flight leads through the great Chimbu gorge, where giant forested walls rise to 10,000 feet and box in the plane on three sides. The landing must be made on a steeply sloping grass strip, carved out by a missionary with native labor at 8,300 feet on the mountain's flank.

Gibbes put the plane down as lightly as a feather. After we had piled out—Doyle, myself, and six trained natives—he took off again immediately, promising to return for us at 9 a.m. 17 days later.

In this region, population pressure has pushed native farming up the mountain to a height of 8,300 feet. Below this, the land

has been denuded of trees and planted again and again in sweet potatoes. Some of the gardens are so steeply terraced that ladders are used to get from one level to another.

The soil appears rich and dark, but in reality contains a large amount of insoluble clay. The hill farmers, struggling to keep one step ahead of starvation, have worked out a precise system of rotation to rejuvenate their worn-out land. This involves alternate plantings of casuarina trees, reeds, sweet potatoes, small tubers, and a sort of grass known as New Guinea asparagus.

The casuarina trees, after a time, are systematically stripped of their limbs. These, along with special reeds planted on the fallow land, are periodically burned. All the while, pigs turn and manure the soil until it is ready for planting again. It will now yield large, nutritious potatoes for another two or three years, then small ones for an equal period. After this the cycle begins once more.

Among these mountain farmers lives Father V. Tropper, a missionary who pushed into this wild region soon after it was discovered. He is greatly liked by his native flock. At his request they shouldered our gear and a large supply of native food and helped us to our objective: two clear lakes surrounded by jagged peaks of bare rock reaching more than 15,000 feet. The lakes were ringed with patches of beautiful, mossy rhododendron forest, thick and almost impenetrable. Once there, the natives left us on our own.

Here we collected and prepared skins with a fervor which sometimes carried us almost around the clock. At times frigid winds forced us to sleep in our feather-lined sleeping bags, but generally the weather was like Vermont in September. Best of all, we found the lakes thinly populated with Salvadori's ducks, two specimens of which we were able to collect.

Challenge: a New Mountain Peak

The local natives identified a promontory just above us as the true top of Mount Wilhelm. However, during several collecting trips to 13,000 feet and beyond, we observed and sketched a peak considerably higher to the north. We finally realized that the natives were wrong about the true location of the summit. Yet the lower peak, we knew, was the one that had been climbed and marked as the top of Mount Wilhelm.

Almost against my better judgment, for this was not a mountain-climbing expedition, I decided to tackle the true summit. My plan was to leave before dawn, climb until 1:30 p.m., and then, regardless of how far I had gotten, head back for the lake camp. Doyle, who had had a bout with mountain sickness, would stay behind ready to send up a rescue party if necessary.

We started from base camp over well-prepared hunting trails, pioneered by Doyle, bordering the lakes. Then we worked our way several thousand feet up a great stony flank to cliffs split with chimney cracks. From the top of these cliffs a long ascending knife ridge undulated northward to the foot of the imposing rock pillar which was the actual crown of Mount Wilhelm.

By great good fortune the day turned bright and clear, and by 12:10 p.m. I stood with two natives from Nondugl on the summit, 15,400 feet above sea level. I then wrote a note on the stationery of the American Museum, giving details of the climb, and sealed it in a bottle. This I placed under three stones on the summit of the sharp peak.

B-17 Marks a Tragedy

With my binoculars I could see, half a mile away, a cairn which had been erected on the other peak, about 300 feet lower than the one on which I stood. Farther east on a rampart of this same mountain glistened the remains of a B-17 which had crashed in 1944 with 13 American deaths (page 679).

The vista of mountains to the east and to the north and northwest—the Finisterres, the Schraders, and the great tail of the Bismarcks—was less clear than off to the west, where the valley of the Wahgi lay in the distance. Behind this lay the backdrop formed by the 50-mile Kubor Range.

To the southeast rose the great peaks of the Kratke, the Herzog, and, far off, the Owen Stanley Ranges. We sat for some 40 minutes, shivering by the tiny cairn. Before we left, I unwrapped from its waterproof casing and held aloft flag No. 128 of the Explorers Club. Then we headed back down to the base camp.

When we left New Guinea early in August, we took with us 1,500 study skins of birds, representing 136 species and subspecies; more than 20 have proved unknown to science. Among them was a new bowerbird, which we named for the late Dr. Leonard C. Sanford, trustee of the American Museum and sponsor of this expedition. We had also secured 900 skins and skulls of mammals, 650 herbarium specimens of flowering plants, and some 500 butterflies of 32 species.

Behind us, with real regret, we left hundreds of natives who had become our friends. We also left, for later expeditions to explore, the many unknown mountain ranges and pockets of Stone Age civilization still undiscovered in this naturalists' paradise.*

* For additional articles on New Guinea, see "National Geographic Magazine Cumulative Index, 1899-1950."

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↑ Bustles of Green Leaves Dangle from Bark Belts of Wahgi Men

"Physically," says the author, "the Wahgi aborigine shows his Papuan, Polynesian, and Negrito ancestry. The forehead is high, nose broad, and cheekbone prominent. Men are bearded. Some display the Semitic nose; all have the Mongoloid eye fold."

↓ When a Chief Yelled, "Bring Food!" His "Marys" Obeyed Quickly

Women's net bags, worn as caps and often used as baby carriers, bore heavy loads of groceries into camp. Dealing out precious salt by the tablespoonful, the scientists bought pigs, sugar cane, cucumbers, sweet potatoes, and New Guinea "asparagus."

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Natives Shiver Half-naked at 11,200 Feet, Preferring to Hoard the Sweaters Issued by the Expedition

The grass hut, standing below Mount Hagen's wind-swept summit, looks up to Mount Giluwe, a volcanic cone rising 13,660 feet. Sweet potato beds climb the distant slopes to the purple band of timber. Robert Doyle stands beneath the Explorers Club flag. A water-filter bag is set up on the left.

Savage Nondugl Man Goes Civilized Woman One Better in Paint, Fuss, and Feathers. He Scorns the Unadorned Male

Polka-dot cheeks, nose plug, fur cap, and mother-of-pearl collar beautify the Nondugl man on left. His friend has a brow band of giant green scarabs bound together with orchid stems. White plumes wave from a black foundation.

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Carriers in the Kubor Range Drop Their Packs and Take a Breather Around Nose Plugs

Here the people expressed such joy and excitement at meeting strangers that they stamped and howled. Women embraced the scientists with football tackles. Others on the sidelines, strangely simulating wilted hands, waved their greetings and sang *"Aya, aya, aya."*

Long Feather Spikes Crown Cowrie Caps of Nondugl Men

New Guinea's aborigines created all their own finery until gold prospectors wandered in in the 1930's. They fashioned pearl-shell collars, strings of red nuts, chains of bamboo rings, wooden bracelets, bark belts, and necklaces of pig teeth, dog teeth, and marsupial teeth. Lately these have been found mixed with the white man's celluloid rings, glass beads, mirrors, bits of tin, and pieces of aluminum from wrecked planes.

Tall plumes, badges of wealth and power, may be anything from chicken feathers to bird of paradise streamers. Only chieftains are privileged to wear the eagle's lordly garb.

< Eyebrows are whitened with lime and ashes. A crescent shell is thrust through the perforated nose. The cowrie headband has a bark liner. All shell adornments were packed from sea to highlands across hundreds of miles of twisting trails.

> The bristling halo of black cassowary feathers once was reserved for warriors who had slain enemies in battle. Plumes were taken from captive birds kept for that purpose.

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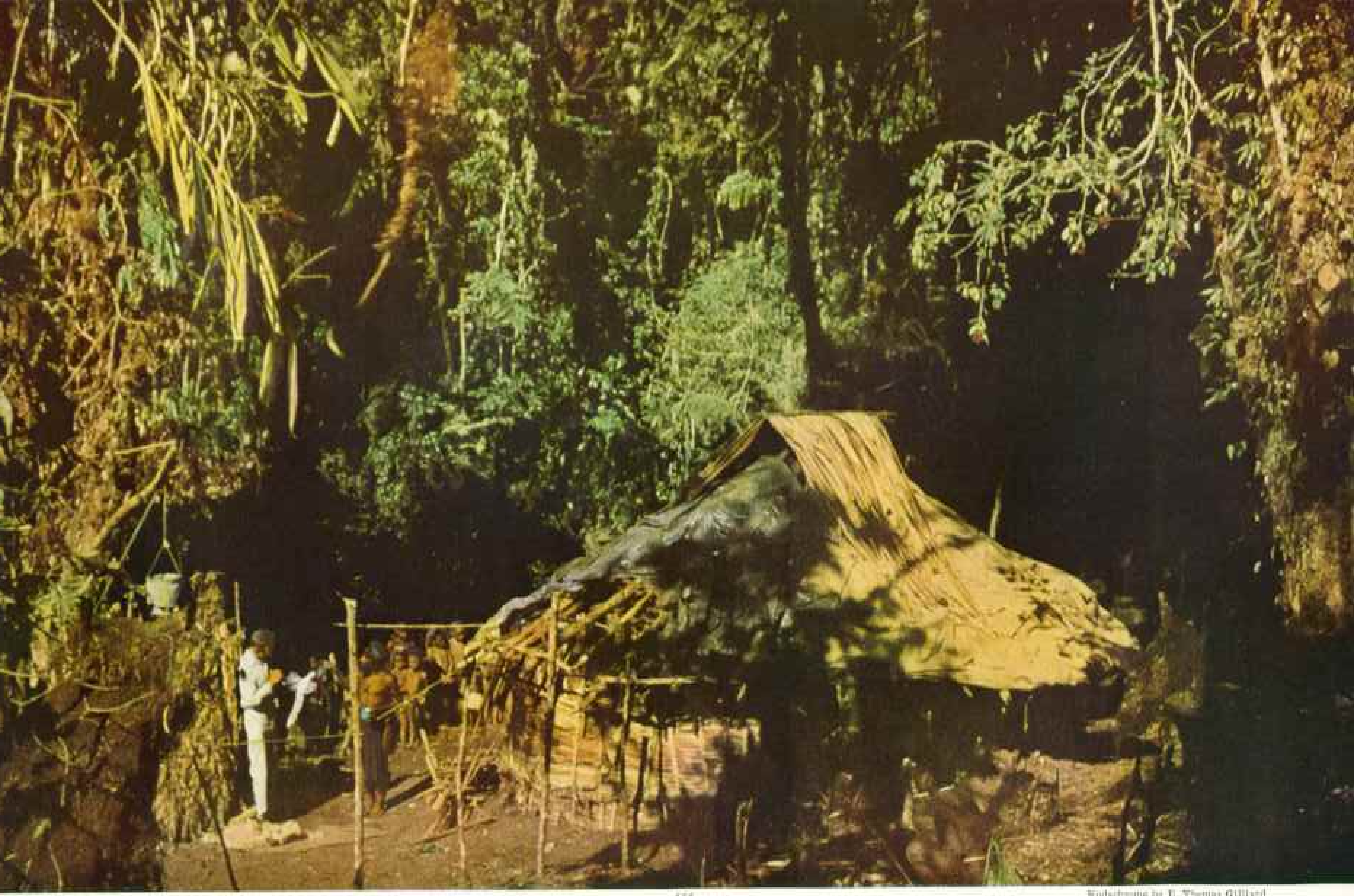

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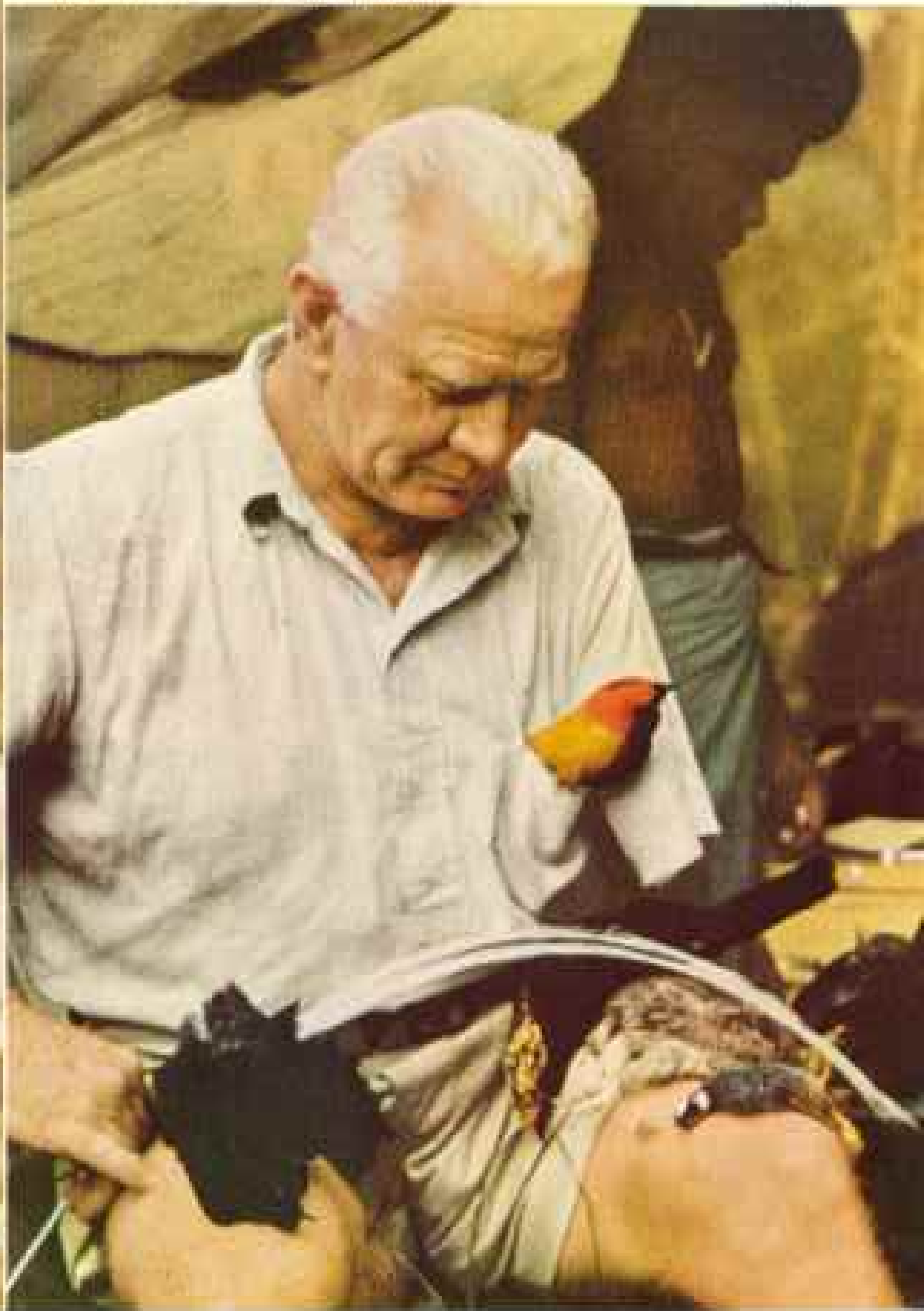

Mount Hagen Camp Is Roped Off Against Mobs of Callers

Here the expedition, settling down for 20 days, enjoyed luxuries such as the bucket shower on the left.

The author spent 8 to 15 hours a day preparing scientific specimens. He holds the expedition's prize discovery, an unknown species of bowerbird.

William Lamont examines a male ribbon-tailed bird of paradise and two species of quail.

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Kodachrome by M. K. Bodnar, S. V. D.

↑ Husband Hunters Wear as Price Tags Their Fathers' Shell Savings

Multiple collars say these girls come from wealthy families. Once married, they must discard their handle-bar-style nose shells. A bride's beauty is not nearly so prized as her ability to cook meals, gather firewood, tend pigs, and bear children.

↓ A Young Blade's Beauty Scar Runs from Brow to Nose Tip

Both men smear their faces with ocher and wear marsupial fur in their ears. Girls sometimes rub so much loose fur into eyelashes that they seem to be peering through veils (page 669). Savagery's scarification is comparatively rare among the highland tribes.

Kodachrome by E. Thomas Gilliard

Berlin, Island in a Soviet Sea

By Frederick G. Vosburgh

With Illustrations by National Geographic Photographer Volkmar Wentzel

At a Russian hut in the middle of the road, wooden barriers blocked the broad route to Berlin from West Germany. A Russian soldier with purple-red shoulder boards, hammer-and-sickle insignia, and a businesslike-looking submachine gun waved our car to a halt.

Piling out, we went into the little hut, bare except for pictures of Stalin and Lenin.

Behind a wicket sat a Soviet soldier with a peasant face and suspicious, knowing eyes. In limping German he demanded our orders and passports, then squinted up shrewdly at the National Geographic photographer, "Kurt" Wentzel.

"Wentzel," he said. "You are a German."

"No," said Kurt, indicating his U. S. passport, "American."

"Deutscher Name, Deutscher Name" (German name), the Russian insisted.

An Indian to the Rescue

"In America," I interposed, "there are many people with German names; many with Russian names, too. In fact, all our names came from some other country, except those of some of the Indians. They were the only people living in America in the beginning."

The Russian looked utterly blank, as if he had never heard of an Indian.

"Here, I'll draw you a picture," said Kurt.

Quickly he sketched an Indian chief, complete with hawk nose and feathers.

Light dawned. The simple face creased in a smile. Nose close to paper, the soldier scrawled in his big book, banged a Russian stamp on our orders from the U. S. High Commissioner for Germany, then handed us back the papers.

"OK," he said in English. The noble redskin seemed to have saved the day. But as we left, the Russian was still repeating, "Deutscher Na-me, Deut-scher Na-me," like a child wrestling with a problem too big for him.

A Slip in Geography Means Trouble

This encounter at Helmstedt last spring was our introduction to the Russians, who control all access to Berlin, deep in their zone of Germany (map, page 694).

Just before, at the United States check point, an American Military Police sergeant had given us a well-intentioned geography lesson.

"On the way back from Berlin," he said, "the road forks. A sign on the fork to the left says Frankfurt on Oder. Lots of people confuse it with Frankfurt on Main, headquarters of the U. S. High Commission. They turn left and wind up on the outskirts of Leipzig, deep in the Soviet Zone—if the Russians don't get 'em first.

"It usually takes several days of parley with the Russkies to get 'em out. We're not allowed to go in there to help 'em; in fact, neither you nor I can go more than 15 feet off this Berlin road.

"Good luck, now. After you pass the Russian check point, don't pick up anyone, don't stop, don't take any pictures, and don't cover the 104 miles to our Berlin check point in less than two hours. We've checked your time, and if you do, we'll know you drove too fast. If your car breaks down, fill out this slip and give it to a passing driver. Then one of our patrols will bring you help.

"If our men haven't checked you in at Berlin in four hours, and we haven't had any word from you, we'll come out looking for you. So long."

The Russian check point at Helmstedt was clogged in both directions with big German Diesel trucks and trailers, halted for checking loads and papers. But a Red Army man glanced at the hard-won Russian stamp on our orders and waved the barrier up. "Gute Fahrt," said the usual German highway sign, meaning "Good passage" or "Open road." We were in the Soviet Zone.

Running a Propaganda Gantlet

For more than a hundred miles we ran a gantlet of propaganda. Every overpass bore a big-lettered preachment from the Communist Party line:

"One Berlin for All Germany," "Arm with Youth for Berlin," "Vote Ja, Ja, Ja," "National Front Fight Against the Colonial Enslavement of West Germany," "Fight with Us for the Unity of Germany" (meaning, of course, unity under Soviet domination), "Ami Go Home" ("Ami" is a derisive term for Americans), "All Germans at One Table" (picturing a fat U. S. soldier with his feet on the tablecloth while Germans show him the door).

Most signs were in German, one or two in Russian, and some in English and French. One in English needed proofreading: "Order the Invastigators of War to Put a Stop to!"

As I read the anti-American propaganda of our wartime ally, I remembered German signs in English on the overpasses as our armies

rolled into Germany in 1945. "Onward, Slaves of Moscow," one had read. "You want Berlin, but You Will Get Moscow."

"Green Tunnel" to Berlin

The wide double-lane express highway, or Autobahn, to Berlin is like a tunnel, you see so little. The only large city we saw from the road was Magdeburg, with its factory chimneys, some smoking, others idle. One distant factory looked half destroyed, half dismantled. An occasional windmill pawed at the sky; farmers drudged in the fields with a cow, a rare horse, or an ancient tractor pulling plow or harrow.

Once we passed a German truck, halted by patrolling Russian soldiers. They swarmed all over it. A Red Army armored car stood by with menacing gun. Forbidden to stop, we never found out what the luckless driver was supposed to have done. At another point we saw a car burning mysteriously at the side of the road with no one in sight.

Much of the route was a two-tone painting in green—the feathery light green of birches against the dark green of pines. Pink and white fruit trees were gay as Easter bonnets. Along some stretches pinewoods had been razed, and crops were struggling among the stumps. That policy of wholesale stripping must have pained the tree-loving Germans.

On Berlin's outskirts we passed another Russian check point—without having to draw an Indian this time—and breathed free air again. Neat white signs announced we were entering the U. S. Sector. American soldiers in khaki "suntans" never looked better to us.

One last reminder of the Russians was a Soviet tank of World War II, high on a concrete pedestal. They left it in memory of the part played by armor in the Red Army's capture of the capital of Hitler's Reich.

Here in the southwest suburbs, Berlin looked like a summer resort. Fat and lazy, the Havel River forms a chain of limpid lakes —Grosser Wann See, Kleiner Wann See, and a series of other "Sees"—like a moat from north to south. Lakes, rivers, canals, and woodland parks cover more than a fourth of Greater Berlin, one of the world's most spacious cities. Its area is five times that of the District of Columbia.

Soviet Holds 45 Percent of City

To visualize split-up Berlin, one must try to imagine Washington—God forbid!—apportioned like a pie among four victorious powers, one of them a Communist dictatorship. The dictator's minions hold the biggest section, about 45 percent, including most of the Government buildings—or what is left of them.

Ranging the countryside roundabout, the dictator's armies encircle the city. No train, truck, car, or barge can move in or out without permission. The only road link with free territory is the autobahn from Helmstedt in the British Zone of Germany, 104 miles away, almost as far as from Harrisburg, Pennsylvania, to Washington, D. C.

Yet, despite their long ordeal, Berliners didn't act like people under siege. When we asked directions, the response was quick, accurate, winged with a smile.

"People here pride themselves on being 'Der helle Berliner'—the bright Berliner—a little more alert and quick of wit than other Germans," remarked Kurt.

At a gas station a bright attendant sniffed at our tank.

"You've been using German synthetic gas," he observed. "I can tell by the smell." (It's nauseating.)

"In fact," he added with professional pride, "I can recognize American, French, British, and Russian *Gasolin*—all just with the nose."

When we stopped to use the phone at a taxi stand, drivers found me the number before you could say "Götterdämmerung." They seemed eager to help Americans.

"There's a great fellow feeling, especially since we and the British fed and fueled the city by airlift and made it stick," said an American official at U. S. Sector Headquarters in the suburb called Zehlendorf.

Once used by the German Air Force, the building stands, big and white, on former Kronprinzen Allée, now renamed Clay Allée in honor of Gen. Lucius D. Clay, who headed the U. S. occupation of Germany during the airlift.*

A street near by is named for an earlier, much-admired American character. It's quaintly called Onkel Tom Strasse (page 692). We could not find a Little Eva Lane, however!

Soviet Sector Dubbed "West Moscow"

Before exploring this city of schism, we took a long look at a map to avoid going into the Soviet Sector by mistake. Seventy-seven percent of the streets leading into it are barricaded or patrolled by Communist police. Some are marked with signs, but a few are signless primrose paths that might lead into trouble. Later we planned to go there, but we didn't want to blunder in, unprepared, and risk having our car confiscated.

If the Communist police of the Soviet Sector find anything they consider incriminating, like West German marks or a copy of the *London Times* or *Stars and Stripes*, the result may be days of durance—worse if the unwitting guest is on the Communist black list.

* See "Airlift to Berlin," National Geographic Magazine, May, 1949.

Acme

Free Berlin Flashes News to Neighbors Across the Invisible Communist Curtain

A 30-yard-long sign reminiscent of Times Square sheds light among those who live in the darkness of Soviet-controlled information. Under the heading, "The Free Berlin Press Reports," five-foot letters twinkle tidings of world events to the Communist-ruled part of the city. From the edge of the British Sector, the busy beacon aims like a gun at the Soviet Sector, just across Potsdamer Platz (page 697). The sausage booths stand barely inside free territory.

In an attempt to block out the sign, the Communists have erected one on their side of the square, out of sight behind the camera; it advertises their Government-run stores. But, despite the obstruction, news-hungry subjects of Communist masters can read the flashing words.

As this item about General MacArthur raced across the array of bulbs, the camera caught a misprint. Even in German, "General" has two e's.

Shades of Little Eva! Children Surround a Hurdy-gurdy Man in Uncle Tom Street

German admirers of Harriet Beecher Stowe's immortal *Uncle Tom's Cabin* named Onkel Tom Strasse in the Zehlendorf suburb, American Sector. The "Halt" sign warns traffic to stop at busy Argentinische Allée. Unregimented West Berlin youngsters contrast with militant marchers in the Soviet Sector (page 695).

Russia's big slice of the city pie is East Berlin. ("West Moscow," Berliners call it.) "Elections" there are the Soviet type, with a single slate of hand-picked candidates.

West Berlin, the remaining 55 percent, is split into American, British, and French Sectors (map, page 694), but is administered as a unit. A freely elected German municipal government runs West Berlin under supervision of the Western Allies.

City Leads a Double Life

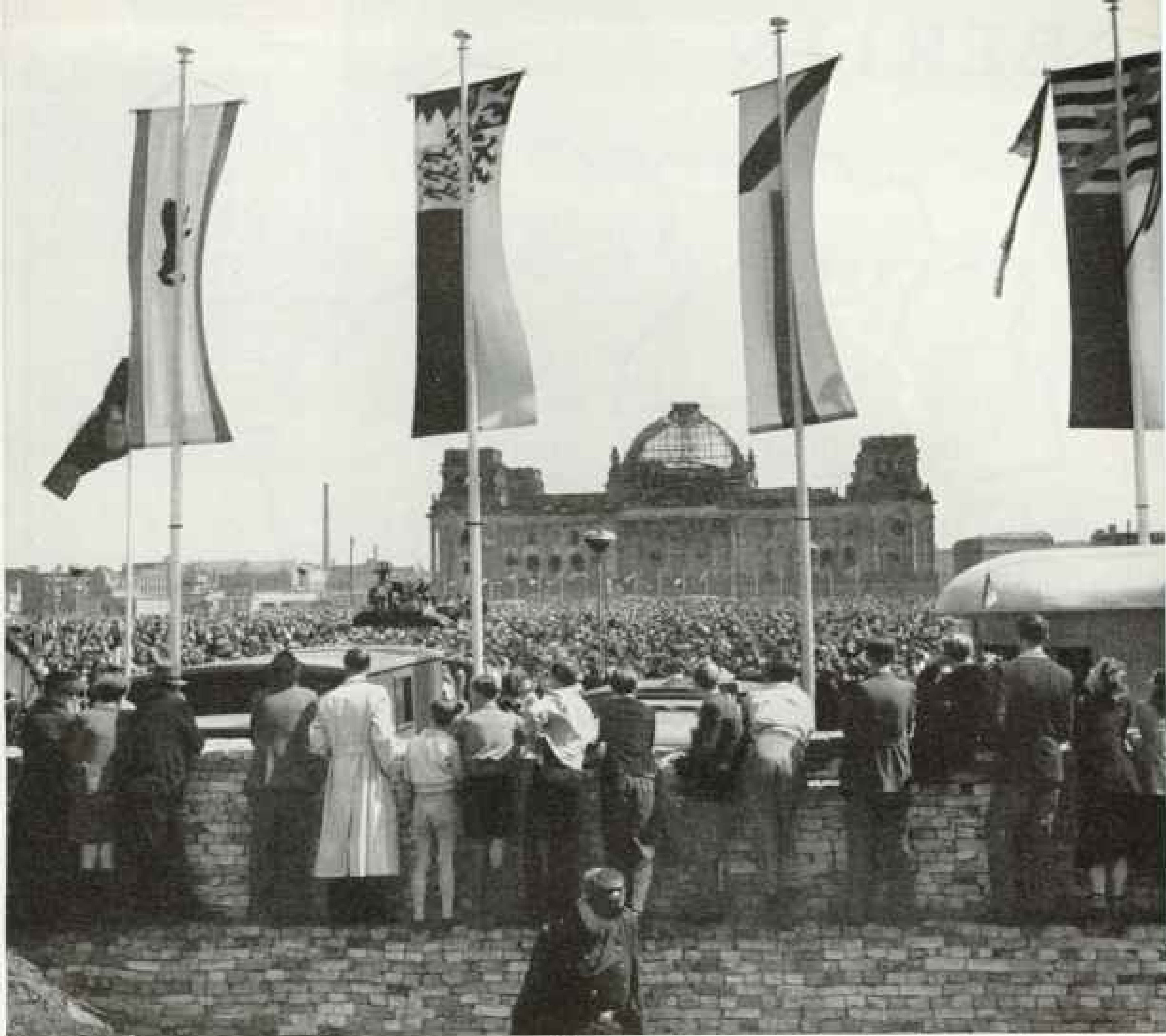
Thus Berlin, physically one city, leads a strange double life. It has two police forces, two fire departments, two postal and telephone systems, two kinds of money, two types of automobile license plates. Schools, courts, press, and radio in the two sections are as different as Communism is from Democracy.

All effort to run the city as a whole ended in 1948, after a Communist mob drove the non-Communist majority of the municipal government out of the Rathaus, or Town Hall.

In the big, palatial, empty headquarters of the Allied Control Authority, supreme council of the four occupying powers, the only office functioning is the Air Safety Center, which clears planes into Berlin and of course is supposed to be given details of all prospective flights. Remarked an American official, dryly, "The Russians say their jets will be flying in all directions, at all altitudes, all day."

Otherwise, four-power cooperation is limited to joint supervision of Spandau Prison, in the British Sector, where the seven remaining war criminals convicted by the International Military Tribunal at Nürnberg in 1945-46 have time to ponder their deeds.

Berlin's Russian Sector serves as capital of



On May Day Half a Million Berliners Mass Against Communism

This mighty outpouring cheered speakers using such phrases as "barbaric police states that hide behind the term 'People's Democracy.'" The huge, orderly crowd extended to the burned-out Reichstag Building, close to the Soviet Sector line. Many East Berliners flocked across to stand with their free neighbors (page 699). Black mourning drapes the banner of Saxony, one of the States occupied by the Soviets. Others (right to left) represent Baden, Bavaria, and Berlin.

the Soviet Zone of Germany. But, largely because West Berlin is so isolated and so vulnerable to Russian squeeze or attack, it was not chosen as capital of the Federal Republic of Germany. That distinction went to the university city of Bonn, far away on the Rhine.

Irked at loss of capital status, West Berliners poke fun at little Bonn. They call it "Bundesdorf" (Federal Village).

Metropolis Has Shrunk a Million

As we drove downtown through the American and British Sectors, we saw increasingly the awful disfigurement left by the war. Retribution rose to its crescendo in the city's center.

Despite all the rebuilding in the West Sectors, many people yet, in 1951, live in bombed or shell-blasted buildings. When we dropped a German newspaperman at his home, he strode through a bomb-created courtyard into what seemed an absolute ruin. Inside, a few rooms had been patched up.

"Housing in West Berlin isn't so short now," he remarked. "Only 1.6 persons per dwelling-house or apartment room, not counting kitchens and bathrooms."

Berlin's population has dropped more than a million since before the war, when the German capital, largest city on the Continent, ranked fourth in the world in population, exceeded only by New York, London, and Tokyo. Today 3,325,200 live here—1,179,300 in the Russian Sector, 2,145,900 on the free side.

Bombed and unbombed apartment build-

Drawn by Herbert E. Eastwood

Fancy Your City Split Like Berlin, with Communists Holding Nearly Half!

Soviet Russia rigidly controls the biggest single sector, nine-twentieths of the total. Communist East Berlin, with its one-slate "elections," is dubbed "West Moscow" by Berliners (page 692). Free secret ballot chooses city fathers of West Berlin, comprising American, British, and French Sectors. Inset locates the former capital, which sits at the end of a hundred-mile limb, the Helmstedt-Berlin highway through the Russian Zone of Germany. Places shown are limited largely to those named in the article.

ings often have stovepipes sticking out through the walls. With coal still scarce, Germans can't be bothered trying to keep central heating going. They settle for stoves, which may at least keep one room fairly warm.

Even in the much more rebuilt Western part of the city, many a ruin still stands as stark as a skull. Such a casualty, dead though still on its feet, is the Kaiser Wilhelm Memorial Church overlooking Berlin's resurrected Broadway, the Kurfürsten Damm (page 700).

Berlin's New Mountains—of Rubble

But most of the rubble in the Western Sectors has been cleared by the busy hands of Berliners of both sexes through hand-labor work projects paid for with Marshall Plan money. Salvaged bricks and stones go into new construction. The waste forms miniature mountains in the outskirts and in Berlin's Central Park, the Tiergarten (literally "Animal Garden," once a game preserve).

In the Tiergarten the blasted ruins of a giant concrete-and-steel flak tower were being buried. Dump trucks and bulldozers swarmed antlike over the huge mound, a new and symbolic landmark in Berlin's generally level terrain. Before long, grass, flowers, and trees will clothe these grim reminders of the consequences of making war.

Stone statues of former rulers of warlike Germany seem ironically, almost indecently, conspicuous in the Tiergarten and along the Sieges Allée, or Avenue of Victory, a mockingly inappropriate name today.

Stripped of most of its big trees, the Tiergarten is as naked as the head of a French girl caught fraternizing with Germans during the war. Berliners had to burn the trees to keep warm during the first postwar winter.

"We had a hard time getting them to do it," recalled an American official. "The city fathers said, 'We'd rather be cold.' "

But eventually many trees had to be burned,

Blue-shirted Young Communists of East Berlin Recall the Hitler Youth

Grim-faced lads pounding flower-decked drums are typical Communist Freie Deutsche Jugend, so-called "Free German Youth." Ahead of a sign urging "Forward with Stalin," they march along Unter den Linden in the Soviet-sponsored World Youth Festival in the Russian Sector. Comparing the Blue-shirts to Hitler Youth, the author says, "Nothing had changed but the color" (page 699).

from the Tiergarten and Grune Wald; stumps and roots of Tiergarten trees were dug up and used for fuel in the winter of blockade and airlift. Now their places are taken by two million new little trees, brought from West Germany and set out with Marshall Plan aid.

Along the Kurfürsten Damm and other important streets in the Western Sectors, Marshall Plan funds have helped repair old buildings and rear new ones. Among them we noted a new hotel, a theater, and a newspaper plant, all bearing signs reminding Berliners where the money came from.

"We Like to See Nice Things . . ."

New stores on the Kurfürsten Damm were stocked with luxury goods—sheer stockings, jewelry, lingerie—at prices roughly comparable to those on Fifth Avenue. Anyone with enough marks can buy them, but most people have to content themselves with window-shopping. More than 284,000 West Berliners are out of work because of the Russian grip on the city's surrounding trade area, and the average income is only about 250 Deutsche marks ($60) a month.

"We have seen so many poor things that we like to see nice things on the Kurfürsten Damm," said a West Berlin doctor's wife, "even if we cannot buy them."

She and her husband had invited us for dinner—well-cooked veal cutlet, or *Wiener Schnitzel*, potatoes, and sauerkraut (page 701). Their blond daughter, 8-year-old Cordelia, asked the blessing, translated thus:

> Earth gave us this,
> The Sun ripened it.
> Dear Sun and dear Earth,
> We will never forget thee.

Then all joined hands around the table and wished each other "Guten Appetit."

"If you go into Communist territory," said the doctor, "you have to take care or you risk to be arrested."

"A young man I know was on his way to visit his parents in the East Zone and was reading a Lutheran church paper on the train," said his 14-year-old son, Justus, in good English learned in school. "He was arrested by the criminal police and all his luggage was examined. Finally they let him go."

Justus's hair was long and shaggy.

For West Berlin's Pet Hippopotamus, Love Laughed at the Iron Curtain

When popular Knautschke needed a mate, East-West negotiation brought him Grete from Leipzig, Soviet Zone. They spent a two-month honeymoon in the West Berlin zoo. Later Grete's daughter Olga came for a similar visit. East and West get alternate offspring. Animal-loving Berliners followed these romances with all the enthusiasm accorded this feeding scene. Knautschke was born in Berlin during a World War II air raid.

"During the whole Nazi time," the doctor explained, "everything was cut in military style, including the hair. Every boy had to have his hair cut short. Now men and boys wear their hair extra long as a reaction against the military haircut."

Talk turned to the problem of making a living.

"Nowadays," said the doctor, "many people in Berlin have two sorts of money. For one Western mark you get five Eastern marks; sometimes as many as seven or more."

He grinned and nodded at Justus.

"The boys in his age are becoming great mathematicians.

"Many West Berliners," he continued, "go to East Berlin to buy groceries—potatoes and bread—because they are cheaper. So many are buying bread there that 30 percent of the West Berlin bakers have no work."

Cheap Bread a Communist Bait

Later I checked these statements with an American occupation official.

"What the doctor told you is true at present," he said. "Here you have a free and a controlled economy, side by side, each with its own currency. Our mark is worth 23.8 cents, or, roughly, a quarter; at five to one the Communist mark is worth only about a nickel. So it's not surprising that some things are cheaper over there in terms of our Western marks.

"Of course the Communists are using this

Merely Crossing the Street at Potsdamer Platz Lands You in the Soviet Sector

Foreground is in the British Sector, background on the Russian side of the line. The big war-damaged building houses one of the State-owned Communist stores called "HO" for *Handelsorganization* (*Handels* means "trade"). A Red propaganda sign urges West Berliners to vote against "remilitarization of Germany." These people have arrived from the Soviet Sector by subway; thousands cross the line daily (page 698).

as propaganda to try to impress the West Berliners. They say, 'See, bread is cheaper over here. Why don't you come over and live with us?'

"Many West Berliners are not averse to saving a few marks that way, but they're taking the bait and not the hook. They know what life is like on the Soviet side. Berliners are as anti-Communist as any people in Europe; they have reason to be. They've had the Russians in the house, so to speak, and they hear plenty from their friends across the line about the secret-police terror and the low standard of living."

To distinguish their bread from smuggled-in loaves, West Berlin bakers now stamp "West" on each loaf they bake.

Shopping on the Communist side of the line is frowned upon by the more public-spirited Berliners.

"We do not think it's the right thing to do," said the wife of a West Berlin publisher of school textbooks. "We call such housewives 'Frau Schimpf und Frau Schande'" (from the German expression *Schimpf und Schande*, meaning "a burning shame").

Uncomplimentary nicknames pinned on offenders have failed to discourage the practice. For instance, so many cross to the Soviet Sector to save money on haircuts that West Berlin barbers have lost about half their customers.

Cross-the-boundary buying is practiced the other way around, too. Most articles are bet-

ter and more abundant in the well-stocked West Berlin stores. Communists who have the money often come over to buy shoes, bicycles, tires, spare parts, light bulbs, butter, textiles, medicines. Life on the Soviet side is hard, and little can be bought there except the barest necessities.

In contrast, the good things of life are so readily obtainable in the West Sectors, if one can afford them, that the West Berlin publisher's wife told me last summer that she was actually sending packages to friends in England, mostly sweets.

Although carrying Western marks into the Eastern Sector is a criminal "currency offense" to the Communists, changing one kind of money for the other presents no problem. Downtown West Berlin is dotted with *Wechselstuben*, or "Exchange Rooms," for the purpose (page 700).

These money-changers exist primarily for the benefit of the thousands of Berliners who commute daily across the line dividing the city. More than 62,000 West Berlin residents work in the Soviet Sector, though the number is steadily decreasing; some 45,000 who live in the East have jobs in the West.

West Berliners working in East Berlin are chiefly skilled specialists and accordingly get somewhat higher pay than the average Soviet Sector worker. Income in East Berlin averages about the same number of marks—250 a month—as in West Berlin, but the cost of living on the Communist side is roughly 25 percent higher.

An Hour Behind the "Curtain"

On May Day afternoon Kurt Wentzel and I took a stroll in the hammer-and-sickle section. We walked a bit warily, for up to that time 24 West Berliners connected with the press had disappeared on similar walks or had been kidnaped in West Berlin and swallowed up in the silence on the other side.

Americans were supposed to be safe, subject to several ifs—*if* they didn't take pictures or ask prying questions, if they didn't carry "capitalistic propaganda" such as a Western newspaper, and if they had no West German money.

Flat in the pockets, we walked through the invisible curtain at Berlin's Potsdamer Platz. No fence or barricade marked the boundary; merely by crossing the street we entered the Soviet Sector (page 697).

Although we were speaking English and the angle of my snap-brim hat must have marked me as an American, patrolling police took no notice of us as we strode toward Unter den Linden. In fact, when we stopped to ask directions, one told us just how to reach the Lustgarten, or "Pleasure Garden," which serves as a Communist rallying place, like Moscow's Red Square.

Our route led past the tumbled remnants of Hitler's Chancellery and the site of the air-raid shelter where, according to all available evidence, the Nazi dictator went to a suicide's death in the toppling ruins of his "thousand-year Reich." Communist wrecking crews long ago blew up the bomb shelter, and now they had all but erased the war-battered concrete-and-stone Chancellery; today its stones stand anew—in mammoth Berlin memorials to Stalin and the Red Army.

On and near Unter den Linden much clearing and building had been done, for the Russians are trying to turn this famous street, heart of Berlin, into a Soviet show place. New buildings were largely Government agencies, including a huge new white-marble Russian embassy. Whole streets near by still gaped in ghastly ruin.

Marchers Belie "Peace" Posters

But surely there was no lack of advertising: two- or three-story-high posters and signs banged away at selling one thing, the Communist Party line. In contrast to Western Sector signs advertising toothpaste, light bulbs, and Mercedes cars, these urged outlawing the atom bomb (balked long ago by the Russians themselves), protested the "capitalist aggression" in Korea, and warned, "Don't Let Berlin Become a Second Seoul."

Ten-times-lifesize pictures of Stalin and German Communists wearing benevolent expressions looked down at holiday crowds, and a voice as excited as Hitler's harangued them in German through loud-speakers.

To turn the Lustgarten into a huge "Marx-Engels Square" for Communist gatherings, the Russians razed the old Schloss, or Palace, where Kaiser Wilhelm II gave the orders for war in 1914.

"Protest the remilitarization of Germany," urged a long cloth sign in the Lustgarten. The red-lettered words formed an ironical caption for a dark military column marching directly beneath them—rifle-toting men in black jackboots, midnight-blue uniforms, and black raincoats that recalled the old Nazi SS troops.

These Mauser-carrying marchers were German Communist *Bereitschaftspolizisten*, or "Alert Unit Police," trained by the Russians in secret-police methods and use of modern military weapons. The U. S. Department of State says this army of "police" in the Soviet Zone of Germany was organized in November, 1946, and now numbers 53,000. Some of its members, the Department says, are trained in the use of tanks, machine guns, artillery, and even aircraft.

If any of the onlookers in the broad plaza noted the irony of the grim column marching against a backdrop of protest against Western "remilitarization," they gave no sign.

On Unter den Linden we saw other columns—marching, singing boys and girls in the light-blue shirts and blouses of the Freie Deutsche Jugend, the Communist youth movement now outlawed in West Germany. They could have been Hitler Youth on the eve of World War II. Nothing had changed but the color.

Fresh-faced, towheaded youngsters in blue looked innocent compared with the dark, sweating column of Alert Unit Police, but to me they seemed even more disturbing. They bore stark witness to the all-out effort the Russian occupiers are making to win the rising generation by catering to the German yen to wear a uniform, march, and sing. The West refuses to regiment youth (pages 692 and 695).

Berliners "Cheapest Atomic Bomb"

That morning half a million Berliners had gathered in a mighty, orderly phalanx on the free side of the Brandenburger Tor, war-scarred gate at the boundary between two worlds. Careful not to step on the little trees newly set out in the Tiergarten, they had come to cheer their Social Democrat Mayor Ernst Reuter and other May Day speakers, and to show their solidarity against Russian intimidation. Thousands from the Soviet Sector poured across the line to stand with their friends in defiance of their Communist overlords (page 693).

A Puzzled Newcomer from the East Gets Help

Wearing shoddy suit and worried air, the new arrival from the Soviet side receives directions from one of West Berlin's high-capped policemen. Thousands like this man with his cheap suitcase pour into West Berlin each month, desperately seeking political asylum (page 704).

"How can you be so brave and lighthearted," I asked Mayor Reuter next day, "when the Russians could seize the whole city at any time?"

"How can you live, otherwise?" the Governing Mayor, or *Regierender Bürgermeister*, of West Berlin responded in slow but good English. "If you have to take it, you *must* take it. The population of Berlin—I am very proud of them. I am only the expression of what the people are thinking. The spirit has been gained and built up in the years we have stood together."

His Honor removed his Churchillean cigar. His jaw went taut with determination.

"We are the cheapest atomic bomb inside the Iron Curtain," he declared. "Our dynamic influence at the Brandenburger Tor is the strongest moral force."

"Can Berlin and Germany survive 'half slave and half free'?" I asked.

"No, not indefinitely," came the answer. "How long depends on our moral strength.

"Eventually this question, the division of Germany, must be settled, and I am sure it will be settled, because the Germans in the East are not being fooled by the Communists."

The Mayor gestured toward his breast.

"You must clip out here," he said, "and see into the hearts of these people. Their apparent response is all artificial—lip service, because otherwise they cannot survive. You

Luxuries Again Tempt Shoppers on Berlin's Kurfürsten Damm, Show Window of the West

Rebuilt restaurants and stores on West Berlin's main shopping street offer everything from sausage and shoes to pâté de foie gras, Rhine wine, jewelry, and lingerie which few Berliners can afford (page 695).

Stores get some customers from the Soviet Sector, where the standard of living is much lower (page 698). Sidewalk cafes suggest Paris. Lifeless as a corpse, war-battered Kaiser Wilhelm Memorial Church stands at the head of the street.

Signs here advertise a movie (*Kino*), Mercedes-Benz cars, Royal Dutch Airlines. One at the corner points to a *Wechselstube*, or "Exchange Room," where East and West marks can be converted.

Pig-tailed Cordelia Thanks Sun and Earth for the Food Before Her

Before feasting on her mother's good German cooking, the honey-haired eight-year-old daughter gave thanks on behalf of the family (page 695). "Taxes are high," observed her father, Hans Bremner, West Berlin doctor (center). "But there is much to be thankful for. At the end of the war we had to eat acorn cake." His wife, between husband and 14-year-old son Justus, cooks delectable *Wiener Schnitzel.*

may blame them, but I do not; there can be no opposition.

"What you see is a colossus with clay feet. In the long run the Soviets know they cannot digest these Germans. Military strength is not everything. Moral, political, economic strength is of greatest importance."

I mentioned something that worried me—those marching, singing columns of blue-shirted young Germans, the apparently strong appeal of the Communist youth movement.

Mayor Reuter pointed out that the Communists pay the expense of bringing the Blue-shirts to Berlin. "If you offered your youth a trip to New York, Chicago, or Washington, with all expenses paid, of course they would come."

"But," I insisted, "the Nazis succeeded in winning youth in about the same way."

"The comparison with the Nazis is not 100 percent correct," the Mayor observed. "This regime is a foreign regime. That makes it much more difficult for the Communists.

"I think the greatest influence on Germany is the young people who are sent to America to stay there for a year or so. Everybody is coming back with a wider horizon."

If Mayor Reuter has any fear of assassins or kidnapers from the Soviet Sector, it doesn't show. An unassuming schoolteacher, he lives in Zehlendorf in a modest stucco house that looks like all the others in the block. Puffing the inevitable cigar and wearing a dark-blue beret, he rides to work at 8:30 in the morning in a chauffeur-driven black Mercedes with the top down on sunny days.

When Mayor Reuter goes to West Germany to make a speech or take part in a conference at Bonn, he often scorns to fly, preferring to go by car in defiance of Soviet soldiers and their German Communist police. The Berlin-Helmstedt autobahn was declared an international-travel corridor by inter-Allied agreement in 1945, and the Mayor explains to his worried office force that he intends to emphasize, by his own actions, the fact that this right is not being given up.

Many Headaches for Businessmen

To this visitor the surprising thing is that West Berlin can live, work, and produce as well as it does in view of Soviet restrictions and delays on raw materials and finished products moving by land or water.

Trains between Berlin and West Germany often are held up by the Communists on some new red-tape pretext. On the autobahn it usually takes hours before the big oil-odorous Diesel trucks get past the Soviet check points. Every now and then a "barge war" breaks out, cutting off the canalboat circulation so important to Berlin's industrial life. As one American put it succinctly, "They stop our barges; then we stop theirs."

At the end of the war, 85 percent of production facilities in this highly industrialized

metropolis had been dispersed by the Nazis to avoid bombing (10 percent), destroyed by bombs, artillery, or street fighting (15 percent), or taken east as reparations by the Soviets (60 percent). In addition, Berlin business found itself almost entirely cut off from the surrounding Soviet-held State of Brandenburg, with which many of the city's industries were closely geared.

Despite these past and present difficulties, West Berlin industries are grinding out radio tubes, light bulbs, paper, furniture, shoes, precision instruments, machine tools. There's even a stained-glass window factory. Berlin's varied output is sold in West Germany or abroad, where it earns much-needed foreign exchange.

Some of the factories are refugees, like Kurt Stiller's shoemaking business. Stiller once was codirector of one of Germany's largest shoemaking plants in Breslau, now under Polish administration. After the war he used up a lot of his own shoe leather by walking from Breslau to Berlin. There he set up a tiny shoe-repair shop that has blossomed into a small but busy shoe factory.

In many cases, manufacturing firms have moved secretly across the line from Communist East Berlin. The heavier machinery had to be left, but proprietors and loyal workmen smuggled much of the smaller equipment across in suitcases. If a machine or a part was too big, they cut it in two and welded it together later.

Some firms, it is true, have fled from West Berlin to West Germany to escape the almost intolerable difficulties. But enough are left to keep the free semicity alive, if not prosperous, with Marshall Plan help.

Good Music Cheap, Installment-plan Art

Music, too, has refused to die. The Berlin Philharmonic Orchestra once again is one of the finest in Europe. Ballet and opera flourish at the Municipal Opera House in the British Sector. The well-paid Symphony Orchestra of RIAS, Radio Station in the American Sector, is rated tops by critical Berlin listeners.

Tickets to West Berlin concerts range from two to 20 Deutsche marks (about 48 cents to $4.80.) Groups of workingmen and students get even lower rates.

Furthermore, West Berlin makes it easy for its eastern neighbors to share its musical entertainment. They are permitted to pay the same number of marks in their Communist currency, really worth only a fifth as much, if they can show an East Zone or East Sector identity card.

Art as well as music has revived. At least one West Berlin dealer sells paintings on the installment plan. Thus purse-pinched customers can enjoy the pictures while they pay.

Higher education has had a rebirth. The Free University in West Berlin has 5,000 students, nearly half of whom now come from Communist territory. It was set up in 1948 after students balked at rigid Communist control of the University of Berlin on Unter den Linden in the Soviet Sector. From America last August came a $1,309,500 Ford Foundation grant to help the struggling Free University.

Visitors who remember the lethargic Berlin of the immediate postwar years see a decided change in the Western Sectors today. People look fresher, healthier, better fed, better dressed. I heard none of the "American swine" talk reported by visitors of five years ago.*

75 Percent Want to Share Defense

Berliners told me with apparent sincerity that they liked having Western troops around as a deterrent to the Russians. A recent poll showed that 75 percent of West Berliners wanted to share, physically and morally, in defense of the West against Communism.

True, they feel—like their Mayor—that this defense can be accomplished without war. Typical of German war-weariness was a 22-year-old boy working as a waiter in Berlin. Captured by the Americans at 16 and released with the coming of peace, he had tried repeatedly to get out of Germany. Bent on fleeing to America as a stowaway, he was turned back in the Netherlands, in Belgium, in France, in Spain.

"I don't want to get tangled up in another war," he said with emphasis.

He and other young Germans expressed disillusionment with politics as well as war. They confuse normal participation in government with the old one-party Nazi system and say, "Look where that got us!"

Because of widespread unemployment, thousands are working at jobs a notch or two below those for which they were trained. At a filling station the attendant insisted on taking out every spark plug and wiping it thoroughly. (They proved to need it.)

"This isn't my job at all," he remarked. "I was trained to be a *Kaufmann* (merchant). But I was brought up to do everything thoroughly."

For holiday relaxation Berliners head for the outskirts on myriad bicycles and motor bikes; but West Berliners can't go far.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "What I Saw Across the Rhine," by J. Frank Dobie, January, 1947. For other postwar accounts, see "With Uncle Sam and John Bull in Germany" and "Uncle Sam Bends a Twig in Germany," both by Frederick Simpich, in the January, 1949, and October, 1948, issues.

Hot Dogs Are *Bratwurst* Here, but They're Good by Any Name

Stands selling *Fleisch Bratwurst*, or fried meat sausage, on the free side of Potsdamer Platz attract many a small Hans and Horst—and occasionally a Hitler-era lad laboring under the name of Adolf. A juicy sausage like the one held by the caricatured chef—but definitely not as big—costs 30 pfennigs, about seven cents. Instead of nesting in a roll, it rides to its fate on a *Knacker*, or cracker.

"In about 20 minutes," complained one woman, "you get to the Soviet Zone and have to stop."

So nowadays these Nature-loving city folk have to content themselves with Berlin's own forest parks, lakes, and rivers, the Havel and the Spree. The latter flows directly through its heart.

Even the poorest Berliners plant flowers; often the brightest flower box adorns a patched-up dwelling in a ruin.

Berlin a Battleground of Ideas

Despite these attempts at normal living, no free Berliner can ever forget that he lives in a battleground of ideas, that just over there, perhaps across the street, is the brooding Communist world.

Occasionally a few shots are fired, as when trigger-happy Communist police blazed away at a busload of American sight-seers in Potsdamer Platz a few months ago.

But usually this is a bulletless battleground, with both sides using every available weapon of psychological warfare. The Soviet station, Radio Berlin, actually located in the Western part of the city, blares Communist propaganda. The powerful American station, RIAS, broadcasts programs full of news, biting comment, music, and interviews with refugees from Red concentration camps and uranium mines. By electric sign the Free Berlin press flashes news to the Soviet Sector (page 691).

Last year the West found a novel way to let the Soviet-stifled voice of East Berlin be heard. Acting on an idea conceived by RIAS, West Berlin's major political parties invited their Communist-ruled fellow citizens to express their opposition to Communism and their desire for free and secret elections by mailing to the West Berlin city hall the stubs of their expired adult ration books for September. City hall desks were snowed under with 376,000 valid books of stubs and 72,000 letters or stubs that did not meet the strict requirements.

The Communists tried to check the response—and find out who had responded—by offering hosiery in exchange for stubs. Exclaimed RIAS, "Lieber Gott! One pair of stockings for freedom!"

"The people over there are hungry for information," observed an American official. "Every May Day we invite East Sector residents over for a big meeting and show at the stadium; about 25,000 come. We give out copies of our paper and our magazines, *Heute* and *Der Monat*. They tear 'em out of your hands. Last year one of our men lost his shirt. Finally the men had to get on top of the truck and throw 'em at the people."

Die Neue Zeitung, U. S. newspaper in German, prints in its Berlin edition a daily box score of desertions to the West by Communist Volkspolizei, or "People's Police."

"More than five hundred 'People's Police' are included among the 20,000 who have come over to us from the East in the last four months, asking for asylum," said the paper's assistant editor. "Some days there are only one or two police, but we get as high as 17 a day; one day we even had 32."

House Without a Smile

One of the saddest places in Berlin is the refugee center, or *Flüchtlingsstelle*. In the long drab lines of waiting people I never saw a smile.

Broken-spirited men, women, and children, these are refugees from the East. West Berlin gets at least 5,000 a month, for here they can walk through the Iron Curtain to freedom. They come with only what they can carry, having sacrificed everything else.

"How can you tell a real refugee from a spy?" I asked the German director.

"Sometimes you find out only after the damage is done," he said. (He used a German proverb, "After the child has fallen into the well.") "Cross-examination backed by double-checking with undercover agents in the East Zone usually brings out the truth.

"We get all kinds of people, but the basic aim of most of them is to raise the standard of life, which they know will be raised in the West as contrasted with the East."

All except spies get sanctuary, but only those who can prove life or liberty was in danger are granted asylum as political refugees. This coveted recognition entitles a refugee to earn a living in Berlin if he can find a job. While unemployed he receives a small allowance.

Because of limited housing and jobs, most refugees spend months or years in barrack-type camps in Berlin and West Germany.

In two stucco houses in a residential section of the American Sector we found the German high command of an active underground movement, the Fighting Group Against Inhumanity. Its volunteers organize resistance to police-state methods in the East Zone, try to trace fellow Germans swallowed up by Soviet prisons or slave-labor camps, free them if possible, and keep alive the spirit of resistance by chalking "F" for Freedom on Communist buildings in the night.

Leader of this organization is Dr. Rainer Hildebrandt, 36, a writer with the brow of a scholar and the burning eyes of a militant. Enemies from the East have tried to kidnap him. Police balked one plot by arresting two gunmen parked in a car outside his house. Their plan, they said, was to have one car knock Dr. Hildebrandt off his bicycle. Other men in a car behind would stop, under pretext of helping him to his feet, then stuff him into the back seat and race for the Soviet Sector.

While we talked with the invisible legion's leader, guarded by a bear-sized dog, mysterious people came and went through the corridors of the old house, fit setting for a Hollywood melodrama.

In one room we saw several square yards of misery, a row of open wooden packing cases containing 66,000 cards. Each of 26,000 bore the name of a person missing behind the Iron Curtain; the other 40,000 were inquiries from anxious relatives.

Names of Nazi concentration camps under Red management turn up in these cards; for example, "Seen at Buchenwald" and the date.

Hamelin Like a Different World

"In Berlin you feel as if you're about 100 miles out on a limb," said Kurt as we sped along the Russian Zone autobahn on our way back to West Germany.

When we reached Helmstedt, we took a deep breath.

"It's as if some heavy hand had been lifted," Kurt said, feelingly.

That night we slept in an atmosphere centuries away from embattled Berlin, the 349-year-old Ratcatcher House in Hameln, the Hamelin of the old Pied Piper tale.

Beside the stone gabled house runs an alley in which, to this day, law forbids any tavern, drums, or merriment. For along this route, any townsman can tell you, the Pied Piper led the children of Hamelin. Like the rats he had led to the river, they followed him out the gates of the town and never were seen again.

Though whatever gave rise to the fairy tale happened more than 600 years ago, the grief of the village still finds expression in the name of the alley, Bungelosen-Strasse—"No Drums Street."

Under the stair-stepped gable roof of the old Ratcatcher House, I dreamed of the Pied Piper of Hamelin. But the children all had blue shirts, and the Piper luring them to the unknown wore Communist red.

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To carry out the purposes for which it was founded sixty-three years ago, the National Geographic Society publishes the National Geographic 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 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons 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 researches solved secrets that had puzzled historians for three hundred years.

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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 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

A notable undertaking in the history of astronomy was launched in 1949 by The Society in cooperation with the Palomar Observatory of the California Institute of Technology. This project will require four years to photomap the vast reaches of space, and will provide the first sky atlas for observatories all over the world.

In 1948 The Society sent out seven expeditions to study the eclipse of the sun along a 5,320-mile arc from Burma to the Aleutians. The fruitful results helped link geodetic surveys of North America and Asia.

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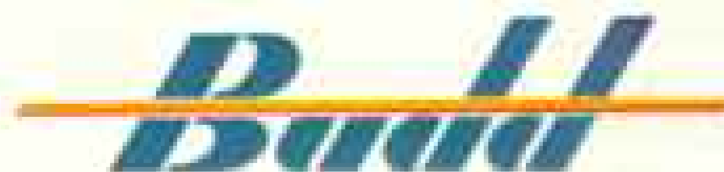

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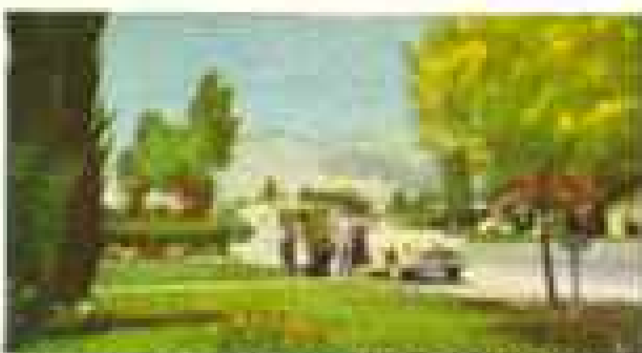

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NEW OIL FIELDS

EDITORIAL REPRINTED FROM The New York Times

"WHAT may well be the beginning of a new major domestic oil source in the northern Middle West is indicated by two recent important finds 100 miles apart, one last April in North Dakota and another in the past fortnight in Montana. For several decades this country has depended heavily, though not exclusively, upon southern and western areas—such states as Louisiana, Texas and California. If these new finds in North Dakota and Montana presage the opening of comparable rich fields they are of great importance.

"The mounting number of cars and oil heaters in this country is steadily increasing our consumption of this material, while from a global point of view the shadows over the future of oil production in the Middle East, particularly Iran, make it most desirable to increase production from more certain sources, as in this country, as rapidly as possible.

"In our gratification over these new finds we should not lose sight of the factors which made it possible for oil to be discovered at depths of 7,000 to 11,000 feet underneath the earth. The contributions of geologists, drilling technicians and related specialists are, of course, of the highest importance, for they make possible the location and then the reaching of this buried treasure. But important, too, are the enterprise and the willingness to bear risks which motivated these efforts. Wells that find oil are well publicized, but the large number which are no more than dry holes in the ground are recorded only in red ink in private ledgers.

"The men and organizations who search for oil at fantastic depths risk millions in such ventures, and frequently lose them. But they continue even after repeated disappointments because on balance profits can be made if a reasonable proportion of successes is attained. In this activity, as in many others, the role of the profit motive in inducing socially useful action is of primary importance, a fact which our people and our legislators might well keep in mind."

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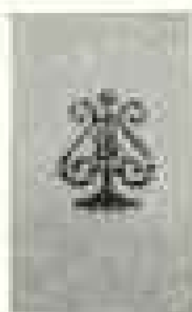

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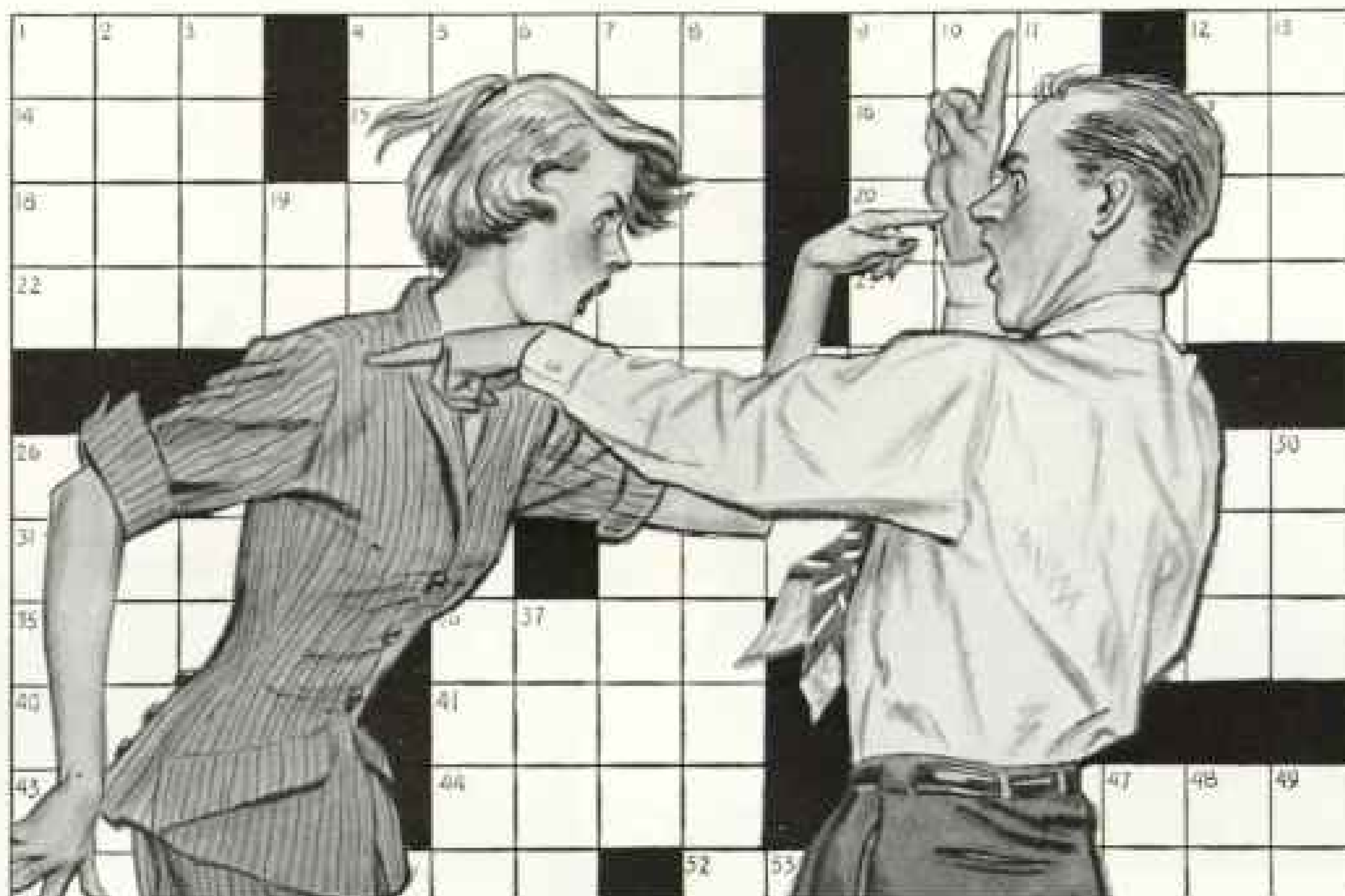

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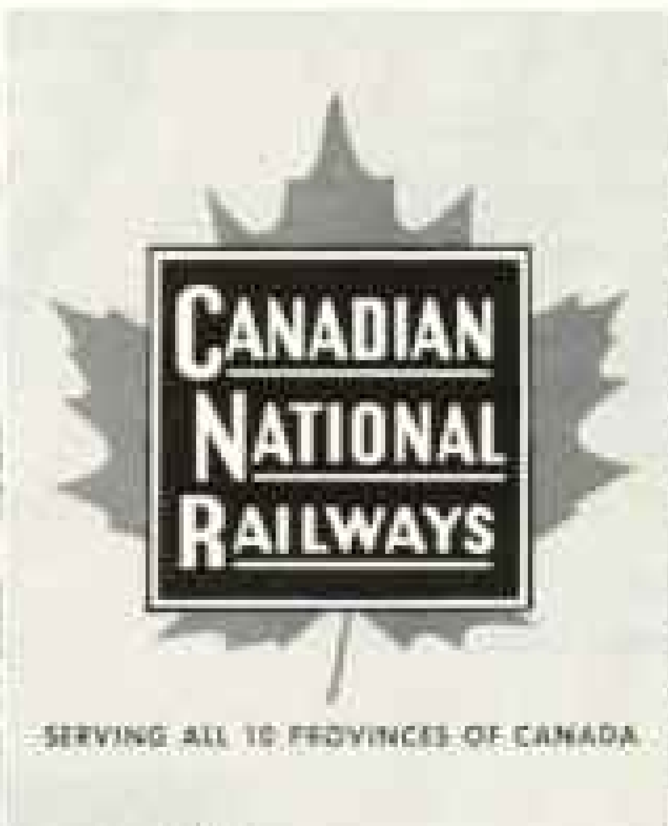

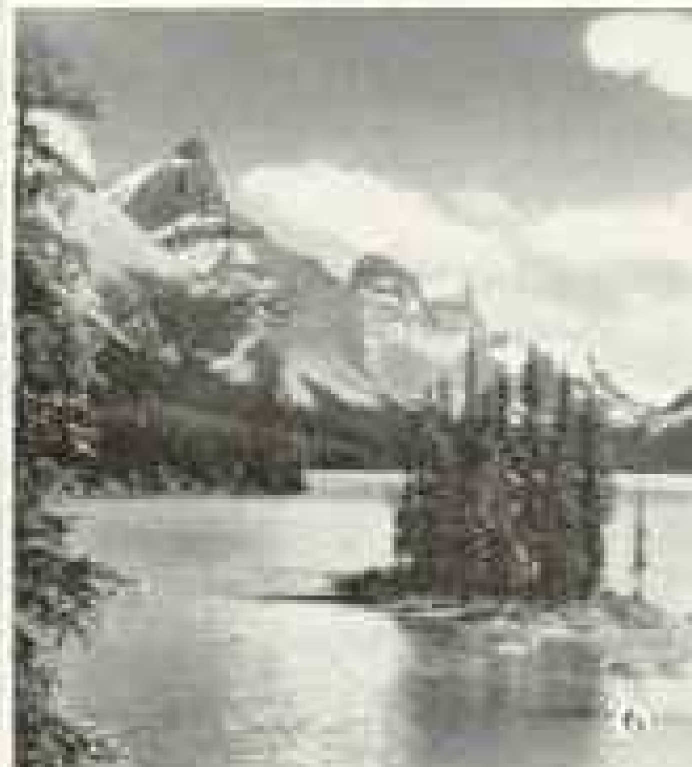

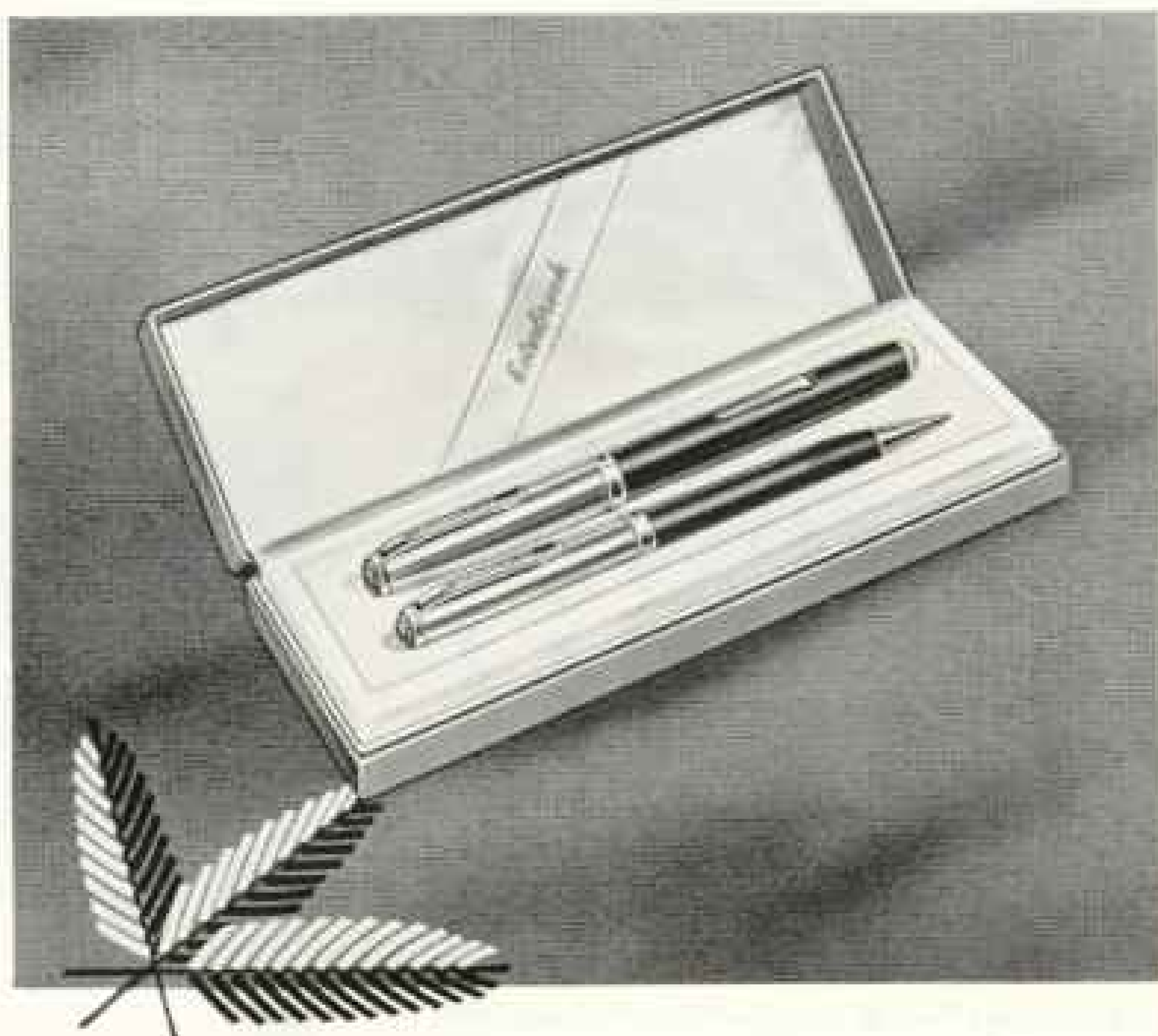

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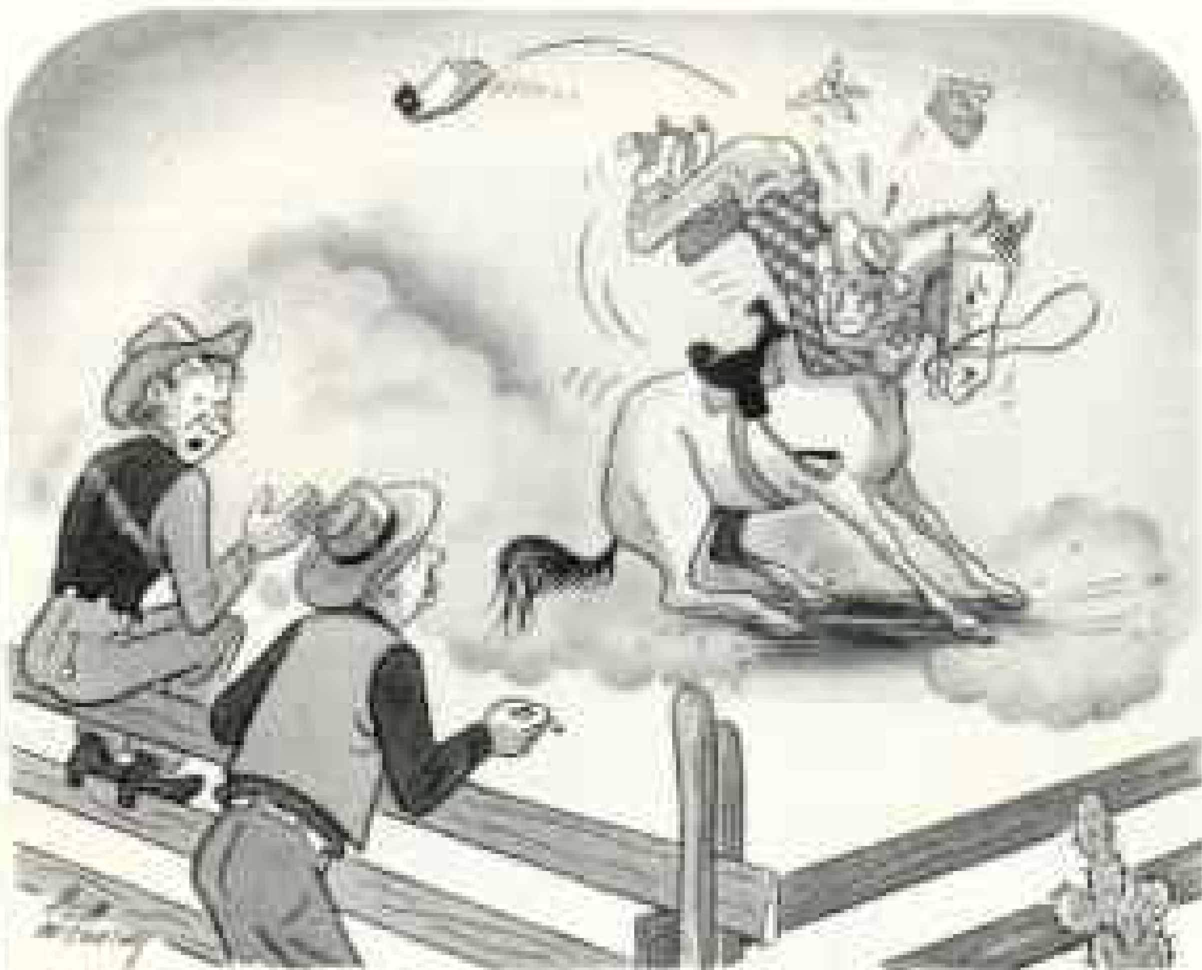

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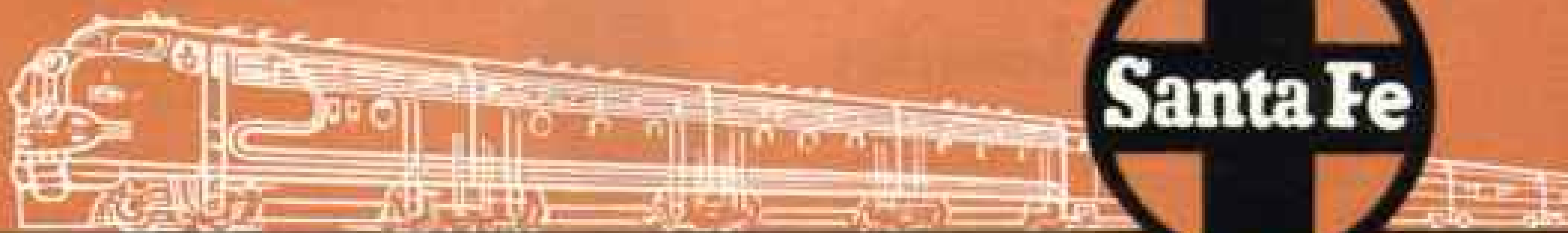

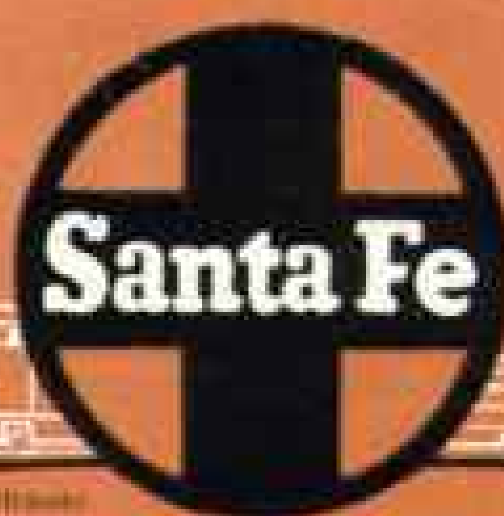

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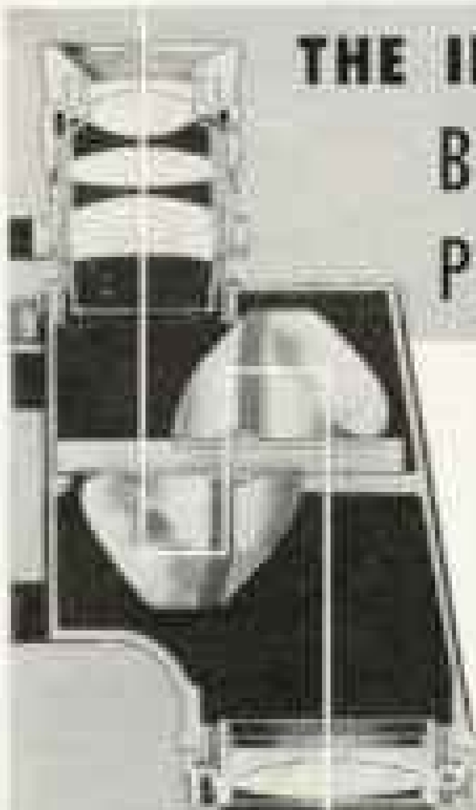

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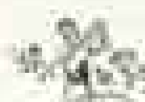

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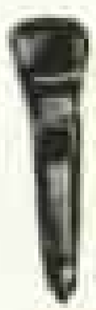

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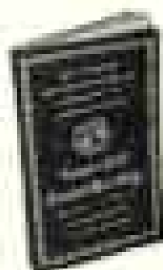

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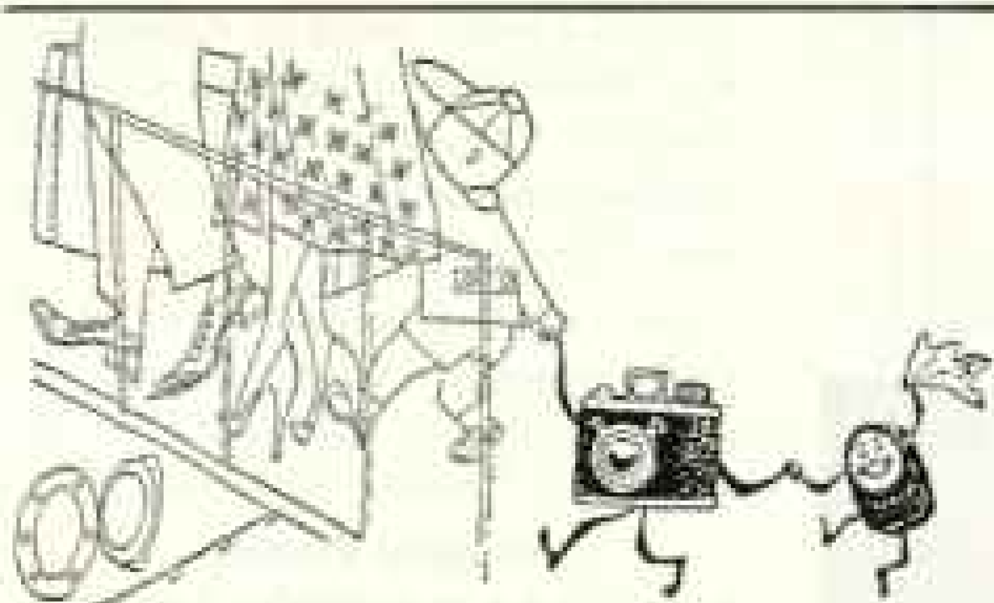

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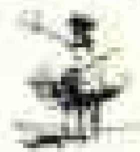

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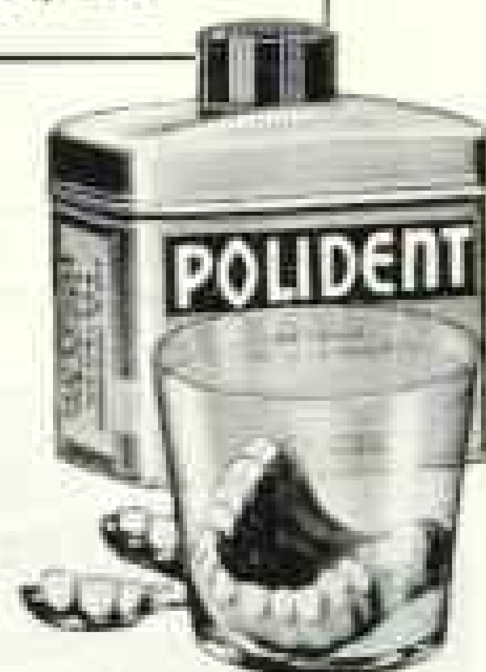

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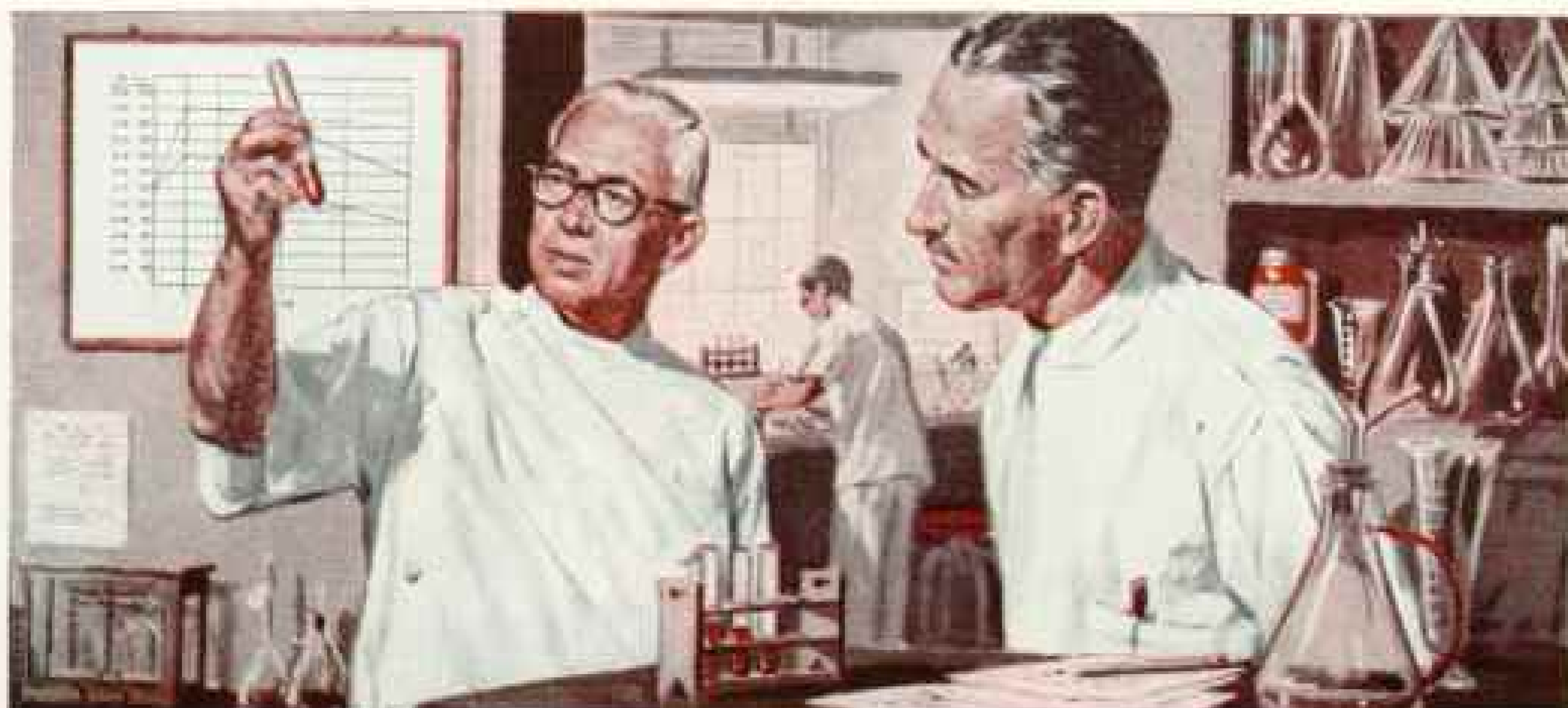

The Doctor looks at Diabetes

It is estimated that there are one million people in our country who have diabetes . . .

Their chances of living happy, useful lives are better today than ever before. In fact, life expectancy for the average diabetic is now double what it was before the discovery of insulin.

Moreover, the outlook for still further gains against this disease is good, as medical science is constantly improving the treatment for diabetes. New types of insulin, for example, have made possible better control of this condition. Hope for future progress lies in current research on insulin and on utilization of food by the body.

Doctors say, however, that successful control of diabetes more than ever depends largely upon the diabetic himself, who must understand his disease in order to learn to live with it. Above all, he must cooperate closely and faithfully with his physician in keeping *insulin*, *diet*, and *exercise* in correct balance.

Today, the patient who carefully follows the doctor's instructions about these three essentials of treatment—as well as other measures to maintain good health—can usually look forward to many years of happy living.

However, there are a great many people in our country who have diabetes, but do not know it . . .

This is because the disease usually causes no obvious early symptoms. Yet detection is easier today than ever before. For instance, it is now possible for anyone to make a simple test at home to detect sugar in the urine—one of the signs of diabetes.

This test is also a routine part of most medical examinations. If the test is positive, the doctor can then make additional tests to determine whether the presence of sugar is due to diabetes or some other condition.

Authorities urge everyone—particularly those who are *middle-aged*, *overweight*, or *who have diabetes in the family*—to have a check-up for diabetes included in regular physical examinations. In this way, the disease can be discovered early when the chances of successful control are best—often by diet alone. It is especially important for those who are overweight to be on guard against this disease, as studies show that 85 percent of diabetics over age 40 were moderately or markedly overweight before the onset of the disease.

Doctors stress the importance of learning the symptoms of this disease. They are: *excessive hunger*, *excessive thirst*, *excessive urination*, *continual fatigue*, and *loss of weight*. Although these symptoms may indicate *well-established diabetes*, prompt and proper treatment can usually bring it under control. Indeed, many patients live as long with diabetes as they would be expected to live *without* it.

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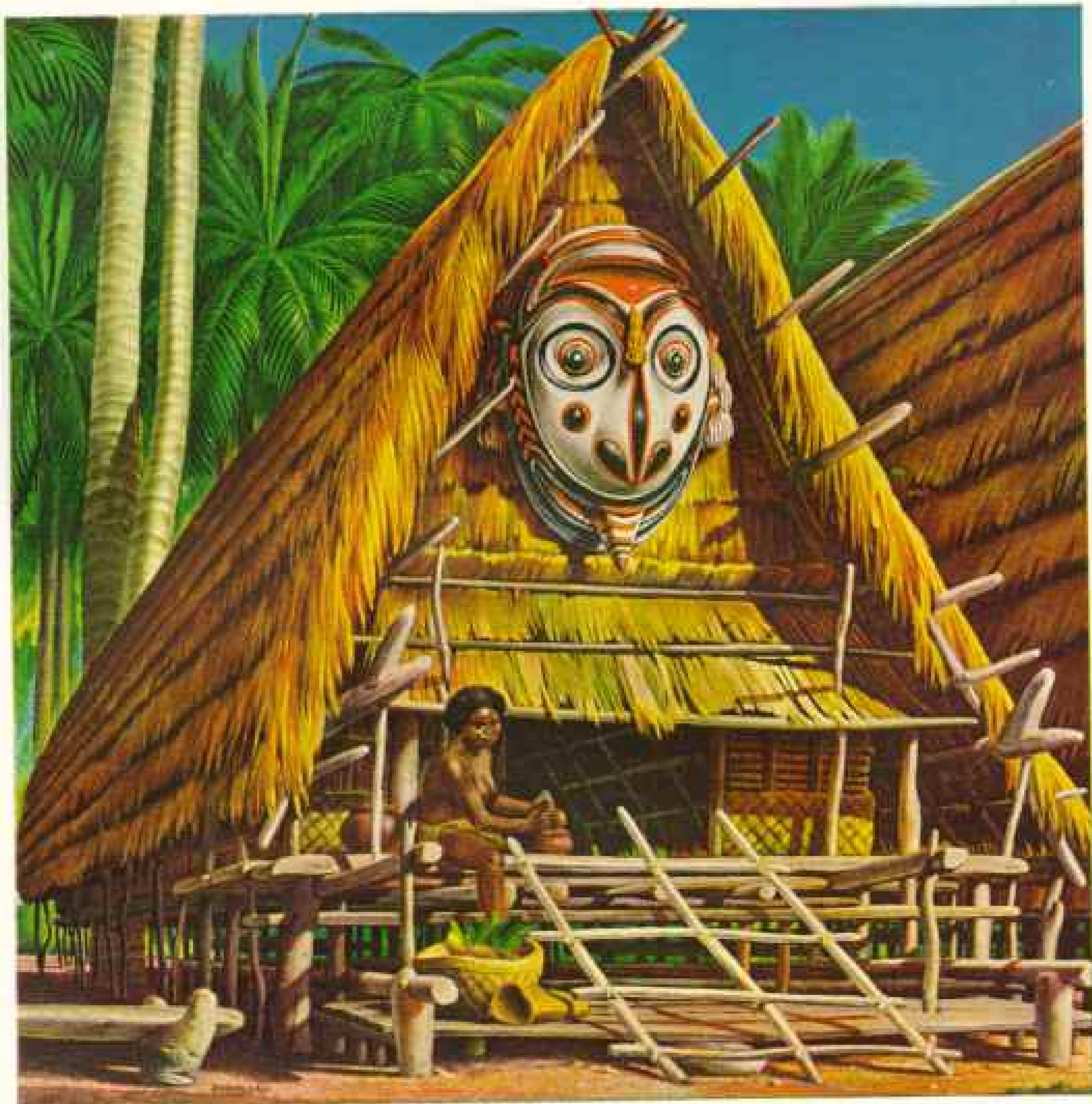

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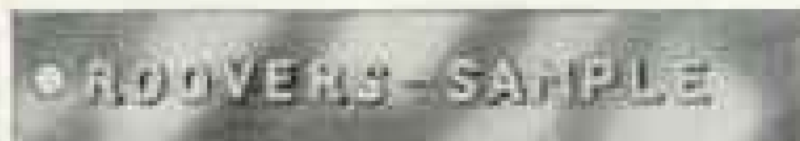

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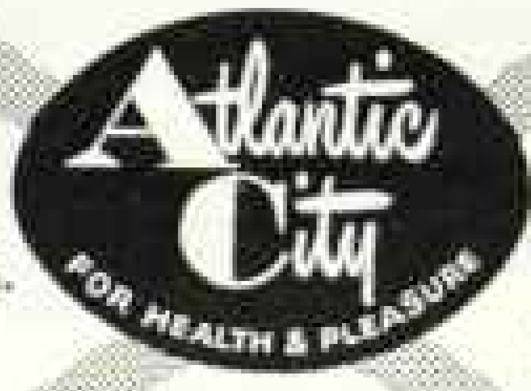

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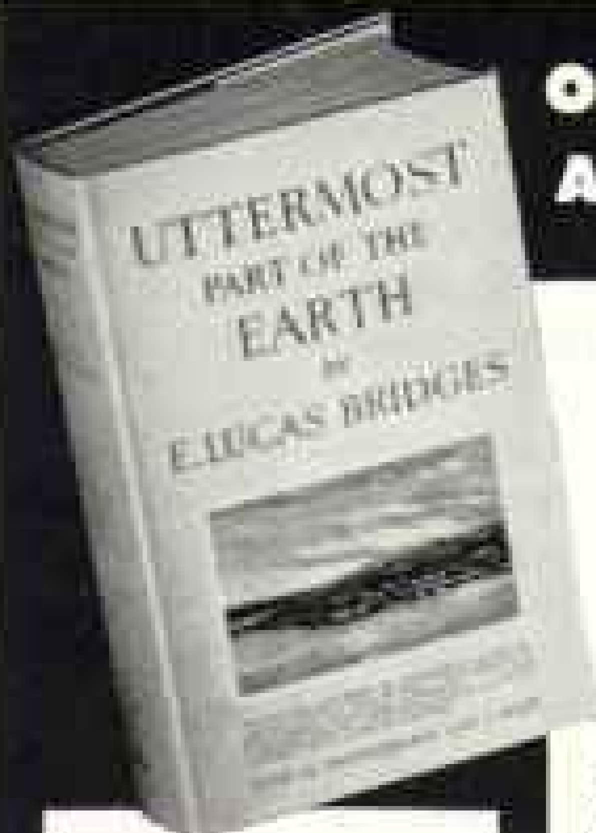

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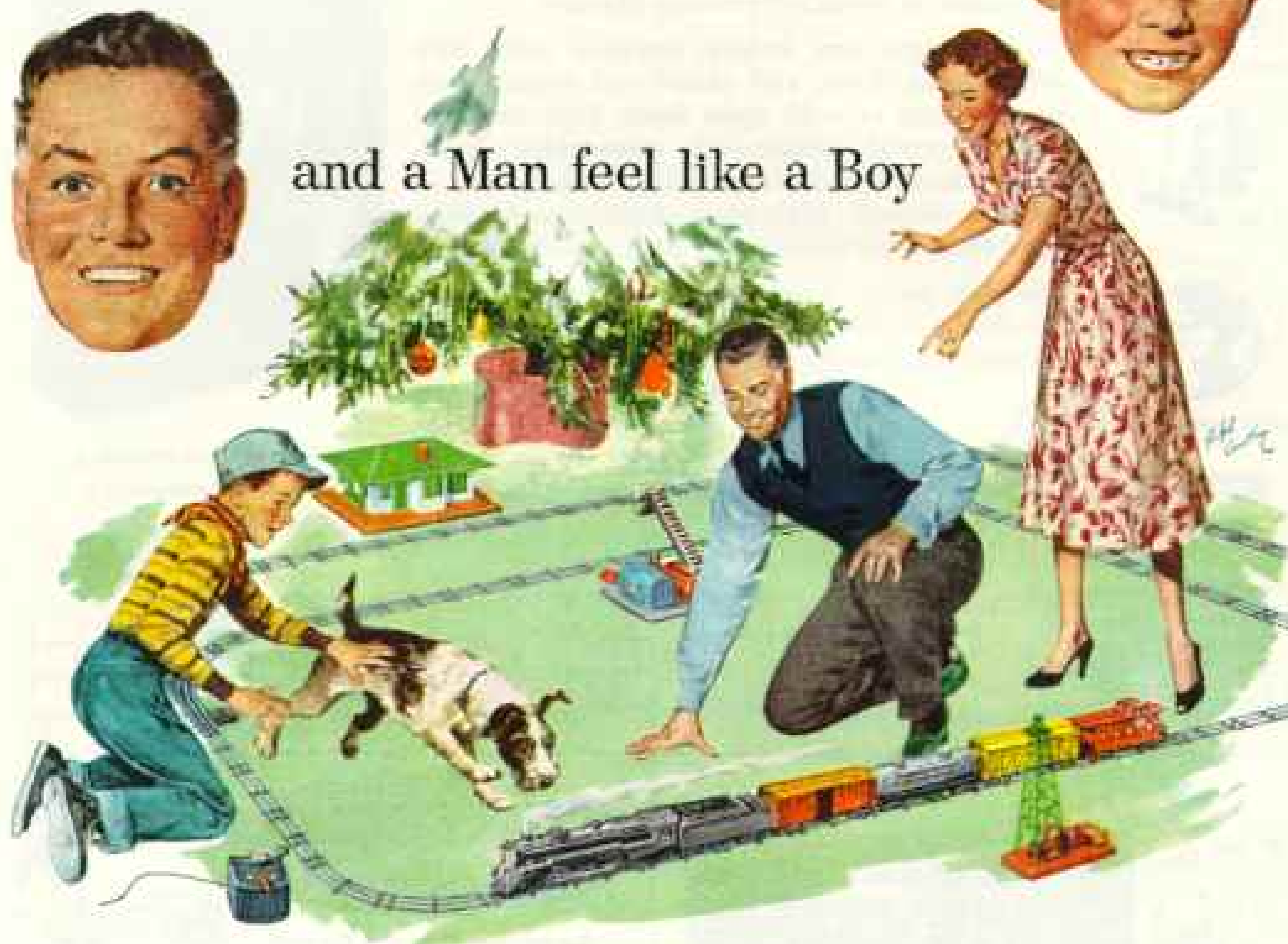

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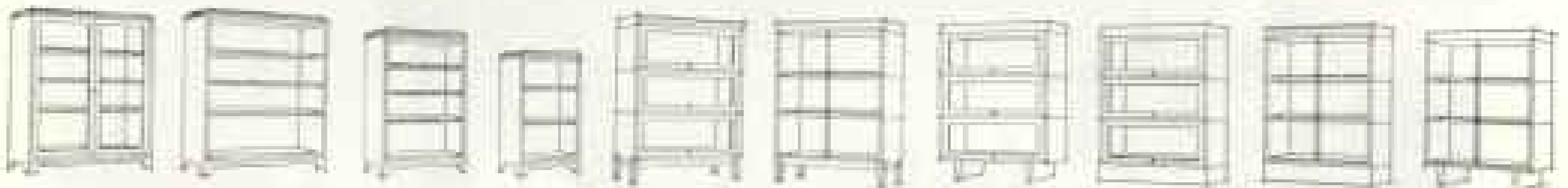

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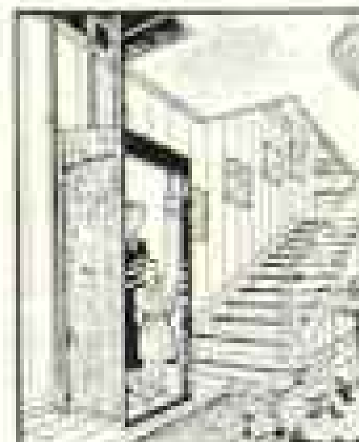

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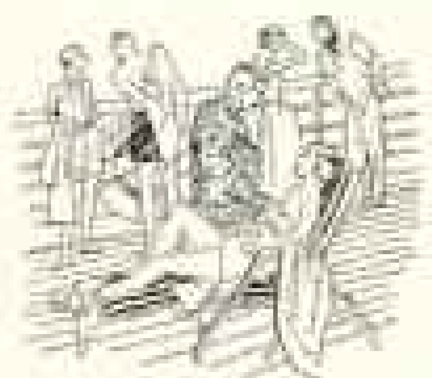

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