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JULY, 1956

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A Stroll to John o' Groat's

BY ISOBEL WYLIE HUTCHISON

ON an April morning of bright sun, cold wind, and billowing cloud, I left Edinburgh on the first lap of a stroll to John o' Groat's on Scotland's far northeastern tip, distant by the route I planned about 410 miles.

Along my way would lie some of the most colorful and historic spots in all the British Isles. Here stand storied castles and playgrounds of Britain's kings and queens; here Mary Queen of Scots once hunted with bow and arrow and here, too, she signed away her kingdom. On the route I could climb a mountain scaled by Queen Victoria, and walk through the countryside Shakespeare used as background for the tragedy of *Macbeth*.

On the far northern coast I would see ruined castles with histories reaching into the 13th century. I might even catch a glimpse of Peter Pan or Long John Silver, both born in these quiet Scottish hills and both, as every child knows, still alive and vigorous.

I planned to ride as many ferries as possible, partly because John o' Groat himself was a ferryman who in the 15th century plied

The Author

Isobel Wylie Hutchison has won fame as a botanist, novelist, and poet, but few people know that this much-traveled Scotswoman also holds the honorary rank of Admiral in the United States Coast Guard. The title "Admiral of the Bering Sea," complete with a flag bearing crossed hairpins, was conferred by the crew of the cutter *Chelan*, on which she traveled during a botanical expedition in the Aleutians. Miss Hutchison's more formal honors include the Mungo Park Medal, presented by the Royal Scottish Geographical Society in recognition of her researches in Alaska, and an honorary LL.D. from St. Andrews University. This is her eleventh article in the NATIONAL GEOGRAPHIC MAGAZINE.

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A Scots Piper, in Macdonell of Glengarry Tartan, Shatters the Air with Skirl and Drone . . .

Kodachrome by National Geographic Photographer David S. Boyer

...As Kilted Laddie and Lassies Dance the Highland Fling for the Gathering at Aboyne

the turbulent waters of Pentland Firth between the Caithness mainland and the Orkney Islands, and partly because a ferry usually offers the wayfarer a romantic and buoyant interlude (map, page 11).

There were few passengers aboard *Bonnie Prince Charlie*, the ferryboat I rode between Edinburgh and Burntisland that spring morning. I stood on the top deck admiring the delicate view of the city. Its soft gray outline of hills and spires, backed by surging white cumulus, rose like a drawing in silverpoint.

Far to westward the giant cantilevers of the railway bridge across the Firth of Forth hung like a lace fringe between Fife and Midlothian. Until the bridge was opened in 1890 the ferry had a special claim to romance, for it was the world's first train-carrying ferry.

The small shipbuilding town of Burntisland has one of Scotland's most unusual churches. There the signs of medieval guilds are still painted on the panels of the galleries the guilds occupied. The sailors' loft holds particular interest, for it shows compasses and old-time navigating instruments—cross-staff and astrolabe—used in the 16th century, as well as the later Davis's quadrant. With such tools, master mariners used to "shoot the sun," dressed elegantly in tailcoats and with buckles on their shoes (page 9).

Storm Saved Fife from John Paul Jones

The town also has associations with Cromwell and Napoleon. The Lieutenant Governor of St. Helena during Napoleon's time lies buried in its churchyard, and Cromwell, when he came north to subdue Scotland, left his mark on the royal burgh of Burntisland, for his first shot is said to have smashed into the provost's china shop.

But probably even Cromwell did not cause such consternation as did John Paul Jones when he sailed up the Forth in 1779 and terrified the folk of Fife. On that occasion the good minister of Kirkcaldy, the Reverend Robert Shirra, led his flock out to the sands, where they knelt in supplication for a wind to drive back "the pirate of the Forth."

The prayers of that little band apparently were heard. As if by magic, a storm arose that night and blew John Paul and his ship out of Fife history forever!

From Burntisland my way led along the busy coast road to Kinghorn and Kirkcaldy, with sparkling views of the blue firth and distant smoke-wrapped Edinburgh.*

Rounding a corner, I came suddenly on a tall monument backed by the sea and fronted by frowning crags. Here, on a dark March night nearly 700 years ago, a horse changed the whole course of British history. Ridden hard to a rendezvous with a queen, it tripped and landed its rider 150 feet on the crags below.

The illustrious horseman was Alexander III, last and best of Scotland's Celtic kings. His death plunged Scotland into civil war and strife for more than a century, for his only direct heir was his little granddaughter, the King of Norway's daughter, who died later on a stormy voyage to Scotland.

As I gazed upward to where the gaunt brown cliff towered menacingly, its front splashed as if with blood by a bush of flowering currant, I thought of what might have happened if that horse had not tripped. No Stuarts would then have ascended the throne, there would have been no Mary Queen of Scots, no Bonnie Prince Charlie, and no Queen Elizabeth II, lineal descendant of those Stuarts!

As I went on my way again, wending high above the Forth, my nasal radar suddenly picked up a soft sweet odor that was not unpleasant. It was the smell of linseed heralding approach to Kirkcaldy, the "lang toun" of linoleum factories whose main street skirts the Forth for several miles.

Though it was now late afternoon, I took time to visit the famous street called the Kirk Wynd, "wynd" being Scottish for a narrow alley. Here still stands the little house where Carlyle lived when he taught school in Kirkcaldy; here, too, he met Edward Irving.

* See "Edinburgh, Athens of the North," by J. R. Hildebrand, NATIONAL GEOGRAPHIC MAGAZINE, August, 1932.

Page 5

Two Young Friends of the Road Fall In with the Author at Kinloss →

To savor the enduring charm of Scotland's village life and capture the lonely beauty of moor and Highland, Miss Isobel Hutchison made a walking tour from Edinburgh to the island's northeastern tip, John o' Groat's. Here, strolling to school with Ann Allan (left) and kilted Kenneth Campbell, she learned what the children planned to wear to a fancy dress parade. "American boys," mused the author, "might reckon that Kenneth was wearing fancy dress already."

This row of old houses appears as native to Scotland as its heather. Stone, once the national building material, composes the simple exteriors. Small windows help to conserve warmth in winter. Moss insulates the thatched roofs.

© National Geographic Photographer David S. Boyer

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High on Its Rocky Throne, Edinburgh Castle Broods over Scotland's Mist-hung Capital

© J. Allan Cash

A Moat of Gardens Separates the Castle from Princes Street, the City's Main Artery

← Life in Auchtermuchty Moves at Walking Pace Along a Winding Lane

One small landholder in this village boasted to the author that he had more livestock than any other farmer in Auchtermuchty: "Seeven cats an' fower dugs an' 20 sheep an' twa coos, 30 hens, 5 pigs, a horse, and TWA MILLION BEES!"

←Page 8, lower: Cyclists along the Firth of Forth give travel advice to the author.

↓ In the sailors' loft of a 16th-century church in Burntisland, a seaman of the British Fleet Air Arm looks at scenes of nautical history.

An old-time navigator (right) sights along a cross-staff while holding an astrolabe. Both instruments were once used for taking the sun's altitude.

The mariner in center panel measures, or "fathoms," a rope.

Motto beneath the angel reads: "THOUGH GODS POWER BE SUFFICIENT TO GOVERNE US YET FOR MANS INFIRMITIE HE APPOINTETH HIS ANGLS TO WATCHE OVIR US."

In this church in 1601 the General Assembly of the Church of Scotland proposed a new translation of the Bible. The King James Version resulted 10 years later.

© National Geographic Photographers
B. Anthony Stewart and
David S. Boyer (opposite, below)

10 David S. Boyer, National Geographic Staff

"Poacher" Wins a Prize. Her Dog Appears Unimpressed

Boy's suit, pipe, and mustache complete the masquerade of this girl at a fancy dress parade in Findhorn. Miss Hutchison presents the award.

the preacher who introduced him to Jane Welsh (afterwards Mrs. Carlyle). Some say the lady's first preference was for handsome orator Irving, but fate decided otherwise.

Sons Brought Kirkcaldy Fame

Adam Smith wrote *The Wealth of Nations* in Kirkcaldy. Carlyle's old school was attended by another Adam, ancestor of the famous architects the Adam brothers, whose lovely home at Blairadam near Kinross I was to visit later.

The wind blew chilly in Kirkcaldy's gray streets, for the sun had clouded over, but I had still 12 miles to go through industrial and coal-mining country before reaching the Lomond Hills and Falkland, where I had planned to spend my first night.

Though I never thumb a lift (for what true lover of the open road would do that?), I am not above taking the help of a bus occasionally, and if a lift is offered—well, it is sometimes dangerous to refuse what the gods provide! On the bleak highroad above the linoleum factories the fates suddenly provided a bus for Perth, which set me down some miles farther on at Falkland Road Station.

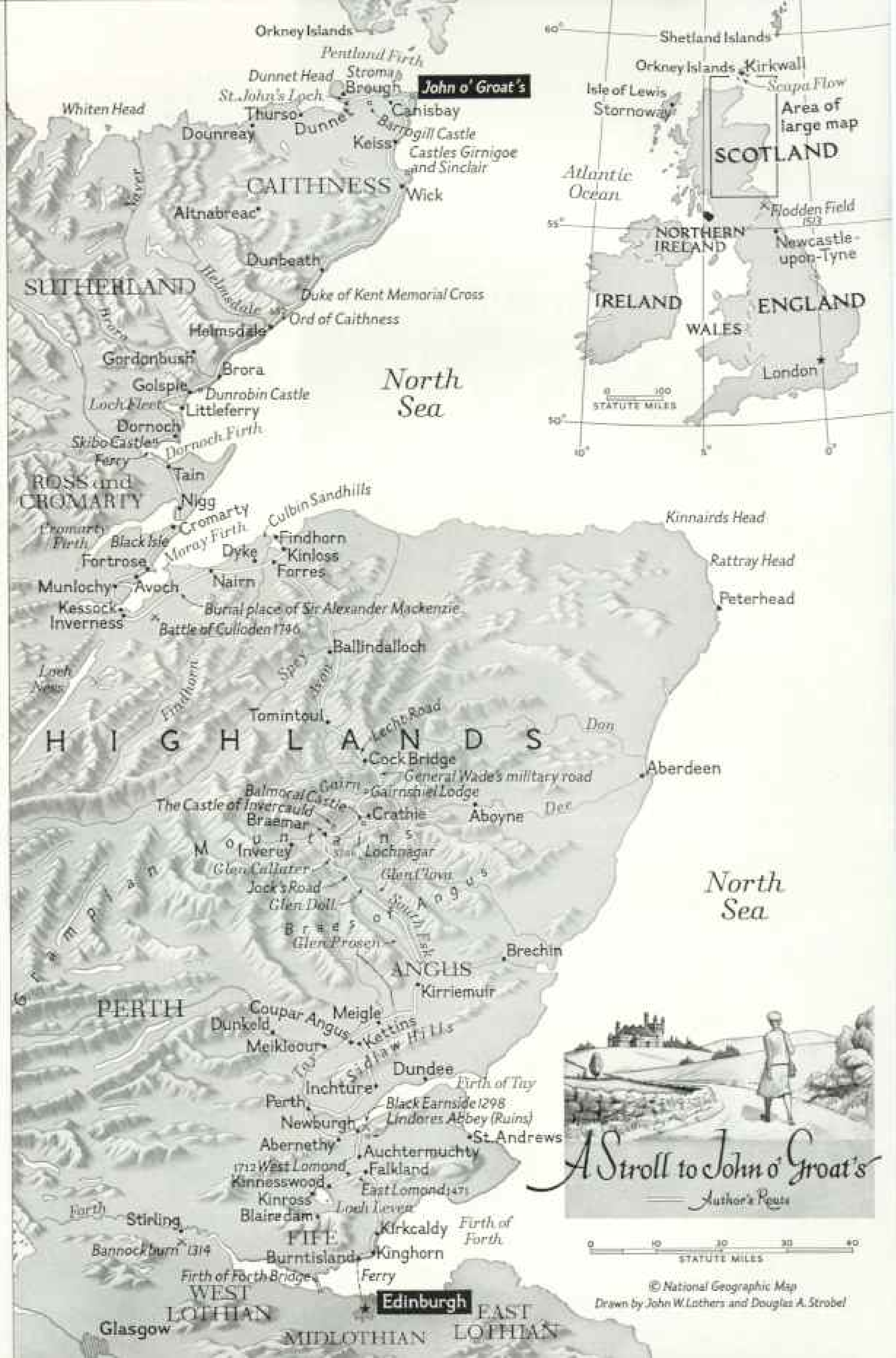
Falkland Name Carried Afar

I walked into one of the most charming hostelries in Fife, the Bruce Arms. From its windows I looked across a cobbled street to the fat towers and small guarded windows of Falkland Palace (page 14). To my shame be it said that this was the first time I had set eyes on it, although the name of this little royal burgh has been carried literally to the ends of the earth, the Falkland Islands in the far South Atlantic being named after a descendant of Sir Henry Cary, Viscount Falkland in Fife.*

The town, with its picturesque streets and thatched or red-tiled roofs, is an artist's dream. It is tragic that some of its oldest houses seem doomed for lack of funds to restore them. Happily the palace itself was placed in the care of the National Trust for Scotland in 1952, with an endowment for its maintenance, by its public-spirited Hereditary Constable, Maj. Michael Crichton-Stuart.

Here Mary Queen of Scots practiced archery and hunted in the forest that surrounded the royal dwelling, "more reminiscent," writes the major, "of the great châteaux of the Loire than any other building in Scotland."

* See "People and Penguins of the Faraway Falklands," by Olin Sewall Pettingill, Jr., NATIONAL GEOGRAPHIC MAGAZINE, March, 1956.



Orkney Islands
Pentland Firth
Dunnet Head
Stroma
St. John's Loch
Brough
John o' Groat's
Whiten Head
Thurso
Canisbay
Dunnet
Barrogill Castle
Dounreay
Keiss
Castles Girnigoe and Sinclair
CAITHNESS
Wick
Altnabreac
Dunbeath
SUTHERLAND
Helmsdale
Duke of Kent Memorial Cross
Ord of Caithness
Brora
Gordonbush
Golspie
Dunrobin Castle
Loch Fleet
Littleferry
Dornoch
Skibo Castle
Dornoch Firth
Ferry
Tain
ROSS and CROMARTY
Nigg
Cromarty
Cromarty Firth
Black Isle
Moray Firth
Culbin Sandhills
Findhorn
Dyke
Kinloss
Forres
Fortrose
Munlochy
Avoch
Nairn
Kessock
Inverness
Burial place of Sir Alexander Mackenzie
Battle of Culloden 1746
Ballindalloch
Loch Ness
Spey
Findhorn
Tomintoul
Lecht Road
HIGHLANDS
Cock Bridge
General Wade's military road
Gairnshiel Lodge
Balmoral Castle
The Castle of Invercauld
Crathie
Aboyne
Braemar
Inverey
Lochnagar
Grampian Mountains
Glen Callater
Glen Clova
Jock's Road
Glen Doll
Braes of Angus
South Esk
Glen Prosen
Kinnairds Head
Rattray Head
Peterhead
Don
Aberdeen
Dee
North Sea
Brechin
ANGUS
Kirriemuir
PERTH
Coupar Angus
Meigle
Dunkeld
Kettins
Meikleour
Sidlaw Hills
Tay
Dundee
Firth of Tay
Inchture
Perth
Black Earnside 1298
Lindores Abbey (Ruins)
Newburgh
St. Andrews
Abernethy
Auchtermuchty
1712 West Lomond
Falkland
Kinnesswood
East Lomond 1471
Kinross
Loch Leven
Forth
Stirling
Blairadam
Kirkcaldy
Firth of Forth
FIFE
Bannockburn 1314
Kinghorn
Burntisland
Firth of Forth Bridge
Ferry
WEST LOTHIAN
Edinburgh
EAST LOTHIAN
Glasgow
MIDLOTHIAN
Shetland Islands
Orkney Islands
Kirkwall
Scapa Flow
Isle of Lewis
Stornoway
Area of large map
SCOTLAND
Atlantic Ocean
Flodden Field 1513
NORTHERN IRELAND
Newcastle-upon-Tyne
IRELAND
ENGLAND
WALES
London
0 100
STATUTE MILES
60°
55°
50°
10°
5°
0°
A Stroll to John o' Groat's
Author's Route
0 10 20 30 40
STATUTE MILES
© National Geographic Map
Drawn by John W. Lothers and Douglas A. Strobel

← Wishful Lasses Tie Luck Insurance to a "Clooty Well" Fence

In the days before the cold-drink stand, travelers depended on roadside wells for their refreshment.

This watering place near Munlochy on the Black Isle peninsula holds an added attraction. Tradition says that wishes made here on the first Sunday in May come true if a bright rag or ribbon is left as a gift to the fairies.

"Clooty" derives from the word clout, meaning rag. Some of these springs of good fortune were originally considered holy.

↓ Schoolboys on Holiday Visit a Historic Countryside

Belmont Castle (background) was once the home of Sir Henry Campbell-Bannerman, Britain's prime minister in the early 1900's. Here in the "Cabinet Room" a treaty was drafted giving Dominion status to South Africa following the Boer War. The Church of Scotland now operates the castle as a home for the aged.

A museum in near-by Meigle preserves some 25 sculptured stones of Celtic origin. Legend says they marked the burial place of Queen Guinevere.

© National Geographic Photographer
B. Anthony Stewart

Charles II was the last British monarch to sleep at Falkland, for Cromwell destroyed all but the south wing. That, too, would have crumbled but for the princely generosity of the third Marquess of Bute. In 1887 he became Hereditary Constable, Captain and Keeper of the Palace, and restored this part to much of its former splendor. It is now the home of Major Crichton-Stuart, who has carefully restored the fine garden.

After supper I set off to climb the 1,471 feet of East Lomond, in the lurk of which Falkland nestles. On my way through the woods at its base I met a man who told me he was "looking for a hawk," a reminder that this burgh where Scotland's monarchs practiced falconry is still a haunt of the bird of prey whose name it calls to mind.

Next morning I crossed East Lomond's twin, West Lomond, which at 1,712 feet is Fife's highest hill. I was on my way to Kinnesswood near Loch Leven, where was born the loch's "gentle poet," Michael Bruce.

West Lomond is the reputed scene of ancient battles between the islanders and the Romans, but to Michael Bruce it was the "Mountain of the Lord," whereon

> No longer hosts encount'ring hosts
> Shall crowds of slain deplore,
> They hang the trumpet in the hall
> And study war no more.

Poet Died at 21

Michael Bruce, the son of a poor weaver, died of tuberculosis in 1767 at 21. His most famous poem is the fine "Ode to the Cuckoo." As I sat munching sandwiches amid the ruins that crown the summit of the hill, my thoughts were of spring and the cuckoo rather than of battles long ago.

Down in the valley I had asked my way of two old men walking arm in arm. One of them was eager to direct me.

"Many's the time I've walked that way as a boy," said he. "You'll be going to visit Michael Bruce's cottage? But you're a week too soon for the cuckoo; it comes about the 30th of April each year. You'll know his poem:

> 'Hail beauteous stranger of the wood,
> Attendant on the spring!
> Now Heaven repairs thy rural seat
> And woods thy welcome sing.
>
> 'Sweet bird! thy bow'r is ever green,
> Thy sky is ever clear,
> Thou hast no sorrow in thy song,
> No winter in thy year!'"

As he stood there in the road reciting the lovely lines, his eyes fixed on the distant hilltop, I saw that he was blind.

When I reached Kinnesswood, I found Bruce's cottage standing with its gable facing a hillside lane. As the dying genius lay in its attic, he could see Loch Leven through a small pane at his feet. These shining waters are famous with fishermen for their trout and with historians for a castled isle where Mary Queen of Scots was imprisoned for 11 months and forced to sign her abdication in favor of her infant son.

Island Prison of Mary Queen of Scots

That night I slept at Kinross and next day hired a boat and was rowed over to this romantic isle, now the home of the jackdaw and the swan. In its ruined castle on May 2, 1568, 18-year-old Willie Douglas neatly lifted the key of his Queen's prison from his father's dinner table under cover of a napkin, and the fat was in the fire!

But perhaps he should have waited till the 11th of May. Eleven, said my boatman, is Loch Leven's favorite number: "It has eleven streams flowing into it and the 'Leven flows out!'"

Though the Queen's escape eventually ended in tragedy, it is still one of the most gallant episodes in history.

From Kinross I turned northeast to Newburgh, a town on the south bank of the Tay, for on my map I saw the magic word "ferry" written across the firth at that point.

But alas! The old ferry no longer existed, and other boats were still laid up for the winter.

To cross the Tay, I had to return to the first bridge at Perth, and on the way I passed through Abernethy with its famous round or "Irish" tower built by the monks long ago. Only three such towers still exist in Scotland, the others being at Brechin and distant Egilsay Island in Orkney. When the National Geographic Society photographers came to Abernethy later, the flag of Scotland was flown from the summit of its tower as a special concession to the United States and color photography!

I passed through Perth by motorbus, which set me down at the village of Inchture not far from the spot where the Newburgh ferry should have landed me. From there I set off to climb northward over the rolling Sidlaw Hills to Coupar Angus, "the country near Dunsinane" of *Macbeth*.

FALKLAND POST OFFICE

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↑ Newburgh Nests Amid Parklike Meadows on the Firth of Tay

This Fife town, chartered a free burgh in 1266, blossomed into life around historic Lindores Abbey, now a ruin sheltered by trees at upper center. Here Wallace celebrated his Black Earnside victory, and followers of Bruce pledged the support that won Bannockburn.

←Page 14: Falkland Palace (right) harbored the dying James V, father of Mary Queen of Scots. On hearing that an heiress had been born to him and that the crown must fall to a princess, James muttered: "It cam' wi' a lass and it'll gang wi' a lass." He turned his face to the wall and never spoke again.

→Falkland's parish church overlooks a passing scene. Old stone cottages (left) were condemned and destroyed this spring.

© National Geographic Photographers
B. Anthony Stewart and David S. Boyer
(right and opposite, below)

Weight Thrower, His Body Atwist, Heaves Aloft a 22-pound Hammer ➔

Page 17: Highland Gatherings or Games originated in the days of clan solidarity, when young warriors competed against one another for family honor.

Now, with clans dispersed, the Gatherings are chiefly social events and colorful spectacles for sightseers. Competitors, largely professional athletes, travel from one meeting to another vying for money prizes. This man, wearing the Hunting Sinclair tartan, performs at Aboyne (pages 2 and 18).

Lower: At Braemar Gathering, kilted judges record the distance of a shot-put. White peg shows other competitors the mark to beat. Officials in dark jackets wear Highland formal dress.

© National Geographic Photographers B. Anthony Stewart (above) and David S. Boyer

Near here stands the famous beech hedge of Meikleour, 85 feet high and more than a quarter of a mile long, planted in 1746, the year of the Battle of Culloden.

Still older is the parish church of Kettins, two miles southeast of Coupar Angus, which I passed on my way down the hills. It owns a curious old Flemish bell, which was shown to me by the church historian and former beadle, the late Mr. Alexander Smart. He explained that the bell, called "Maria Troon," was originally given by a gunmaker of Mechelen to the monastery at Grobbendonk near Antwerp. How it ever came to Kettins is a mystery perhaps as odd as the crafty gentleman with the surname Strange, who, according to Mr. Smart, refused to have an inscription put on his tombstone, explaining that people passing by would wonder why it was blank and remark "That's Strange!"

Mystery of the Carved Stones

Stranger still are the carved stones at Meigle, five miles from Kettins, which has been called Scotland's oldest village. On my way to Kirriemuir next day, I visited the Meigle Museum where many of these stones have been collected. Certainly they are old, so old that archeologists are confused or silent before them. They are apparently confined to the east of Scotland, and their curious symbolism is a mixture of Christian and pagan. The Celtic cross is seen on some, combined with grotesque human and animal figures.

I closed the door of the room at last and stole softly away. I felt there was something cold and sinister about the stones that I was almost afraid to waken.

As I approached Kirriemuir, a sizable town on the slopes of the Braes of Angus, my thoughts were of its most famous citizen, Sir James Barrie, and the book which first brought him (and the town) world-wide fame, *The Window in Thrums* (page 21).

"Thrums" is, of course, the name Barrie gave to his birthplace. In Barrie's youth every cottage here had its hand loom, and thrums were the ends of the weavers' threads. Kirriemuir is still a weavers' town, though now the shuttle's clack has given place to the hum of power looms and the little workrooms to thriving factories.

The road from Meigle had brought me under an avenue of magnificent Spanish chestnuts which led to an enchanted land, the land of Peter Pan and Mary Rose. As I rested by the path to the cricket pavilion (Barrie's gift to his birthplace), a little elderly lady came up the path talking to her dog and sat beside me. We got into conversation, and I found that she had known Barrie quite well.

"There are not so many people left now in 'Kirrie' who can say that," she added. "He didn't come here much after his mother died. I think he felt it was all too much changed. But if you want to hear about him, you should call on Miss Bell Lunan; her family were Barrie's next-door neighbors."

It was not till my return to Kirriemuir in June that I met Miss Lunan, whose mother Jess was the prototype of Barrie's first heroine in *The Window in Thrums*. Her short black staff and low wooden chair still stand beside her famous window.

As a child, Barrie ran in and out of the Lunan house. "When he came back on his last visit, he called in here, and well I remember how he cried, 'There's the little window where all those wonderful things were seen! And that's the dear old chair!' And he held out his arms as if he'd hug them both, and there were tears in his eyes."

Tribute to Famous Explorers

Barrie is Kirriemuir's great man, but he attracted others to the neighborhood. A bronze fountain at the foot of Glen Prosen, some miles away, commemorates two famous explorers whom he loved and admired—"Robert Falcon Scott and Edward Adrian Wilson, who knew this glen," says the inscription.

"They reached the South Pole on 17th January 1912 and died together on the great ice barrier March 1912. For the journey is done and the summit attained and the barriers fall."

(Continued on page 25)

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← Bent with Strain, a Man Gains Momentum for Tossing the Caber

A few quick steps, a heave, and the 180-pound fir log arcs into the air. The art is to throw the 15-foot caber—Gaelic for pole or rafter—so that it lands on the thick upper end and falls away from the tosser.

The sport originated in the days when this kind of heave was a practical way of getting logs across unbridged streams.

Several helpers mounted the caber in this man's arms before he began his run. To beat the Scottish record, the log must fly more than 42 feet.

Other feats of strength and agility at the Aboyne Games include racing, broad jumping, weight putting, and ball and hammer throwing (above).

Between sporting events pipe bands march and dancers whirl in the Highland Reel and Fling. All performers except the racers must wear Highland garb.

© National Geographic Society

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↑ Muscle Versus Metal, the Hammer Swings at the Braemar Gatherings

This spectacle in the Princess Royal Park highlights the autumn season in Scotland. Queen Elizabeth attends if in residence at near-by Balmoral. Lairds bring their house guests. Visitors, streaming from miles around, swell attendance to an annual 40,000. Fashions go on parade. Balls and parties enliven the night hours.

Cameramen (right) focus on the hammer thrower as judges (center background) await the toss. Rules require that the athlete throw the hammer without turning. Racers warm up at far left.

→ For the daylong Gathering these spectators bring tea and sandwiches. The clansman's kilt is made of Hunting Stewart tartan, Ancient color. Staghorn buttons adorn the jacket; clan crest decorates the bonnet.

National Geographic Photographers B. Anthony Stewart and David S. Boyer (right)

© National Geographic Society

↑ A Humpbacked Bridge Vaulting the River Gairn Helped to Doom Highland Isolation

At the end of the 17th century Scotland's Highlands stood apart from the world. Fiercely independent, the clans rallied only to their chiefs, glorying in war with one another and raids on the Lowlands.

The first great attack on this way of life came in 1724 when the English general, George Wade, surveyed the Highlands and turned a regiment of redcoats into road builders.

The clans soon saw the danger. One observer wrote: "Chiefs and other gentlemen complain . . . that their fastnesses being laid open, they are deprived of that security from invasion . . . that the bridges . . . will render the ordinary people effeminate and less fit to pass the waters in other places where there are none."

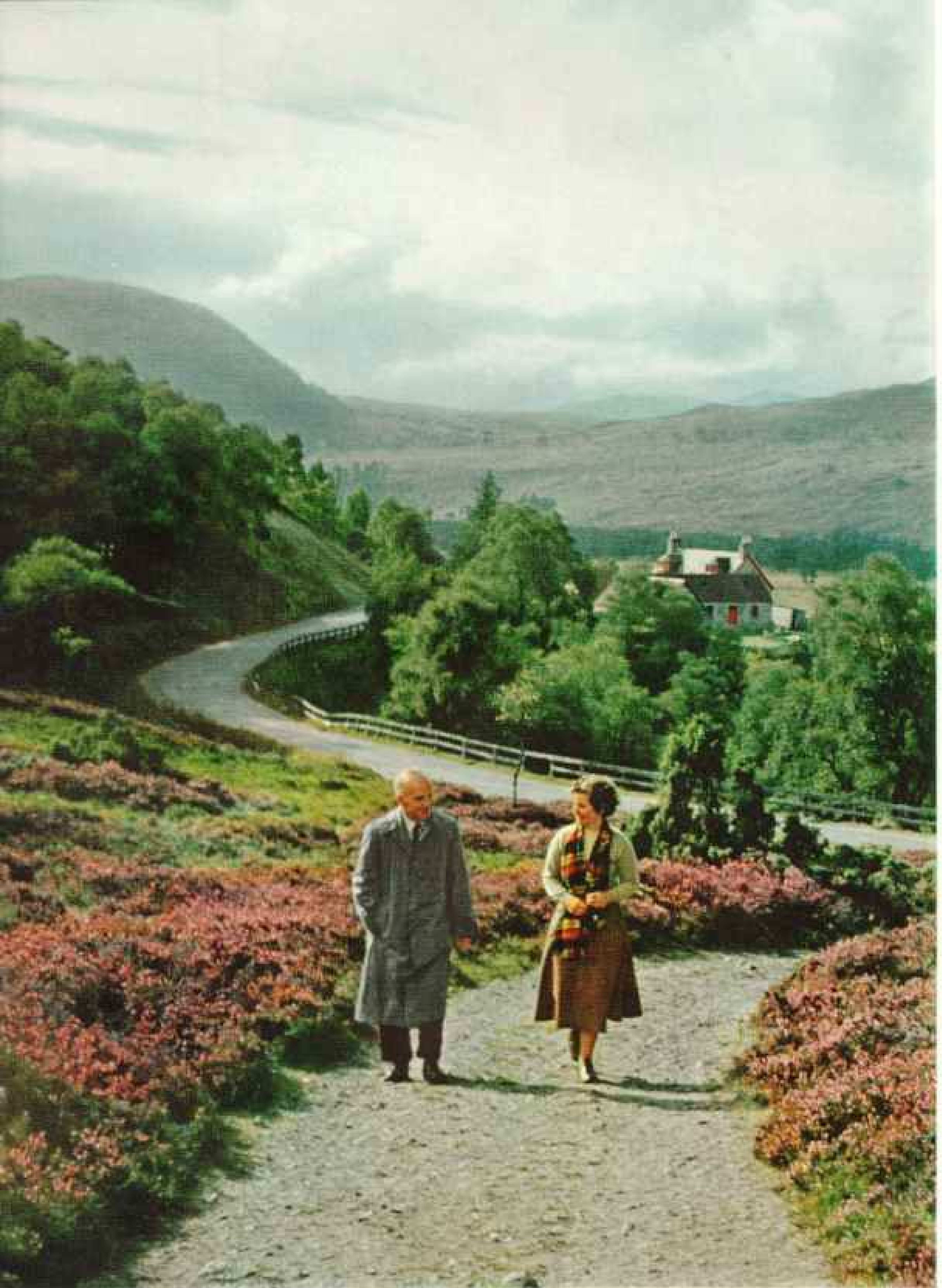
Clansmen objected because the roads' gravel would hurt bare feet and unshod horses' hooves.

But Wade and his "highwaymen" prevailed, and bridges such as this one came to span the torrents. Here, booted to the thighs, a fisherman casts for trout near Gairnshiel Lodge (left).

→ "Thrums is the name I give here to the handful of houses jumbled together in a cup. . . ." Thus wrote Sir James Barrie in *Auld Licht Idylls*, the first of many books immortalizing the life of his Angus County home town, Kirriemuir. These townspeople dress as characters from Barrie books. The Little Minister applies make-up to Babbie, his Gypsy love, to the mild amusement of Peter Pan.

↓ Glasgow businessmen rejoice over the sole catch of the day, a Loch Leven trout.

© Kodachromes by National Geographic Photographers B. Anthony Stewart (opposite) and David S. Boyer



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Royal Deeside, Cradled by Gentle Hills, Opens a Gateway to the Central Highlands

No savage peaks or barren wastes menace the soft beauty of the valley. Even bad weather is often walled out by the mountains to the west. These walkers take a path fringed with heather. Road leads to Inverey (left).

National Geographic Photographer B. Anthony Stewart

Grouse Moors, Deer Forests, and Salmon Streams Lure Sportsmen from All the World

Queen Victoria "discovered" Deeside about a century ago, and the world followed with shotgun, rifle, and rod. Some crofters became gillies, or hunting guides, and lairds augmented incomes by renting their estates.

This eloquent tribute seemed an inspiring send-off for the summit of my stroll, which now approached. I planned to cross the Grampian Mountains by an old drove-road known as Jock's Road, which crosses the mountains and descends into Glen Callater near Braemar.

Glen Clova, one of the most beautiful of the glens in the Braes of Angus, cradles the River South Esk between steep mountains where some of Scotland's rarest alpine plants find a secret home. I slept in the hotel at the head of this glen. After breakfast I set out for my most adventurous walk.

Queen Victoria Climbed This Mountain

Jock's Road scrambles up to a plateau above the 3,000-foot level; the way was poorly marked on the summit and would be most difficult to follow if mist should gather. Burdened with my pack, I found it a stiff clamber up the steep zigzags. Stout fellows Jock and his beasts must have been, I thought as I panted after them.

About four miles from Glen Doll the track disappeared. Soon I crossed a patch of snow. Only the harsh "churr-rr" of the ptarmigan and the distant sound of a falling cataract broke the silence. I hastened on, for mist had already blotted out the 3,786-foot crest of dark Lochnagar. This mountain is regularly invaded on Midsummer Eve by parties of climbers going up to watch the sunrise. It has also the proud distinction of having been climbed on more than one occasion by Queen Victoria herself.

Page 24

← Plastic Cape Makes a Hut on the Heather for a Pair of Rain-bound Cyclists

On a bicycle built for two, Mr. and Mrs. Harry Kirkpatrick of Newcastle-upon-Tyne pedal through the Highlands. Here they wait out a storm alongside the road between Tomintoul and Braemar.

Dead branches of burned heather splotch the moors with gray-white. Roots live on. Scots regularly burn the land to destroy other plant growth and encourage the hardy heather by forcing young shoots.

Upper: A rosy tide of heather washes against evergreen Balmoral Forest. The low-growing shrub, *Calluna vulgaris*, covers the nakedness of the moors with raiment both beautiful and useful. Red grouse and other game birds feast on the tender young shoots and seeds. Flowers yield honey and, rarely now, famed heather ale.

Highlanders once built their cottages of heather stems mixed with peat mud and straw. Even today some sheds are walled with the material and roofed with heather's soft, springy foliage.

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At last I reached the knaps of Fafernie, precipices that bristle above the steep drop into Glen Callater. Beyond lay lonely Loch Callater; now I felt I could rest and lunch, for its waters would be a sure landmark.

It proved a long, tough walk to get there, but I forgot to feel tired when I reached the outskirts of Braemar and saw under a copper beech a house with sheltering eaves and some yellow poppies growing under the windows. A tablet over the door stated: "Here R.L.S. spent the summer of 1881 and wrote *Treasure Island*, his first great work."

There it was! "The late Miss McGregor's Cottage." The name greatly delighted Stevenson's father, for he said, "It was not everyone who could be addressed round by Heaven!"

Robert Louis Stevenson came to Braemar in the first year of his marriage with his parents, his wife, and his small stepson Lloyd Osbourne. It is said to have been in response to the boy's request "to try to write something interesting" that the opening chapters of *The Sea Cook* (as *Treasure Island* was first called) were written.

Treasure Island Sold for £100

It was published in *Young Folks* in monthly installments, bringing its author £2 10s. a page. When it came out as a book in 1883, he received £100 for it and wrote to his father, "It does look as if I should support myself without trouble in the future."

From time immemorial Highland Games have been held at Braemar, and every September the town is the scene of a truly royal gathering patronized by the British monarchs (pages 17, 19).* During this exciting time it is difficult to find accommodation, but in early May I was almost the only guest for dinner in the vast dining room of the Invercauld Arms.

Next morning I walked along the Dee Valley to Crathie, where a notice suggesting "Supper, bed, and breakfast" attracted me to a cottage almost opposite the towers of Balmoral Castle (page 26).

I spent a week end within sound of the castle clock, explored the castle grounds, and at Crathie Church on Sunday just missed by a week the first attendance of Britain's Heir Apparent, Prince Charles.

* See "Clans in Kilt and Plaidie Gather at Braemar," 11 illustrations in color, NATIONAL GEOGRAPHIC MAGAZINE, August, 1935.

← ***"All Seemed to Breathe . . . Peace, and to Make One Forget the World"***

Queen Victoria wrote these words on her first visit to Balmoral. "The mountain air was most refreshing," she discovered; "the scenery . . . wild, yet not desolate." Her heart captured, Victoria spent her happiest days at this Deeside retreat. The present castle was completed for royal occupancy by 1855.

Queen Elizabeth and the Duke of Edinburgh with their children carry on the tradition of annual holidays at Balmoral.

Here the author looks toward Lochnagar (right). When Victoria and Albert climbed the peak, they found "the wind blowing a hurricane, and the mist being like rain."

The Victorians took time to live and liked to celebrate their doings. A high cairn on the hill opposite the castle records a royal marriage; another, still higher, "erected in presence of Queen Victoria and Albert, Prince Consort," marks the purchase of the Balmoral estate on October 11, 1852.

A chance encounter on the road introduced me to a hospitable motorist who kindly drew up his car to ask, "Would you like a lift?" When I told him I was writing an article for the NATIONAL GEOGRAPHIC MAGAZINE, he exclaimed, "Why, I've been a member for years!" Then he added, "You should get in touch with the Laird of Invercauld; his wife is an American."

I followed his advice a month later. The Laird is Capt. Alwyne C. Farquharson. A telephone call to the castle on a wet June afternoon brought immediate response. We were all invited to dine that evening at The Castle of Invercauld, and our spirits, damped by persistent bad weather, soared again under the genial influence of Captain and Mrs. Farquharson (opposite). They showed us many of the treasures of their fine Highland home and invited our fisherman, Mr. David Boyer, to sample the Laird's private salmon pool on the Dee next morning.

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← **The Castle of Invercauld: a Sanctuary of Memory for Clan Farquharson**

From these crenelated walls, ancestral stronghold of clan chiefs since the 16th century, the Earl of Mar sent forth his call to the clans, gathering them for the Jacobite Rising of 1715. In the Rising of '45, "Colonel" Anne Farquharson raised and led a troop of clansmen for Bonnie Prince Charlie, even though her husband fought for the enemy.

Here the Laird of Invercauld, Capt. Alwyne Farquharson, checks his gun before an afternoon of grouse shooting. His American-born wife and her daughter, Marybelle Gordon, see him off.

© National Geographic Photographer B. Anthony Stewart

The treasures included a piece of Bonnie Prince Charlie's plaid and a locket with his hair, given by the Prince himself to "Colonel" Anne Farquharson. This lady's husband, the Mackintosh of Moy, had declared for King George. Not at all deterred by this, she raised a troop of 300 of her clansmen for the Prince and rode at its head in bonnet and tartan with pistols in her holster. When she and her husband, Capt. Angus Mackintosh, met again after all was over, he doffed his bonnet and bowed low to his superior officer with the admiring words, "At your service, Colonel!"

"You'll have a long, lonely walk," I was told as I left Braemar for the village of Tomintoul, high on the moors between the Don and Spey Valleys. The route I followed was Gen. George Wade's old military road, made after the Jacobite rebellions of the 18th century. Crossing the Gairn by a picturesque humpbacked bridge, it climbed over wild moors, descending again into the valley of the upper Don.

The way was lonely and very beautiful, but toward evening a heavy rain began to fall. I had intended spending the night at Cock Bridge, about halfway to my destination, where an inn was marked on my map. But when I arrived I found the inn no longer existed.

Shelter in a Workmen's Hut

Workmen, erecting pylons for electric light, gave me shelter in their hut from the torrential downpour which swept the moors. An obliging lorry driver carried me in his cab up the ladderlike zigzags of the Lecht Road, the steep trail which climbs out of the Don Valley, and set me down in the carefully planned Georgian village of Tomintoul, with its soldierly square surrounded by houses that seem to stand at attention.

Next day I reached the primrose-dotted banks of the pretty River Avon near Ballindalloch and crossed the moors to Forres, which shares with Inverness the honor of being mentioned by Shakespeare. "A deserted place; a camp near Forres." So opens the great tragedy of *Macbeth*.

On the outskirts of the town, in a field, stands what is probably the largest carved monolith in Scotland, known from ages past as Sweno's Stone (page 37). It is carved with human and animal figures and is believed to record a great victory over Shakespeare's "Sweno, the Norways' King."

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↑ Blue Shadows Shroud Perthshire Hills, Gaunt Sentinels on a Lonely Road. The Author Takes Cheer from Her Heather-brush Fire

↓ Shaggy Highland cattle, native to Scotland, browse placidly above Cromarty on Black Isle. Heavy coats and manes adapt them to bitter cold. They survive on the scantiest pasturage. Though slow in maturing, the animals eventually yield fine-grained beef of unsurpassed flavor. Down in the village, a plaque in the parish church commemorates the translator of Rabelais, Sir Thomas Urquhart. He died in a fit of laughter, overjoyed at the news of Charles II's restoration.

© Kodachrome by National Geographic Photographer B. Anthony Stewart

Inevitably, witches are associated with this pleasant burgh of trees and parks. The pretty hamlet of Dyke near by was especially notorious for "a great outbreak of witchcraft" in the 17th century. Its Laird, in London when the trouble began, had to hasten home to be present at the trial and burning of the unhappy women.

A few weeks after my visit to Forres a farmer, plowing near Shakespeare's "blasted heath," unearthed what he described as "the exact spot of the witches' cauldron" of *Macbeth*. There were the remains of some sort of stone fireplace and the unmistakable signs of many fires. The Devil and his witches must have been very busy in these parts.

The Devil also gets credit for the devastation at the barony of Culbin, close to Forres, during a great sandstorm one night in 1694. As legend has it, he engaged the attention of its last Laird, Kinnaird, in a game of cards, and by morning the mansion was buried in sand. People say the card game continues still. They tell of a benighted traveler who came upon the mansion's chimney, but, hearing "ghostly laughter and lurid language from the depths," fled for his life!

Actually, it appears that a series of great storms at the close of the 17th century completed an encroachment of the sands which had been going on at the mouth of the River Findhorn, near which Forres stands, for many years. "Slowly and surely," says the handbook of the Forestry Commission, "the stage was being set for the drama which was to end with the disappearance of the barony for all time from the sight of man."

From Witches to Modern Wizardry

It was not to look for witches but to admire the wizardry of the Forestry Commission, which has reclaimed the great desert of the Culbin Sandhills in a truly marvelous manner, that I spent a week end at Findhorn, a fishing village at the river's mouth. It has suffered two displacements by sand and has now established itself on the opposite bank from the Culbin dunes.

More than 6,000 acres of desert have been reclaimed since 1921, and in 1955 the commission extended it to 7,512 acres. Its beautiful roads lead through sanctuaries for rare birds and unusual plant life.

When I guided the photographers there in June, we watched forestry officers thatching the dunes with birch and pine branches. Not only does thatching help fix the sands; it protects the young trees from sun and provides humus for them as the branches decay. Corsican pine has proved the most suitable variety to grow at Culbin, but Scots and lodgepole pine are also used (page 39).

Under Culbin's drifted sands many treasures have come to light, such as old coins, bronze ornaments, pottery, a Celtic armlet. It is rumored that a smuggler's hoard of "brandy-kegs and wine, silk and tobacco" still awaits some lucky finder!

From Findhorn I walked to Nairn, farther along the coast, where I hoped to get a ferry to the Black Isle, actually a long peninsula running out between Moray and Cromarty Firths. Here too I was disappointed. The ferryman had drowned in war years, and no other had replaced him. I had to detour to Inverness and cross to the Black Isle by the regular ferry at Kessock, walking northeast from there to the village of Avoch.

Explorer Rests in Avoch Churchyard

In Avoch's churchyard lies buried one of the world's most renowned explorers, Sir Alexander Mackenzie, the first man to cross North America north of Mexico and the first to explore from source to mouth the great Canadian river that bears his name. Mackenzie reached the Pacific at Dean Channel, British Columbia, and wrote on the rock there "with vermilion paint mixed with grease" the famous inscription now cut in it: "Alexander Mackenzie, from Canada, by land, 22d July 1793." *

In the vestibule of Avoch's church, which stands on a hill high above the little fishing village, I found photographs of Canada's

* See "Across Canada by Mackenzie's Track," by Ralph Gray, NATIONAL GEOGRAPHIC MAGAZINE, August, 1955.

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Tain's Old Tower and Mercat Cross → Wear the Patina of Age

In the 11th century the village of Tain received its first charter as a royal burgh, winning exclusive right to conduct a market in the district. In time, the Mercat (market) Cross came to dominate the commercial section, giving religious sanction to business there. Civic authority was symbolized by the burgh shield and lion reared on the cross (right).

Only the base of this cross survives from olden days. The shaft—minus the arms—was restored in the last century. The Old Tower, built about 250 years ago, now serves the county government.

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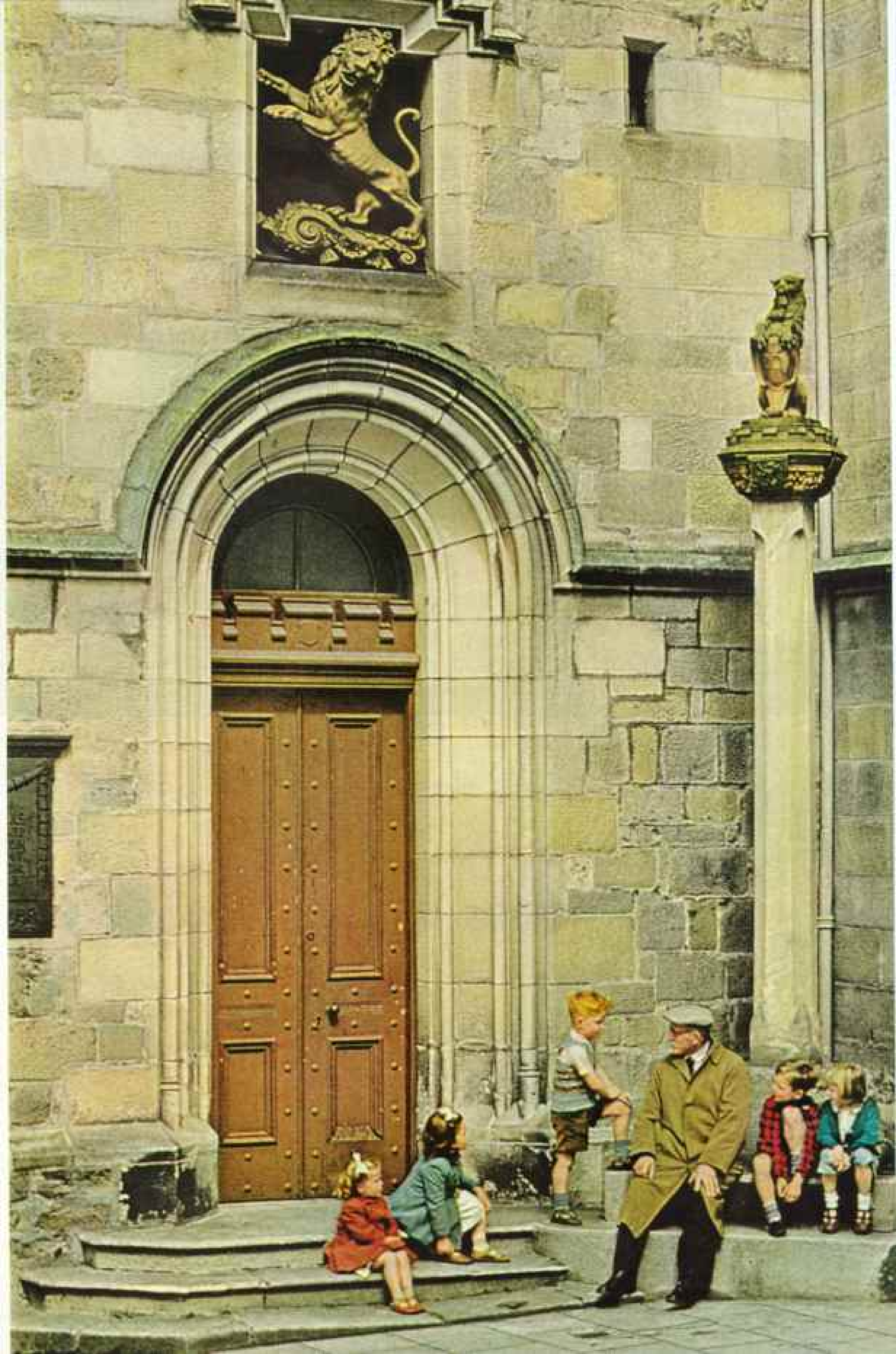

↑ River-threaded Helmsdale Rears Granite Walls in the Curve of a Highland Horseshoe

The highlands of Sutherland bear the look of everlasting wilderness, but it was not always so. Once oats covered the valleys with gold, and clansmen grazed their cattle across the slopes.

After the clans were destroyed, Highland life was rocked by change. In the early 1800's, crofters were too numerous for the impoverished soil to support. Many sought a better life in the New World, or moved into towns such as Helmsdale to live by fishing (page 34).

Landlords found profit in large-scale sheep farming. In some cases tenants were evicted and their homes burned to clear land for grazing. At one time a ship at sea was lost in the smoke of burning crofts.

← Mr. William Nicolson shows the author a wadset, or mortgage, dated 1657.

National Geographic Photographer
B. Anthony Stewart

↓ Day's Work Done, Brora Coal Miners Find Refreshment in Trout Fishing

Isolated from other Scottish coal mines, this small pit is the northernmost in Britain. It has been worked intermittently throughout the centuries since the days of Mary Queen of Scots.

The colliery, a distillery, and a woolen mill (pages 35 and 41) give Brora an industrial complexion. Yet the scattered village, created a burgh in 1345, remains an attractive spot for summer visitors and sportsmen.

Brora's seaside golf course commands a view of six counties, while its hazards win the respect of experts. The beach is broad, curving, and clean; the surf usually safe for children. A bowling and tennis club flourishes. The river and a near-by lake offer excellent sport for salmon and trout fishermen.

These miners, off work at 4 p.m. but still wearing their underground gear, fish the River Brora until dinnertime.

National Geographic Photographer
B. Anthony Stewart

memorials to this great Scotsman, who was born at Stornoway on the Isle of Lewis in 1764 and spent his last years on the Black Isle. There he married and settled down in 1812, purchasing Avoch House from his wife's trustees. He died suddenly in 1820, taking ill on his way home from Edinburgh.

Blaze Destroyed Mackenzie's Souvenirs

Fire ravaged Avoch House in 1832, destroying many of the explorer's treasures, but two wings of the "burnt house" (as it is called) are still occupied. To Canadian lumberjacks who worked on the Black Isle during World War II it was a resort of supreme interest.

Old customs die hard on the remote peninsulas and islands of Scotland. Not far from Avoch I saw a "holy well," which is still hung "for luck" with ribbons or bits of bright cloth, particularly on the first Sunday in May, just before my visit. Hundreds of such tributes, old and new, festooned the fence for many yards on either side of the wayside trough into which the water falls.

I spent the night at Fortrose, principal town on the Black Isle and once the seat of the Bishops of Ross. The ruins of their rose-red cathedral stand on a green lawn opposite the pleasant hotel in which I stayed.

Later I walked along the peninsula's high ridge to the charming village of Cromarty, made famous by Hugh Miller, one of the foremost geologists of the 19th century. His effigy on a tall pillar surmounts the town and overlooks the thatched cottage of his birth.

In the fine old parish church a tablet commemorates another Cromarty celebrity, the translator of Rabelais, Sir Thomas Urquhart. His epitaph is surely unique, for he died of laughing, delighted at the news that Charles II had been restored to his throne (page 29).

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← **Leaning into the Stroke, Helmsdale Fishermen Pull for Home**

Scotland's fisheries have ranked among the world's finest since the Middle Ages. In 1493, King James IV spoke of the riches of the sea, declaring that men must work at fishing for the "eschewing of vices and idleness and for the common proffeit and universall weil of the Realme."

Quality table fish and shellfish still abound, though the supply fluctuates. These men had only to row down the tidal waters of the River Helmsdale for salmon, but their catch was small compared with the abundant harvest of King James's day.

Lower: Fishermen draw their net near Helmsdale pier, here being reinforced against strong tides.

© National Geographic Photographer B. Anthony Stewart

Though Cromarty's fishing trade seems dead, I found its ferries still working and crossed to Nigg. By pleasant backwaters I reached the royal burgh of Tain, which apparently can supply all wants at the hardware store of Messrs. Wallace and Fraser, from a coffin to a load of ice or a donkey. All three of these, in fact, were ordered at the shop one Monday.

Tain stands on the shores of the Dornoch Firth, which, cutting deep into the country, divides Sutherland from Ross and Cromarty (page 31).

A few miles out of Tain I crossed the firth, saving 20 miles on the road to Dornoch. It was a near go, for "Sandy the ferry" had his house on the far side, and for two hours I flew the white flag in vain to signal him. I learned later that his boat was under repair. At last two men working at a garage on the Tain side obligingly got out their motorboat and took me across.

Few Old Ferries Remain

Sandy the ferry is one of the last of his trade left in the north. He seems doubtful that anyone will take on his job if he goes. If not, romance goes with Sandy, as it has already gone from Littleferry across Loch Fleet some miles farther on. When I reached it, there was no boat at all.

When I crossed Dornoch Firth I had entered Sutherland, to me the loveliest and loneliest of Scottish counties, whose vast moors and fantastic mountains range from the eastern to the western seaboard.

I stayed the night at Dornoch in a hotel that was once the castle of the Bishops of Caithness and has served as a county courthouse and prison in its time too (page 42). Its narrow windows in the tower look across to the seven-centuries-old cathedral squatting over the pleasant town with outspread wings like a mother bird on her nest. The cathedral's beautiful stained windows commemorate Andrew Carnegie, who once owned near-by Skibo Castle, as well as members of the ducal house of Sutherland, whose great castle of Dunrobin is a landmark for miles.

The county town of Sutherland is Dornoch, but Brora, 15 miles north along the coast, is often called its industrial capital, for it has a woolen mill, a coal mine, and a distillery. I visited the first two but did not venture into the last, for I had been told that its product was irresistible!

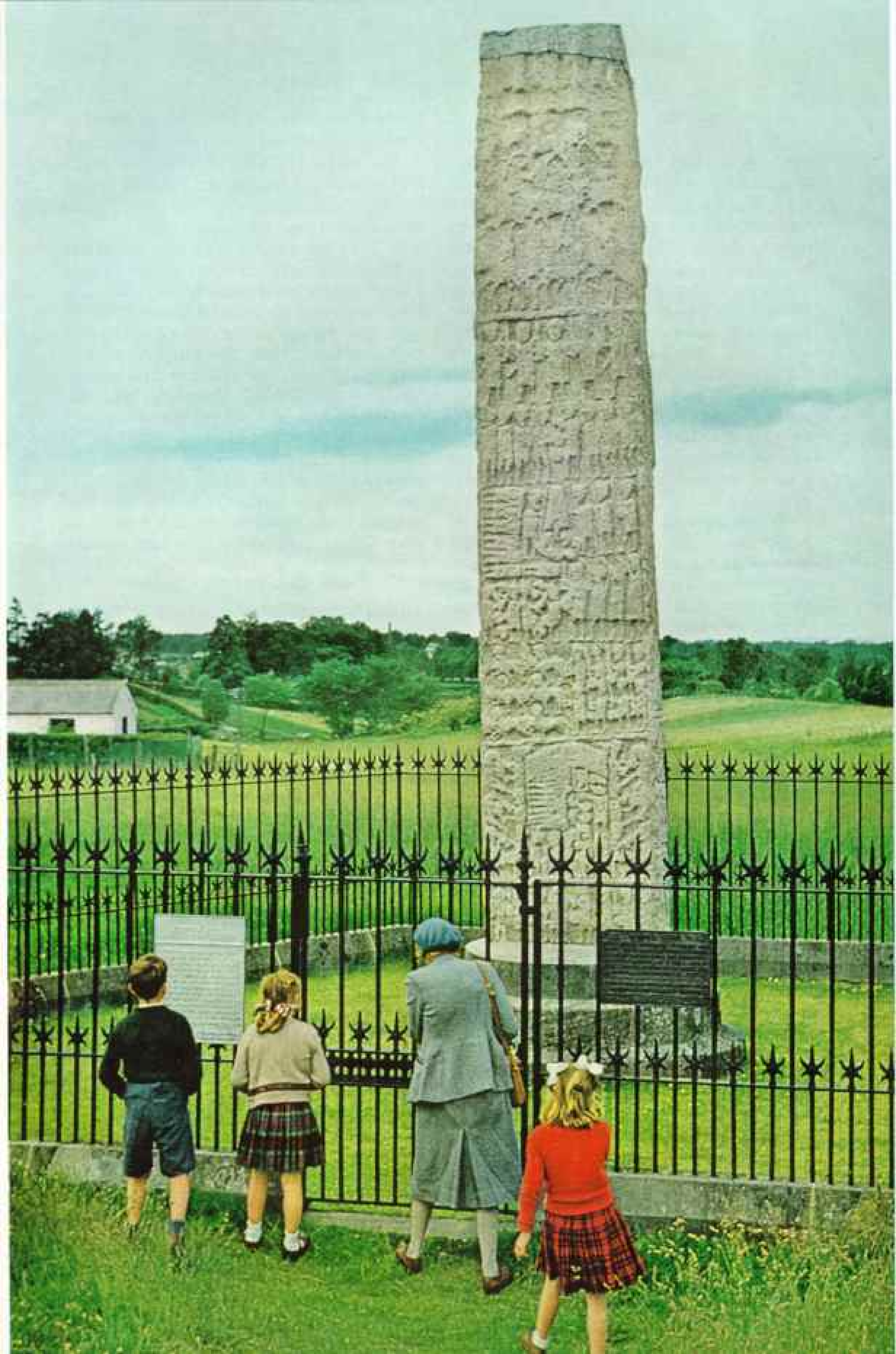
© National Geographic Photographers B. Anthony Stewart and David S. Boyer (below)

↑ One-teacher School at Gordonbush Draws Its Pupils to a Highland Hilltop

↓ A piano accordion sets the rhythm as tartan kilts whirl in the streets of Findhorn, a fishing community of about 500. Facing Moray Firth, the village was twice destroyed, once by shifting sands (page 39) and once by floods. Findhorn now occupies a safer site.

Nameless Warriors Fight a Forgotten War → on This Timeworn Monolith near Forres

Page 37: Sweno's Stone dates from the 10th or 11th century. Carved from sandstone, the monument stands about 20 feet high. In popular belief it commemorates a battle between Scots and Danes, although Sweno was identified by Shakespeare as "the Norways' king."



At the up-to-date woolen mill of Messrs. T. M. Hunter, Ltd., I saw wool in all the stages of washing, teasing, dyeing, spinning, and weaving into colorful tweeds and tartans for Scotland's export trade. This mill handles the small crofter's single bag of wool sent by post, as well as the flocks and bales of the large farmer (page 41).

Brora's coal mine is the farthest north in Britain. It has produced coal, off and on, since 1529 but was not continuously worked until 1872. One of its 22 miners took me down its 300-foot shaft to the workings. He told me with pride that in three years its output had increased from 3,000 to 8,000 tons. In 1951 the Brora miners won the trophy offered by a London newspaper for the greatest increase in output for a small mine in a three-month period.

"Not many coal mines have a salmon river in the foreground," said the manager when I returned to the surface. Certainly the Brora coal mine, by the rushing River Brora, is the most picturesque I have seen, and its employees are expert fishers (page 33).

From Brora the road winds along the coast to Helmsdale at the mouth of the River Helmsdale (page 32), whose tributaries were the scene of a Scottish gold rush in 1869. A town of tents and shacks sprang up in the strath, and the burns were vigorously panned. Though an estimated £12,000 in gold was taken, the precious metal does not seem to be present now in sufficient quantity to be profitable. Nothing remains of the old "Klondike" but a couple of wooden arches by the roadside, one of which bears the attractive Gaelic words Baile an Or (Town of Gold).

Fishing Yields Today's Gold

Fishing would seem Helmsdale's most golden proposition today. Mr. Cook, the town's energetic schoolmaster, gave up a busy evening to show me the reconstruction of the old pier, from which seining is still carried on (page 34). It was being strongly reinforced by steel and concrete, for the encroaching tides threaten to engulf Helmsdale's old castle on the headland above. Mr. Cook also showed me his schoolhouse garden, in which he grows his own tobacco.

Beyond Helmsdale the road rises more than 600 feet at the Ord of Caithness, where the traveler enters Scotland's most up-to-date county. For Caithness is on the eve of revolutionary new developments. On its northern seaboard, at Dounreay near Thurso, the Government is building Scotland's first atomic reactor station, its energy to be used for industrial purposes. The station will add 300 to the town's population, as well as 200 new houses and a new secondary school.

In 1953 the Government also established at Altnabreac, amid the wild Caithness moors, a small experimental peat-burning power station, consisting of a 2,000-kilowatt closed-cycle gas turbine and a 750-kilowatt open-cycle turbine. Thus, for the first time in industry, peat has been brought into association with gas turbines, promising important developments in the use of peat for power.

Hitherto Caithness has been noted for its agriculture. The Caithness farmer provides some of Scotland's best cattle and sheep. The famous North of Scotland Cheviots were bred and raised in Caithness from a few sheep Sir John Sinclair imported in the 18th century.

Dense Fog Shrouds Caithness

On a milestone at the summit of the Ord I read the words "John o' Groat's, 50 miles" painted in scarlet lettering. Happily I swung down the hill. But I had crossed the Ord on a Friday (a thing no Caithness inhabitant likes to do, for thence on a Friday in 1513 a battalion of Sinclairs marched to Flodden Field and only one drummer boy returned), and my luck was out. A dense, clammy sea fog suddenly laid its cold hand on the Caithness coast, and I hardly saw the county till I reached Wick three days later.

This large and stirring town has a busy harbor, home for herring drifters that ply to and from fishing grounds in the North Sea. From its airport planes reach the Orkneys in half an hour and Aberdeen in an hour. In a building that is now a customhouse, overlooking the harbor, R.L.S. spent part of his eighteenth summer and wrote that "the rugged excitant of Wick's east winds have made another boy of me."

At Wick the fog changed to rain, and the rain gradually to sunshine. I now stood only 17 miles from John o' Groat's, and my road led through territory that teemed with interest for the antiquarian. Here are stone circles and monoliths, ruined forts and watchtowers, and villages of lost generations only guessed at by the historian. He is on surer ground amid the remains of Norse and medieval castles that crumble on the brinks of cliffs along parts of the magnificent coastline.

© National Geographic Photographers David S. Boyer (above) and B. Anthony Stewart

↑ **Forestry Workers Bring Up Thatching to Stop the March of Culbin Sands**

Violent windstorms in 1694 whipped sand dunes into fury between Nairn and Findhorn (background). Drifts engulfed the manor house of Culbin and 16 fertile farms. Today foresters combat the continuing shift to the east by putting down a blanket of tree branches until seedling pines can anchor the sand.

↓ **A Kilted Kibitzer Suggests a Play in a Game of Draughts at Nairn**

Perched on the "cold shoulder of Scotland," Nairn shows a warm face, reputedly the sunniest in the land. A favorite resort along Moray Firth, the town features three golf courses and superb beaches. Here on a putting green the author makes her move in a game known to Americans as checkers.

"One such place," writes R.L.S., "has impressed itself upon my memory beyond all others. On a rock by the water's edge, old fighting men of the Norse breed had planted a double castle; the two stood wall to wall like semi-detached villas; and yet feud had run so high between their owners, that one, from out of a window, shot the other as he stood in his own doorway."

Following in Stevenson's footsteps, I passed the old castles of Girnigoe and Sinclair (page 44) and slept that night in the village of Keiss, where another grim ruin rears black towers skywards. At Keiss I arranged to spend the night in the home of a young fisherman and his sister.

Only a few miles now separated me from my goal, but I scorned the suggestion of another resident that I should take the bus. Well it was that I did, for my young friends were the means of introducing me to two descendants of John o' Groat himself.

This interesting couple, William Nicolson and his sister, lived in a dwelling known as the Half-Way House, a mile or two out of Keiss (page 48). Their father, John Nicolson, whose great-grandmother was a member of the famous Groat family, died in 1934 at the age of 91.

One of the Nicolsons' oldest friends, Dr. Charles Malcolm, Keeper of the Signet Library in Edinburgh, has brought to light as much of the true story as is known of the famous ferryman, John o' Groat.

John o' Groat May Have Been a Scot

There seems no good explanation for the generally accepted statement that John was a Dutchman. A charter was granted to one John Groat by the Earl of Caithness (not by the King of Scotland, as is usually stated) in 1496 to the ferry and "ferrylands of Duncansbay." John was not only ferryman but also factor and chamberlain to the Earl of Caithness, and two of John's sons, Hugh and Gilbert, entered the church as priests.

John's house must have been an unusual one, for more than one old authority mentions it, though not very explicitly. Rumor credits him with tact, for his seven sons were of such turbulent dispositions that their father built a house with eight doors and an octagonal table, which would give all the men equal precedence!

William Nicolson, an artist in his spare time, showed me his portfolio of water colors. Meanwhile his sister, also an artist, set on the table such a variety of home-baked dishes as I had not tasted in my long journey. Thus fortified, I set out on the last lap.

The sun was shining as I topped a rise and looked out over Pentland Firth. On the shore stands a turreted hotel; its flagpole occupies the reputed site of John's octagonal house. Later I crossed on the ferry to visit Stroma and was hospitably housed at the manse. The island has some 275 inhabitants, a church, school, shop, and lighthouse, but no hotel and no piped water. On its towering cliffs millions of sea birds have their tenements.

Queen Mother Brings Romance

The weather was now perfect. I could see the island kingdom of the Orkneys strung out to northward; even the tower of the Cathedral of St. Magnus at Kirkwall was visible beyond Scapa Flow. South of the islands the mainland swung away to its northern extremity at Dunnet Head. The white church of Canisbay stood conspicuous in the foreground amid its tombstones, under one of which John o' Groat reputedly lies "across the last ferry."

Still in sunshine, I left Stroma next day by ferry and made my way to Dunnet Head. Behind a small wood I passed deserted Barrogill Castle, once called "Castle of Mey," which I was told was for sale. Another deserted house, I thought sadly. The delight and surprise of the people of Caithness can be imagined when it was announced later that the Queen Mother had bought it for a Scottish residence.

When I visited Dunnet, the Queen Mother was expected soon on a private visit to friends, and the little village of Brough was in a state of suppressed expectancy.

"I don't suppose I'll have much chance of seeing her, though," said an old woman who had asked me in to her fireside for a chat, "for she'll be in the car when she passes." Little did she think that in a very short time she would be a tenant on the Queen Mother's estate!

Not far from Barrogill lies St. John's Loch, a placid sheet of reed-fringed water famed in olden time for its healing powers. I did not forget, before starting my return journey, to fling into its shining depths my groat of gratitude, a threepenny bit and a penny, for a happy journey. For they say the saint is as particular in exacting this tribute from travelers as his namesake, the old ferryman.

© National Geographic Photographers B. Anthony Stewart (below) and David S. Boyer

↑ Brora's Woolen Mill Transforms a Bag of Yarn into a Plaid Blanket

A customer may bring small lots of wool to this mill to have it woven into specially patterned tweeds or tartan fabrics. Here manager Robert Ballantyne checks colors in a completed blanket. Bins of woolen yarn line the walls.

↓ A Fly Maker Dresses an Orange Parson, Feathery Lure for Salmon Fishing

Working in her home near Brora, Miss Megan Boyd makes fishing flies from bright feathers. The Orange Parson in her tiny vise is used mainly in spring; in summer and fall salmon usually rise to smaller lures. Many of Miss Boyd's clients live abroad.

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↑ **Medieval Dornoch Castle, Once the Home of the Bishops of Caithness, Welcomes Guests as a Hotel. The Proprietress Pours Coffee**

↓ Left: The maid takes chill off hotel sheets with a "pig," an earthenware hot-water bottle. Dornoch residents number fewer than 1,000; its hotels can scarcely accommodate the visitors drawn by golf and swimming. Even in the 17th century the town was noted for "the fairest linkes . . . surpassing . . . St. Andrews."

Right: Youngsters at Clyne Junior Secondary School at Brora read together at a twin desk. Student art decorates the blackboard.

© Kodachromes by National Geographic Photographers B. Anthony Stewart and David S. Boyer (below, right)

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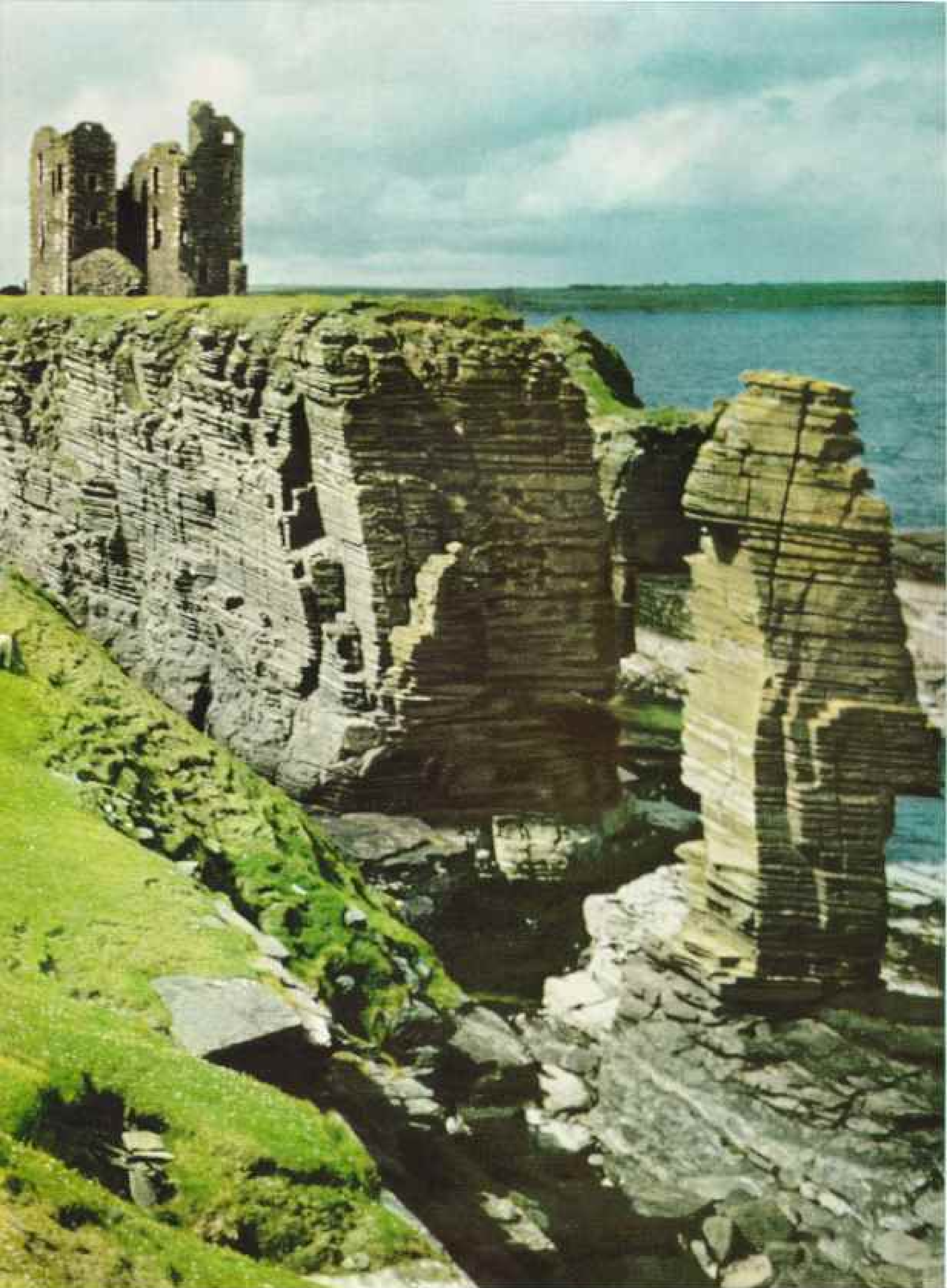
Cheviot Sheep Graze in Pastoral Peace near a Scene of Bygone Horror

Ruined castles stand dark and sinister as when the wicked fourth Earl of Caithness, 400 years ago, allowed his son to die of thirst in the dungeon because he had shown clemency to the family's hereditary foes.



National Geographic Photographer B. Anthony Stewart

Skeletons of Castles Girnigoe (Left) and Sinclair Haunt a North Sea Ledge

In the time of the sixth Earl of Caithness a disagreement between the Sinclairs and Campbells broke into war. The Campbells laid siege to Castle Girnigoe, inspiring the well-known song, "The Campbells Are Coming."

← Bare and Empty, a Caithness Moor Still Yields Riches in Peat

Centuries ago this bog was a lake bordered by bulrushes and mosses. Dying plant life choked the bottom; decaying, it became peat, chief source of heat for the homes of Caithness County.

This farm family mines its own territory. Men cut thick blocks with long-bladed spades; women stack the slabs for six weeks of drying.

Peat bogs go as deep as 50 feet. Partly decayed layers near the surface are used for cattle bedding. Heavy black slabs from deeper down make the best fire logs. Farmers spread charred peat as fertilizer.

↓ A farm woman and her grandchild welcome the author to their thatched cottage. Animals are sheltered in one end of the home.

Near by, on a lonely moor, Miss Hutchison found the cross erected in memory of the Duke of Kent, who crashed and died here on a special mission during World War II.

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© National Geographic Photographers B. Anthony Stewart (below and opposite above) and David S. Boyer

↑ Helmsdale Piper Teaches a Friend to Make Music on the Bagpipes

The lesson: keep the bag filled with air so that it flows evenly into the chanter (lower pipe) and drones (over the shoulder). The chanter, fingered by both hands, carries the melody in piercing oboelike tones; drones sound the A note in tenor and bass.

↓ "Maria Troon Is My Name," Says the Old Bell at Kettins

Mr. Alexander Smart, beadle of the parish church, interprets the Flemish inscriptions on this bell, a mysterious migrant from the monastery at Grobbendonk near Antwerp. "Mr. Hans Popenruyder gave me, A.D. 1519," the bell adds.

End of the Road: After John o' Groat's, Scotland's Mainland Drops into the Sea

The story of John o' Groat, the man, is encrusted with legend. Many believe that he was a Dutchman named John de Groot to whom James IV awarded the privilege of running a ferry across Pentland Firth. One tale gives him the nickname "o' Groat" because he charged a groat for passage.

The truth lies in a charter, dated 1496, in which the Earl of Caithness granted ferry rights to one John Groat, probably a Scot.

Here Mrs. Allister Mackenzie, wife of the John o' Groat's hotelkeeper, coaxes her pet Scottish terrier to stand up for Una Manson. Post office sign shows a variant punctuation of the name.

↓ The fact of the ferryman's descendants is real enough. These two, William Nicolson and his sister, take tea at their farm home near Keiss. Shortbread, queen cakes, oatcakes, pancakes, scones, and jam load the table.

The couple's father, a noted antiquarian, collected Norse relics which are displayed in the house.

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Hunting the Heartbeat of a Whale

A Scientific Expedition Sails a Lonely Mexican Lagoon in Search of Clues to the Mysteries of the Human Heart

BY PAUL DUDLEY WHITE, M.D., WITH SAMUEL W. MATTHEWS

"WHEN I first tried animal experimentation for the purpose of discovering the motions and functions of the heart by actual inspection and not by other people's books," wrote Dr. William Harvey in 1628, "I found it so truly difficult that I almost believed with Fracastorius,* that the motion of the heart was to be understood by God alone."

Thus begins one of the most celebrated works on the human heart, Harvey's *De Motu Cordis*. Many times have these words returned to my mind during a lifetime of studying—often with animals—that most wonderful and mysterious of mechanisms, the heart.

Pulse of a 30-ton Patient

Early this year we embarked upon an adventure that brought back Harvey's opening sentence with redoubled meaning. Our expedition, with all the extraordinary equipment of 20th-century science at its command, still found "animal experimentation ... so truly difficult" that we nearly met disaster.

We sailed into the lonely waters of Mexico's Scammon Lagoon, halfway down the Pacific coast of Baja California, seeking a strange goal (map, page 54). We were going to try to record the heartbeat of a whale.

For our unusual venture the National Geographic Society, the Douglas Aircraft Company, the Sanborn Company of Cambridge, Massachusetts, makers of our sensitive heart recorders, and many other organizations and people had given generous aid.

Before the expedition was over, we learned why the California gray whale long ago was nicknamed "devilfish." We nearly lost a boat, stove in by a mother guarding her newborn calf. Six of our party came all too close to the lashing tail of the angry giant.

In the end we fell short of our goal. But we knew more about the difficulty of measuring the heart impulses of an animal "patient" 40 feet long and weighing some 30 tons.

In setting forth with such an aim, we were really searching for clues to mysteries of the human heart.

* Physician-poet of Verona, 1483-1553.

Both whale and man are mammals. But whereas man's heart is roughly the size of his two fists, the heart of an adult gray whale would overflow a bushel basket and tip the scales at more than 250 pounds.

Human hearts beat 50 to 90 times a minute. But the heart of a large whale pumps very slowly—perhaps fewer than 10 times a minute. No one knows exactly, for the pulse of earth's most ponderous creature never has been taken satisfactorily. To do so has been my dream of 40 years.

In 1916 we dissected the heart of a sperm whale caught in the Atlantic by one of the last of the New Bedford whaling ships. Microscopic study revealed an intricate and beautiful structure. Some of the largest tissue cells ever measured were found there. Specialized bands of muscle, conductors of the heart's electrical currents, were seemingly better perfected than in any other mammal.

In the intervening 40 years we have made electrocardiograms of mice and circus elephants. The mouse's heart, we found, beats 500 to 600 times a minute, while an elephant's pulse thumps only 35 to 40 times. The larger the heart, the slower its beat.

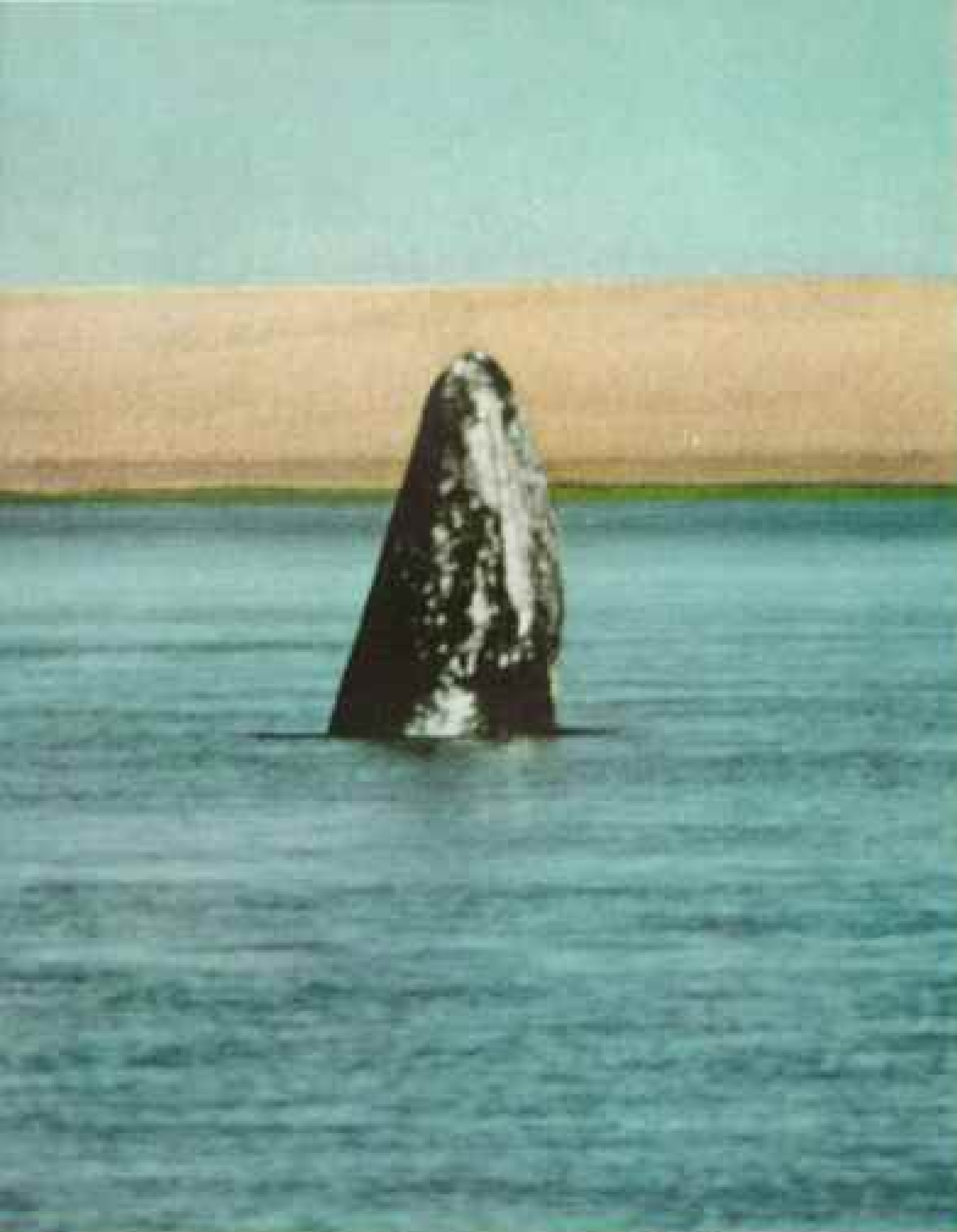
The mammalian heart contracts and beats in its unfaltering pulse because of electricity it generates within itself. Its driving impulse or current, measuring no more than a thousandth of a volt in the human, begins in the so-called "pacemaker" of the heart.

Expedition Heartbeat

Forty years ago a young Boston cardiologist, Dr. Paul D. White, published the first detailed scientific description of a whale's heart. Since then, seeking greater understanding of heart structure and pulsation, he has studied living mammals ranging from mice to circus elephants and the beluga whale.

Early in 1956 a National Geographic Society research grant assisted Dr. White and two colleagues, Dr. Robert L. King and James L. Jenks, Jr., in an attempt to make an electrocardiogram of a California gray whale in its breeding waters along Mexico's Baja California peninsula.

Dr. White is President Eisenhower's heart consultant. Dr. King, an associate and cardiologist of the Mason Clinic in Seattle, Washington, was president of the American Heart Association in 1953-54. Mr. Jenks is president of the Sanborn Company of Cambridge, Massachusetts, manufacturers of electrocardiographs and other precision instruments.



Barnacled Head Erupts as a Gray Whale "Spy-hops"

Medical science searches for deeper understanding of the heart, not only in quiet laboratories but sometimes in distant and dangerous places.

To record the slow pulsing of the largest of all hearts—a whale's—Expedition Heartbeat roved Mexico's lonely Scammon Lagoon early this year. A National Geographic Society grant to the author, a world-famous cardiologist, aided the project.

←As if to spy on the intruders, a 40-foot gray suddenly lunges straight up, thrusting low-set eyes above the surface. The camera's long-distance lens makes the whale, some 70 feet beyond the boat, seem closer.

↓At the same instant, a camera on the boat catches another view of the whale's snout. At top is a reel of insulated wire attached to a light line-throwing gun. Goal was to sink two wired contacts just under the whale's skin, then connect the wires to a cardiograph.

←Page 50, lower: A scientist sights on a whale as it surfaces to blow.

© National Geographic Society

Kodachromes by Samuel W. Matthews (above) and J. Baylor Roberts, National Geographic Staff

Nobody knows how this electrical impulse is generated. It must originate in some yet unknown chemical action. The nervous system operates as a control, we know, but if the nerves inside the heart are cut, there still will be regular electrical impulses generated. The rate, speed, and time intervals of these impulses tell much about the heart's health. The electrocardiograph, which records such data, is an important tool, but we still have much to learn from it.

What might be regarded as a serious sign of danger in one man's heart, for example, may prove to be within the range of normal action in another's. The physical size of the heart itself may cause misleading differences in the cardiogram. What might seem at first glance to be a malfunction may be due merely to a heart larger than average.

Whale Is Last to Be Measured

It is this possibility which had led us, again and again, to seek the heartbeats and electrocardiograms of many mammals other than man. The whale is the last to be attempted.

In 1952, off the southwest coast of Alaska in Bristol Bay, Dr. Robert L. King, James L. Jenks, Jr., and I succeeded in taking a cardiogram of a beluga, or small white whale. Our patient, only 14 feet long and weighing little more than a ton, had a remarkably slow heart rate. Its pulse beat 12 to 20 times a minute and averaged 15 even when the whale was vigorously pulling us out into the Bering Sea in a small skiff.

Still, we had not completed our task. The beluga is pint-sized compared with other cetaceans. We had proved, however, that an electrocardiogram of a whale could be recorded, something never before accomplished.

In 1953 and again in 1954, we scouted for California gray whales off San Diego. Even with a fast Navy boat and later a helicopter, we failed to get close enough. The wary grays would dive whenever we approached.

"Try Scammon Lagoon," Dr. Raymond M. Gilmore, of the U. S. Fish and Wildlife Service, and Dr. Carl L. Hubbs, of the Scripps Institution of Oceanography, advised. "It's the main winter breeding ground of the gray whale herd," Dr. Gilmore said. "You'll have good weather, and the water is shallow. The whales cannot dive very deep."

And so, after two years of preparation, we set out to invade the grays' home waters.

We found ourselves a congenial, purposeful crew on our two-day voyage south along the Baja California coast from Los Angeles. Our host and expedition skipper was aircraft manufacturer Donald W. Douglas, an experienced sportsman completely at home on the water.

With Mr. Douglas were Frederick W. Conant, senior vice president of the Douglas Company; Charles A. Langlais of San Francisco, whom we quickly dubbed "Captain Ahab"; ship's engineer Leo Thomas, and Luther Gift, ship's cook without peer.

Our scientific party included Dr. King and Mr. Jenks, president of the Sanborn Company, plus a young Sanborn engineer, Paul Levesque, upon whose knowledge of electronics and marksmanship with a light line-throwing rifle we depended greatly. In addition, two National Geographic Society staff members, J. Baylor Roberts and Samuel Matthews, had joined us.

A few days later, when Donald Douglas, Jr., and Donald "Bud" Gardiner of the Douglas Company flew to Scammon Lagoon, our crew was complete. We totaled 13, but no one thought the number ominous.

Dorado, an 83-foot twin diesel craft provided by Mr. Douglas, proved a luxurious way to go whaling. Roomy and elaborately equipped with the latest navigation devices, the yacht originally had been a Coast Guard patrol boat.

Gray Whales Neared Extinction Twice

Making a steady nine knots, we cruised past the purple mountains of Mexico's youngest State, Baja California Norte. The marching peaks and mesas dropped sometimes almost sheer to the sea.

Our coastwise course paralleled the migration route of the California gray whale. From summer feeding grounds far to the north in the Arctic Ocean and Bering Sea, this uncommon species travels 6,000 to 7,000 miles south each winter to the sheltered lagoons and bays indenting the coasts of Baja California.*

Dr. Gilmore had told us much about the grays. "They almost became extinct twice in the last hundred years," he had said. "Between 1850 and 1890 the bay and shore whalers along the California coast hunted them until the nursery waters were virtually

* See "Whales, Giants of the Sea," by Remington Kellogg, National Geographic Magazine, January, 1940.

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Samuel W. Matthews, National Geographic Staff

↑ Heart Specialist and Aircraft Maker Go Forth to Take a Whale's Pulse

Dr. Paul Dudley White (right), President Eisenhower's heart consultant, notes traits of the wary gray; while Donald W. Douglas, president of Douglas Aircraft Company, an expedition sponsor, keeps watch for a misty spout. Life jackets attest the danger of an angered whale capsizing the boats.

↓ Sensitive Instruments Catch and Trace the Smallest Movement of a Heart

Seagoing electrocardiographs, which turn tiny heart currents into wavy graphs, were Dr. White's hope for recording a whale's heartbeat. Here James L. Jenks, Jr., president of the Sanborn Company, another sponsor of the project, tests the instruments aboard the expedition vessel *Dorado*.

National Geographic Photographer J. Baylor Roberts

emptied. Naturalists assumed the grays were gone and forgot about them.

"Then Roy Chapman Andrews went to the Orient in 1910. He had heard talk of a strange whale called the *koku kujira*, or 'devil-fish,' being hunted off the southeastern shore of Korea. He discovered it was a gray whale of the same species that had disappeared from California, but of another herd."

The Devilfish Come Back

California gray whales eventually increased again in the eastern Pacific, Dr. Gilmore related. They reappeared in such numbers that they were hunted again in the 1920's and 1930's, and again they almost disappeared. Only a few hundred remained by 1937 when international whaling agreements, backed by U. S. law, gave them rigid protection.

"We know they're increasing now," Dr. Gilmore had told us. "We counted 1,624 in 1955. Allowing for those we didn't see, we believe that this year the herd may total several thousand.

"They come down along the coast starting in December, staying close inshore all the way from Oregon to Baja California, looking for their breeding and calving homes. Formerly they came into San Diego Bay, but the whalers killed them off."

With thousands of other Americans we had visited San Diego's Point Loma to watch the grays parading past. The National Park Service maintains a whale-watch station there as part of Cabrillo National Monument.

The giant mammals do not tarry. Their minds are on havens far from man's interference, such as Scammon Lagoon. There we also now were headed, with special permission from the Mexican Government.

We anchored early one morning close off

Surrounded by Mexican Desert, Whales Play in This Arm of the Sea

Whalers found the hidden lagoon a century ago. Under Pacific winds, sand dunes "walk" along its shores. Salt beds shimmer like ice. *Dorado*'s scientists, exploring uncharted channels, were nearly sunk by an angry whale in "White's Waters" (page 59).

© National Geographic Map Drawn by Victor J. Kelley

Wide World

Scientists Inspect Whaling Weapons That Will Inflict Little More than Pinpricks

The "whalers" experimented with three means of hurling wired barbs. Dr. White (center) fits a glass fiber arrow to a spring-steel crossbow. Dr. Robert L. King, Seattle heart specialist, holds a wooden-shafted Alaskan beluga harpoon. Mr. Jenks carries a naval line-throwing gun, only weapon that showed much promise. Unlike the explosive harpoon of commercial whalers, it causes little injury to the whale.

Lagoon Head (Morro Santo Domingo) in Sebastián Vizcaíno Bay. A dim line on the horizon marked a long thumb of hills and sand dunes reaching into the Pacific.

Seventeen miles south of our anchorage lay Scammon Lagoon's narrow opening. We knew that Dr. Gilmore was somewhere inside aboard a Scripps Institution vessel, and we radioed him of our arrival. He answered that he would come out and lead us across the shallow bar into the lagoon.

Two hours before dawn next morning we were under way, cautiously following his craft along the shore, with dangerous surf breaking near us.

As the sun came up, flaming across the dunes, we saw our first whales in number. They rose to blow, usually three quick spouts in succession, and then dived again with tail flukes waving high. Occasionally one would breach in a spectacular vertical lunge, or slowly thrust a dark conical snout high out of the water, remaining in that strange position for long seconds as if looking around. That was exactly what they were doing, Dr. Gilmore told us later. He called the odd leaps "spy-hopping."

Now the long ground swell of the open bay no longer had us staggering and clinging to any support. Through calm water, with a light breeze and a warm sun, we moved slowly through the curving entrance channel.

Thirty miles long by an average seven miles wide, Scammon Lagoon stretched away like a great lake. In expanse this little-known body of water is more than half the size of California's Salton Sea.

Few seamen or yachtsmen have ever been

Station W-H-A-L-E, Its Antenna Bobbing, Floats in a Sea Sled

To relay heart impulses to a cardiograph on *Dorado*, two midget radio sleds were built for Dr. White's project.

The sleds, light enough to be towed by electric wires from small barbs in the whale's blubber, were designed to send automatic signals while skimming in the mammal's wake.

Here an expedition boat tows a sled past an anchored vessel of Scripps Institution oceanographers, who were taking a whale census.

Despite repeated trials, signals from the sleds proved too weak. Therefore the cardiograph was installed in a speedboat, which could pace a whale while scientists took a direct heart recording.

➔Page 57, lower: Dr. White studies a cardiogram of Mr. Jenks, who huddles under a parka to stay warm; electrodes are strapped to his bared arms and legs. His heart impulses were transmitted from bow to stern on *Dorado* by the orange radio sled above.

🡣Expedition members rewire one of the sleds.

© National Geographic Photographer J. Baylor Roberts

inside Scammon Lagoon. Official charts show only an uncertain outline for much of it. Neither its twisting channels nor its wide shoals and tidal sand flats have been accurately sounded or marked with buoys. We passed islands that old charts failed to note. One of these we later named Cardiac Island, and another became Geographic Island.

Only an occasional turtle hunter visits Scammon's barren shores. No one lives there. We saw a few deserted weather-beaten shacks and the blackened remains of campfires surrounded by charred mounds of turtle shells and bones. How such camps exist for more than a few days is hard to imagine. The nearest fresh water is a rabbit-haunted spring four miles from the head of the lagoon.

This water hole gives Mexicans their name for Scammon Lagoon: Laguna Ojo de Liebre, or "Lagoon of the Jack Rabbit Spring."

Years ago salt was dug from extensive flats near the lagoon's head, and large ships negotiated these tricky channels. Now an abandoned pier and rusty remnants of a narrow-gauge railway are all that remain.

Long before the salt ships, however, Scammon Lagoon knew the tall masts of sail-rigged whaling vessels and heard the cries of harpooners and oarsmen of open whaleboats.

The first whaler to find and explore these waters was Capt. Charles Melville Scammon, a San Franciscan who sailed into the lagoon almost 100 years ago, in 1857.

Whalers Found Abundant Quarry

In the brig *Boston*, with a schooner as tender, Captain Scammon entered the lagoon along the same course that we had followed from Lagoon Head. He was trapped overnight when the wind failed him on the shoalest part of the entrance, but a northerly breeze next day took him safely through "the turbulent passage."

Later, after a three-day gale had abated, "the brig and her consort made the best of their way up to the head of the hitherto unexplored waters. Here the whales were found in great numbers," he wrote.*

Like Scammon, we already were preparing our equipment for the pursuit. Our plan of attack was this: By using two hand-thrown harpoons, specially designed crossbows of powerful construction, or lightweight shoulder guns, we would attempt to place two electrodes beneath the tough black hide of an adult whale, penetrating its blubber layer but not deeply enough to cause serious injury.

Slender nylon-insulated wires would trail from the harpoon heads. These would be attached to a watertight sea sled somewhat resembling a midget boat, carrying radio transmitting and telemetering equipment.

The harpooned whale, we thought confidently, would drag the sea sled behind it. From the instant the sled was attached, radio signals would broadcast the whale's heartbeat back to a receiver aboard *Dorado*. A few minutes would be enough to obtain a useful recording.

Ballena Draws First Blood

That day we were first elated, then disappointed.

"Admiral" Douglas and Ted Conant lowered our harpoon boat, *Ballena*, and set off to reconnoiter the near-by channels and sandbars. Soon they were back, exultant.

"We've poked a whale with an oar!" shouted Mr. Douglas. "*Ballena's* been blooded."

And it had. Steering their boat right up to a roving whale, they had leaned out and prodded it sharply. The whale swerved, was nicked by *Ballena*'s whirling propeller, and left a faint red trail of blood behind her.

Jim Jenks, however, had bad news. The more powerful of our two radio sleds failed to work. Somewhere within its maze of tubes and wires something had gone awry. The other sled, though it sent a signal, proved too weak and also had to be given up.

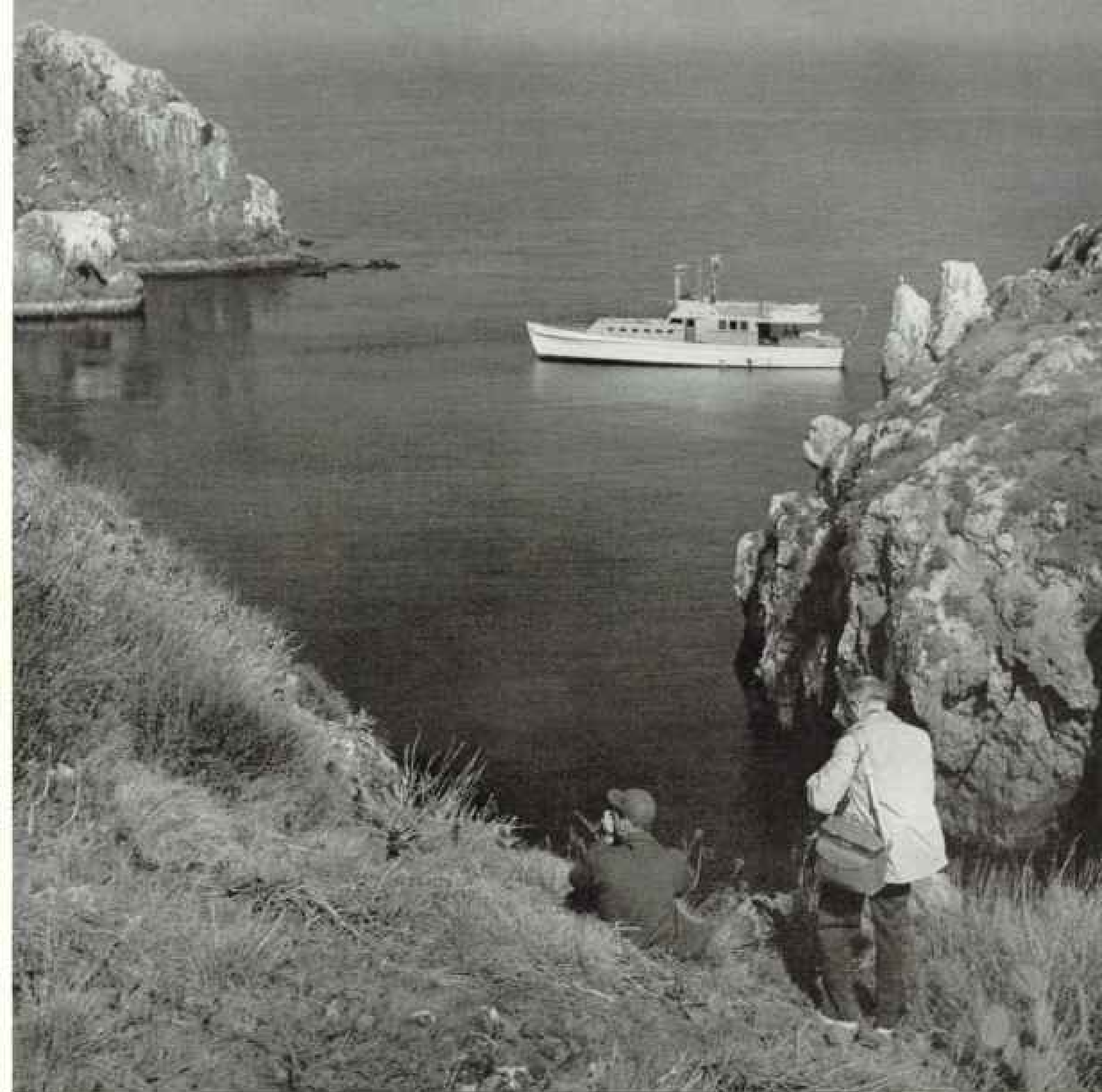
"Let's try to record directly from a whale," came Mr. Douglas's quick answer. "*Ballena* can carry the electrocardiograph. After we harpoon the whale, we'll stay close enough to it to let the wires lead straight to the machine."

It had worked in Alaska—why not here?

Next morning, beginning at sunrise, we chased whales—adult whales of mighty spout, mother whales with close-following calves, and pairs or trios of whales courting playfully.

Many times our would-be harpooners came to close quarters. But each time they held their cast, for it was necessary that two harpoons be thrown into the ponderous creature, as far apart on its body as possible. Only thus could a measurable signal be sent to the recording instrument. But a surfacing whale seldom exposes its entire length. There were no openings offered that day.

* *Marine Mammals of the North-western Coast of North America.* San Francisco and New York. 1874.



Samuel W. Matthews, National Geographic Staff

Dorado, Following the Gray Whale to Its Calving Waters, Pauses in a Rocky Cove

The 83-foot diesel yacht carries radar, sonic depth-finder, automatic pilot, and berths for 14. Swordfish and marlin are its usual quarry. Here *Dorado* anchors at Mexico's Todos Santos Islands.

The wind came up with a bite in it that afternoon. Having conferred again with Dr. Gilmore, we hoisted *Dorado*'s anchor and moved several miles farther up the lagoon, nearer the area he called the nursery. This was to become known to us thereafter, I must confess, as "White's Waters."

There were other impromptu names bestowed in this area the next day: "Stove-in Point" and "Jenks Nose," "Don Jr. Shoal" and "Roberts Run," among many.

Shortly after dawn, *Ballena* disappeared up a narrow arm of the lagoon stretching into the desert. She carried six of our party, including Mr. Douglas. Two more manned a guard-and-rescue boat; others of us kept watch and waited aboard *Dorado*.

Suddenly the loud-speaker of our boat-to-ship radio blared. "*Ballena* to *Dorado*—*Ballena* to *Dorado*. A whale has hit us! We're sinking—we're sinking fast!"

Our hearts sank as well, as we searched with binoculars. There was no sign of *Ballena*.

Then the radio broke into sound again. "We took a hole in the bottom a foot square. The water's gaining fast, but we may be able to handle it. Here comes the guard boat. Stand by, *Dorado*."

Hurriedly we lowered away our one remaining skiff and attached an outboard

↑ Stove in by a Whale, *Ballena* Limps Home

Whalers of old dubbed the gray a "devilfish." Three days after invading Scammon Lagoon, expedition members learned why. An irate cow, fearing that her calf was in danger, suddenly turned on their boat as it approached.

The whale charged into the keel, sheared off the rudder, bent the propeller, and left the fragile craft with a gaping hole smashed in the bottom.

Here the boat's crew, moving to the opposite gunwale and bailing furiously, keeps *Ballena* afloat as she is towed back to *Dorado*.

Captain Douglas talks with the mother ship by radiophone.

← Fast Repair Work Bandages the Hole

A skillful patch made *Ballena* seaworthy again, though she had to be steered with an oar. Five layers of glass cloth sealed with resin covered temporary planking.

While repairs on the smashed boat were made, the whale search continued by skiff.

© National Geographic Photographer
J. Baylor Roberts

motor. Dr. King and Paul Levesque donned life jackets to go to *Ballena's* aid themselves. They had scarcely shoved off—and promptly stalled their motor—when the radio came to life once more. Mr. Douglas's voice boomed out:

"Old Captain Scammon,
He was sure right—
These mama whales
Can stand up and fight!

"We're O. K. now, *Dorado,*" he reported. "We've rigged a soft patch over the hole. We're being towed in."

Just then, around a low spit of sand dunes that hid the long channel where they had vanished, reappeared two small dots. Leading was our outboard-powered guard boat, *Petrelita,* throwing a frothy wake. Behind it trailed *Ballena,* canted at a crazy angle.

We could see four figures bailing away in the wounded speedboat. Charlie Langlais was steering *Petrelita* (opposite).

"Dr. White," the loud-speaker said, "we think you should take Bosun Jenks's cardiogram as soon as we get back. The whale stove in the bottom right beneath him!"

Laughingly, I agreed to measure all their heartbeats. "Did you get the whale's cardiogram?" I asked anxiously.

"Get a cardiogram!" came the reply. "We didn't even throw a harpoon at her. She just didn't like us."

Irate Mother Attacks Boat

Their story was soon told. *Ballena* had found many whales in the nursery. Finally the hunters came upon a mother and her calf following a slow course down the channel. The boat began a cautious approach.

Suddenly the young whale leaped as if in fright, clearing its mother's back. Then the great female, twice as long as *Ballena's* 18 feet, veered directly toward the boat.

Before the rudder could be thrown over, the whale had struck. The boat lurched upward as the charging cetacean lifted it like a chip of wood. The engine stopped... started again ... stalled a second time.

Scant seconds passed. Then came a splintering impact—whether from the whale's lashing tail flukes or from a butt with its nose, the passengers could not tell. Water gushed into the boat.

Mr. Douglas reached for the radiophone. Equipment was shifted to an after seat. With whatever came to hand—cardboard box, coffee can, even a hat—the hunters began to bail.

They stayed afloat, by shifting to one side and lifting the hole partly out of the water, until *Petrelita* arrived from its patrol station half a mile away and towed them quickly to a near-by shoal. There Don Douglas, Jr., jumped overboard and rigged a canvas tarpaulin over the outside of the hole.

By fast thinking they saved their boat and brought her home. Hoisted aboard, *Ballena* proved to have lost her rudder; her propeller was bent beyond use, its shaft and supports twisted 15 degrees off line.

Search Goes On in Remaining Boats

A council of war was in order. Should we continue our quest? "Of course," came the answer. "We have two boats left. Captain Ephraim, be not downhearted!"

I was "Captain Ephraim"—so dubbed after an old-time New England whaler—and Captain Ephraim at that moment was indeed downhearted. I was remembering Dr. Harvey's prophetic words.

While half our crew worked long hours patching *Ballena's* wounds, *Dorado* returned to her anchorage in "Conant's Cove"; the cockleshell *Petrelita* was fitted out with bright orange marker buoys at the end of sturdy harpoon lines, and with these she moved to the edge of a steep-sided shoal several hundred yards from the main boat.

There she sat, bobbing forlornly. Whales swam to and fro, up and down "Douglas Channel." But not a whale came within range of the hunters' harpoon guns.

While the outboard patrol went on, a second watch was maintained from the bow of *Dorado,* with crossbows and a hand harpoon at the ready. Only once, that afternoon, was the harpoon thrown. The long lance must have struck a glancing blow. It hit the target, but the whale merely gave it a flirt of the tail and was gone.

So ended still another day of disappointment. Worse, our time was running out.

Johnny Martin, the Douglas Company's chief pilot, had flown a new propeller shaft for *Ballena* down to us, landing on a dry lake bed several miles from our anchorage. When the plane went back the next afternoon, two of us would have to be aboard. The date of President Eisenhower's examination was at hand for me. Dr. King had an urgent appointment in Seattle.

63

↑ Mother and Baby Come Up for Air

To this sheltered desert lagoon each winter come hundreds of California gray whales, some to mate, some to bear their 14-foot calves, and all to frolic lazily in sunlit blue channels and shoals. They migrate thousands of miles from Arctic seas to the same Baja California lagoons year after year.

Mottled gray to almost black, these whales exceed 40 feet as adults, more than twice the length of the boat cautiously circling in the background.

Here a cow and calf rise to the surface simultaneously to blow and inhale. Gestation took nearly a year; weaning is still a leisurely six to eight months away.

A gray whale normally calves every other year, bearing five to eight young in a lifetime of 15 to 20 years.

← Tail Flukes Rise as a Whale Dives Deep

After spouting several times, the gray sounds, its tail appearing briefly like a giant black butterfly. The creature will not resurface for 3 to 5 minutes. The flukes, nearly 10 feet across, show the white scars of barnacles.

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J. Baylor Roberts (opposite, below) and Samuel W. Matthews, National Geographic Staff

↓ Expedition Trophy: Whale Bone Bleached by Desert Sun

Dorado takes home a mammoth skull bone of a gray whale stranded long ago on a Scammon beach. Dr. White had already left by plane to examine President Eisenhower. He plans to return to Scammon Lagoon next year, perhaps with a helicopter. National Geographic flag and Cruising Club of America burgee snap in the breeze.

"We'll use *Dorado* herself this time," Skipper Douglas decided. And use her he did, twisting and turning within the narrow unmarked channels, backing all engines when shoals rose suddenly beneath her, going ahead as whales were sighted near by.

Still we had no clear shots. It seemed almost as if the whales were playing tag with *Dorado*. Then came welcome news: "*Ballena* repaired and ready to lower." Our hard-working crew had fitted the powerboat with the new propeller and shaft, made the patch watertight and the sturdy craft seaworthy once again.

We anchored immediately. Within minutes the boat was lowered away. This time it was a true whaleboat, for in place of its rudder torn away by the whale, an oar now served as a tiller.

We were soon away, with Skipper Douglas, Sam Matthews, and "Captain Ephraim" manning the rescue skiff in the wake of *Ballena*. The tide had turned, and whales were everywhere.

As we moved across the shallows, eddying with swift-running tide, we could hear the monsters blowing. As each surfaced, across the calm water came a long throaty "whoooooosh," somewhat like a locomotive in a railroad station releasing a burst of steam.

"Thar She Blows" Signals a Chase

On *Ballena* Dr. King cried out, "Thar she blows!" With Paul Levesque he stood ready with the guns. The boats turned together to give chase. A group of full-grown whales moved slowly upchannel. Gleaming backs, showing white barnacle patches, rolled above the surface, submerged, and then surfaced again a few minutes later.

Ballena's first approach proved too fast. When they next appeared, the whales were behind her but still coming straight ahead. Apparently, unlike the female that previously had attacked, these whales were quite undisturbed by the boat. *Ballena* made a wide, cautious turn and edged up once again.

Without any warning, the enormous head of a gray shot straight up out of the water in a spy-hop. Spray showered from its sides.

"Fire!" shouted Levesque. Both harpoon guns cracked simultaneously. Lines flashed outward from the reels at the muzzles.

The upright whale gave a massive shudder and fell away to one side in a white thrash of water. "Let's get out of here!" someone aboard *Ballena* shouted. Behind the boat an orange marker buoy shot away, leaving a foamy wake.

Certainly one dart had struck the whale and buried itself strongly. Dr. King, with the last turn of electric wire snagged on the reel of his gun, found his weapon jerked from his hands. It hung above the water, held by a safety line to the boat.

In a flash Bud Gardiner jerked a knife from a sheath at his waist and cut the taut rope. Line, gun—and knife—snapped outward, spun, and vanished beneath the waves.

Whale's Charge Snaps Line

The wire from the fouled gun must have snapped in the whale's first great lunge. Apparently the other barb pulled free, for a second later the orange marker drifted lazily to a stop. When we pulled it in, a single arrow trailed from the twisted line.

Such was our final foray against our reluctant patients. We had lost a gun, and nearly lost a boat. We had learned much about the touchiness of whales at the height of their calving season. We had found once more that our heartbeat-hunting weapons were not yet adequate for their job.

Even if we could have stayed several weeks more inside Scammon Lagoon, we doubt that we could have achieved our goal on this occasion. The seeming ease with which the harpooned whale snapped our connecting cable made it apparent that far stouter line would be necessary to hold a connection.

It was time now to depart. Once again we heard Donald Douglas say, "Captain Ephraim, be not downhearted! The Captain Scammon Club will convene here again. And next time perhaps we'll come after mama whale in a helicopter. Let her try to stave us in then!"

Valuable Experience Gained

As Johnny Martin lifted our northward-bound plane and roared across Scammon's wide expanse, *Dorado* lay slim and white beneath us, preparing for its voyage home.

We were not downhearted. We had failed, but it was a profitable failure, for we knew now where our shortcomings lay.

We will surely go back, winding through Douglas Channel past Cardiac Island and Geographic Island, to record the heartbeat of the wary grays.

Desert Sheikdoms of Arabia's Pirate Coast

In Trucial Oman's Principalities, Cradled by Seas of Sand and Salt, Camels, Dates, and Pearls Support a Fiercely Independent People

BY RONALD CODRAI

With Illustrations from Photographs by the Author

OF all the troubled lands east of Suez, few spots are so little known to Westerners as Trucial Oman, which swelters between Saudi Arabia's "Empty Quarter" and the Persian Gulf, in an area where even National Geographic Society maps read "Coastal sovereignty undefined."

Yet the proximity of the Trucial Coast to Bahrain and other great oil centers of the Near East makes it a prized pawn in today's struggle between East and West. Every scrap of information about its proud little principalities is eagerly sought. And the six years I have spent there on business since 1948 have given me a chance to study its geography and know its people as few Westerners have been privileged to do.

From my house in Dibai I could watch the graceful lateen-sailed *booms* as they drew away from the shallow lagoon for ports as distant as Zanzibar. Beneath my veranda lay grunting camels, left hobbled while their owners—tribesmen from the great sand seas of Arabia—shopped in the crowded bazaar.

At the beginning of summer I would listen to the chanting of boat crews as they rowed out of the lagoon for the start of another pearl-fishing season. And each fall, when flights of turkey-sized bustards came to the desert, the sheik's falconers would appear again, swaggering about the town with hawks perched on heavy canvas cuffs.

It was a strange world, and yet I came to feel as much fondness for the people of this sere and bitter corner of Arabia as I do for any I know.

Seagoing Brigands Preyed on Ships

Trucial Oman's seven sheikdoms count only about 80,000 people. Five of these "kingdoms" face north across the Persian Gulf toward Iran: Abu Dhabi, Dibai, Ajman, Umm al Qaiwain, and Ras al Khaima. The combined state of Sharja-Kalba lies also along this coast, although a part of Kalba adjoins the seventh, Fujaira, on the Gulf of Oman (map, page 71).

A century ago this "Pirate Coast" was shunned by mariners of Europe and Asia alike. Omani seamen, fearlessly putting to sea in shallow-draft Arab dhows, preyed on any ship that ventured into the gulf. They even plied their bloody trade as far afield as the Arabian and Red Seas.

Mercilessly the seagoing brigands put captured crews to death before plundering their ships. Taken captive themselves, some arrogantly demanded "the same immediate death we would have inflicted upon you."

To protect the interests of the Honourable East India Company, which had suffered nearly half a century of losses, the Bombay government attacked the freebooters' strongholds and forced the principal sheiks of the Pirate Coast to sign a treaty of peace.

Finally, in 1853, came the Treaty of Perpetual Peace with Great Britain, which is in force today. Thus the Persian Gulf was made safe for shipping, and from this truce the sheikdoms became known as Trucial Oman.

Exotic Bazaars Unchanged by Time

The town of Dibai, with a population of some 15,000, is Trucial Oman's chief commercial port. Its colorful, crowded bazaar, largest on the coast, is a lodestone that draws every Bedouin whose camel can get him there.

The walks I enjoyed most through Dibai's bazaar were in the company of Bedouin on their rare trips to town. One such was Mubarak, the Blessed One, who arrived after a 200-mile camel trek from his barren, sandy tribal ground. After hobbling his camels—the cord worn around an Arab's headcloth can be used for this purpose—he stopped to drink coffee with me. But Mubarak was impatient. The shops would close after evening prayers, and there was no time to lose.

Leaving his rifle but still wearing a bandoleer of ammunition and his *khanjar*, the wicked-looking curved dagger that is Trucial Oman's national weapon, he strode beside me under the palm fronds that shade the bazaar's narrow streets.

War Cries Ring Out as Desert Fighters Dance on the Sands of Trucial Oman

Like much of the turbulent Near East—seething with problems of nationalism, oil, and religion—Arabia's Trucial Oman has lived for centuries with violence. Today an uneasy peace, fostered by British influence, prevails in the seven sheikdoms, where the tribesmen's fiercely independent spirit often flared in raids and clashes.

Few Westerners have visited the hot, desolate Trucial Coast, fringing the Persian and Oman Gulfs. Author Codrai lived there six years, trusted by rulers and Bedouin alike; he came away with a remarkable record of daily life in the little-known principalities.

These tribesmen traveled with the author into a wilderness of dunes where danger was ever present. At night each man slept with rifle at hand, a cartridge in the chamber and safety catch wired back.

Here the men toss their weapons high and prance gleefully in a traditional Arab dance. Rifles and carbines decorated with silver glint against the sky.

↓ Even small boys sometimes wear a *khanjar*, the national weapon of Trucial Oman. Hamdun, a youngster of Dibai, brandishes his silver-mounted dagger in imitation of his elders.

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Dibai's teeming market has changed little through the centuries. Arabs, Iranians, Baluchis, Negroes, Pakistanis, and Indians sit in the doorways of little open-fronted shops before colorful bales of cloth worth thousands of rupees. Other merchants squat in the open, with only a few odds and ends spread on the ground before them (opposite).

Every few yards Mubarak would meet a Bedouin he knew, and they would touch noses in greeting—left side, right side, and left again. At one point a fellow tribesman took him aside, and I saw Mubarak part with a handful of Maria Theresa dollars.

"What would life be in the desert," he philosophized, "if one member of a tribe did not help another? It is a crime not to aid one's brother."

Stopping at a shop where the air was rich with sweet smells, Mubarak ran his fingers through cereals and spices. Sniffing coffee beans and biting grains of rice, he inquired about current prices.

Mubarak was so overcome by the sight of the clothes, the sweetmeats, the shiny cooking utensils, that I sped our pace through the bazaar for fear he would spend all his money. But then we reached a gunsmith, and there was no urging him on.

The Baluchi owner sat in the dark interior of his shop refilling cartridge cases. I knew the products well. His ammunition would fire with a disappointing bang, and the sluggish bullet would be followed by a shower of sparks.

But Mubarak had spotted a rifle he liked. Off he went to get his old one. Sometime later he told me that he had sold one of his camels to pay for his purchase.

Black Cloth Hides Bright Garments

In 1952 my wife came out from England to join me in Dibai, and for the first time my house began to receive visits from the female members of the local population.

With few exceptions, the women of Trucial Oman cover their faces with masks. Both outer garment and head covering are of plain black material, which conceals their brightly colored dresses and jewelry.

Apart from one or two privileged occasions, I was exiled to another room whenever the ladies visited my wife. There were, however, times we both enjoyed, when as many as 20 girls of a Koran class visited us with their female teachers (pages 88 and 94).

The exclusion of wives from public view has given rise to a class of professional dancers who embellish ceremonies and celebrations. In bright dresses and gaudy jewelry, but clinging to the customary face masks, they bring a touch of life to many parties.

Broadly speaking, the women of the desert have more character than those in the towns. Desert life is never easy, and Bedouin women are of hardy stock. I have heard of instances in which a woman has dropped back from a caravan with a friend, given birth to a child, and then caught up with the group.

The lives of Bedouin women are less strictly regulated than those of their town sisters. They mix with menfolk of near relationship and enjoy the campfire in their company. They tend goats and camels and are as knowledgeable in such matters as men.

Cardamom Flavors Bedouin Coffee

Arab hospitality is a byword in this part of the world, and the poverty of many Trucial Coast tribesmen has not lessened this charming attribute. Humble Bedouin invariably offered me a bowl of camel's milk, though it was all they had. And I have many times been feted at the forts of the rulers, whose retainers vie in the preparation of lavish meals.

The Arab's love of coffee is legend. The brew of Oman and most of Arabia is bitter and black, often flavored with cardamom, and served in cups like little crucibles.

"*Qahwah*," cries the sheik, and a household slave appears, carrying a brass pot in his left hand and two or three cups in the other. He pours a few drops into the bottom of a cup, but the guest customarily refuses it and motions the slave to the sheik, who likewise waves it away. This continues until the guest at last accepts the coffee in his right hand. After the usual three fillings the guest waggles the empty cup to denote that he has had enough. Foreigners unacquainted with this custom sometimes find themselves unable to stop the flow!

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Rupees and Fish Change Hands in Dibai →

This masked woman in the port's teeming bazaar offers a varied stock that includes needles, eye blacking, medical concoctions, thread, and even empty bottles and tins—scarce commodities in the desert.

Here a townsman bargains for a string of fresh fish. Desert people favor dried fish, including shark, because it withstands long journeys without spoiling.

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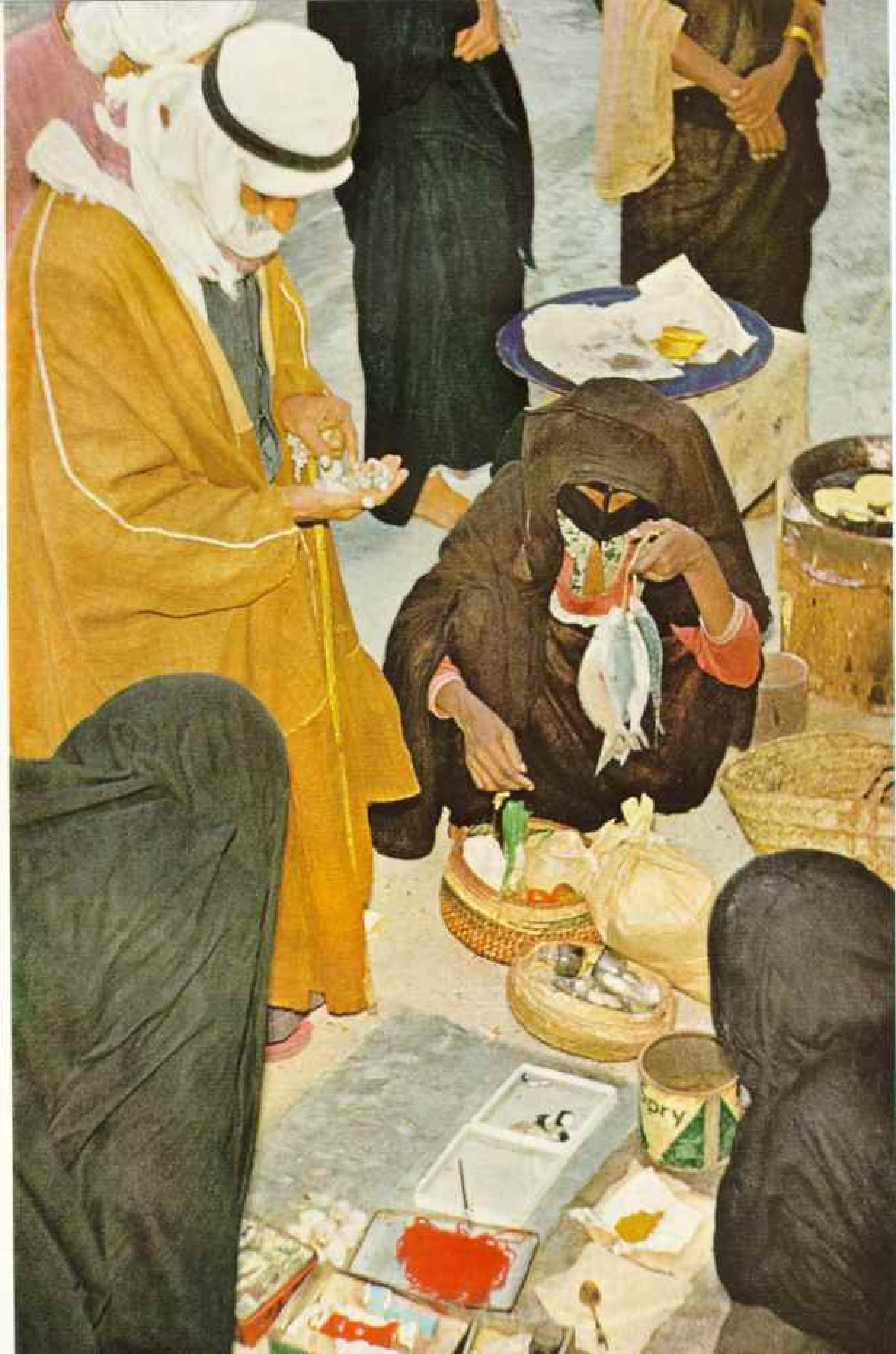

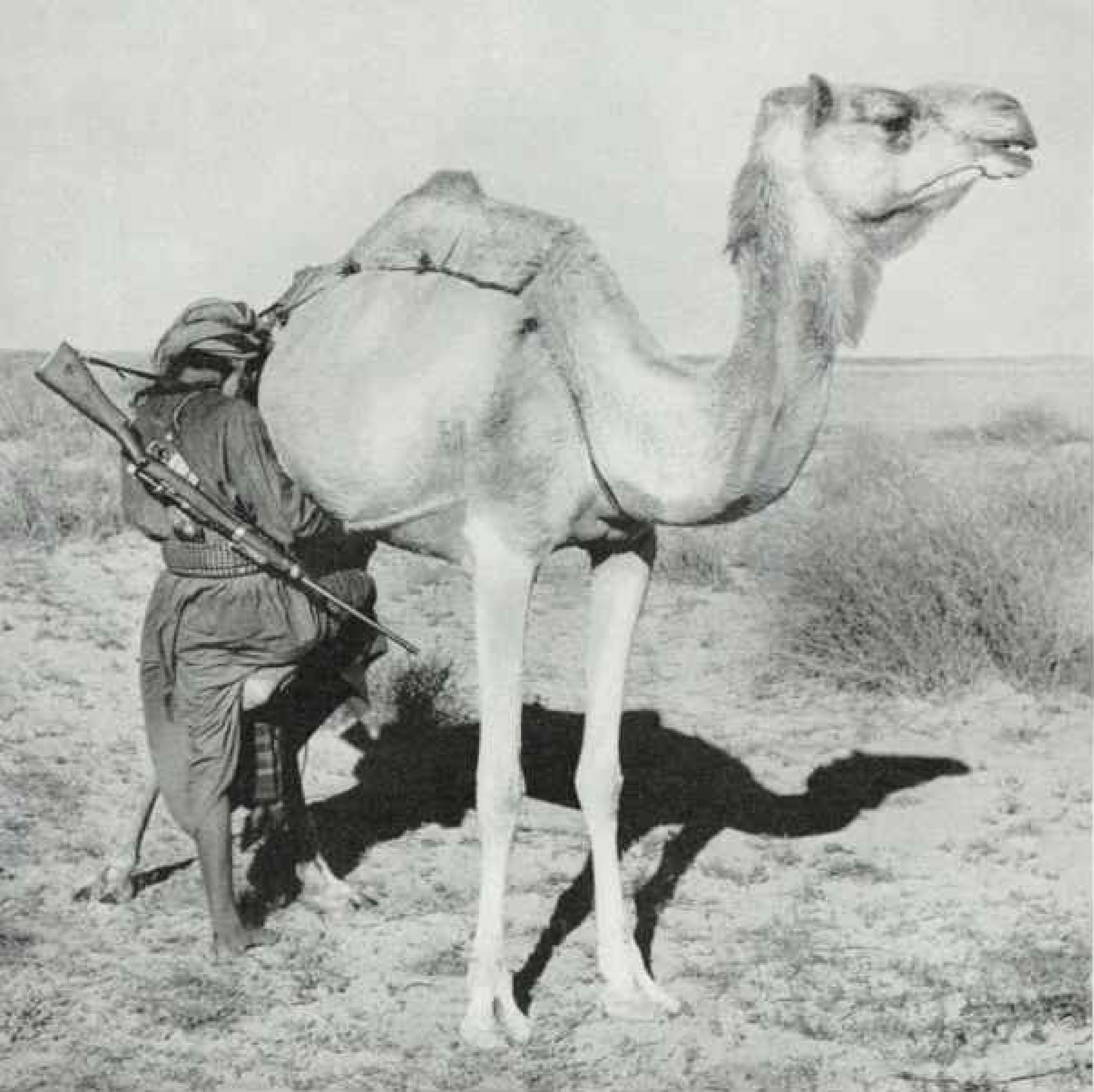

But this is a simple ceremony compared with the banquets offered by rulers of the sheikdoms. When the meal is ready, a slave spreads a white cloth over the Oriental carpets. A procession of men follows, each carrying a dish, which the ruler directs into position. Most impressive are the five-foot trays piled with rice, on top of which are goats or sheep. Young camels are sometimes served. There may be as many as a hundred side dishes: stewed meat in gravy, whole chickens, sweetmeats, and the inevitable dates.

Sometimes custom directs that the principal guest become the host, and he must invite the real host to eat with him! Picking up food with his right hand only, the guest has his fill, and he and the host amicably pass tidbits to each other.

"Praise be to God!" exclaims the guest, for, apart from an appreciative belch, it is not customary to thank the host personally.

Many Arabs smoke locally grown tobacco in very small pipes that allow only a couple of long puffs. Sometimes after a meal the whole of the assembled company will smoke from one pipe. On one occasion I was caught unawares, and my brier was taken from me and passed around for everyone's enjoyment.

When the guest shows signs of leaving or when the host wishes to hint that it is time for him to be on his way, rose water is called for, together with a small container in which a piece of frankincense burns on charcoal. The Arabs fan the fragrant smoke under their beards and headcloths and hold the container under their cloaks.

← Bowl on Knee, a Thirsty Herdsman Milks a Camel

Dried dates and camel's milk provide the desert Arab's staple diet.

Writes the author: "Deprive a Bedouin of camel's milk and he is a most unhappy fellow. He possesses uncanny vision and can detect a camel in milk at a great distance."

Desert protocol permits any traveler to help himself to the milk of a grazing camel if the beast has weaned her young.

Snake's Tail Cleans → a Sand-laden Eye

Wind-blown sand irritates and infects the eyes of desert dwellers. A tribesman will frequently run a bullet across his burning eyelids to cool them. This Bedouin uses the tail of a snake captured in the dunes to pick out the grit.

↓ Trucial Oman's Sheikdoms Hug the Pirate Coast, Once Infamous Lair of Sea Raiders

Only the vaguest boundaries separate Trucial Oman's seven sheikdoms (underlined); Sharja and Kalba form a combined kingdom. An estimated 80,000 live in this little-known part of the Arabian Peninsula.

© National Geographic Map

Drawn by Gilbert H. Emerson and Victor J. Kelley

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Street Dancing Marks → a Nine-day Fete

A mixed population fills Dibai, chief port of the Trucial Coast: Arabs, Negroes, Iranians, Baluchis, Pakistanis, and Indians. At public festivities the various nationalities tend to separate into little groups, whose members dance and play according to their own customs.

At one time during the author's stay in Dibai several scores of youngsters underwent ceremonial circumcision. Feasting, dancing, and camel racing preceded the ceremony.

This singing, swaying throng is composed of Baluchis, mainly from the coast of Makran.

Costumes stem from a trade that has flowed for centuries across the Persian Gulf. Headcloths like these come from distant Kashmir, striped skirts from India.

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Watchtowers Guard Dibai Against Surprise Attack

For generations intermittent wars between the sheikdoms kept the Trucial Coast in a state of tension and alarm.

Raiders most often struck in the interior, but occasionally they descended on a coastal town. They preferred to attack just before dawn, or at the height of a dust storm, when near darkness cloaked their movements.

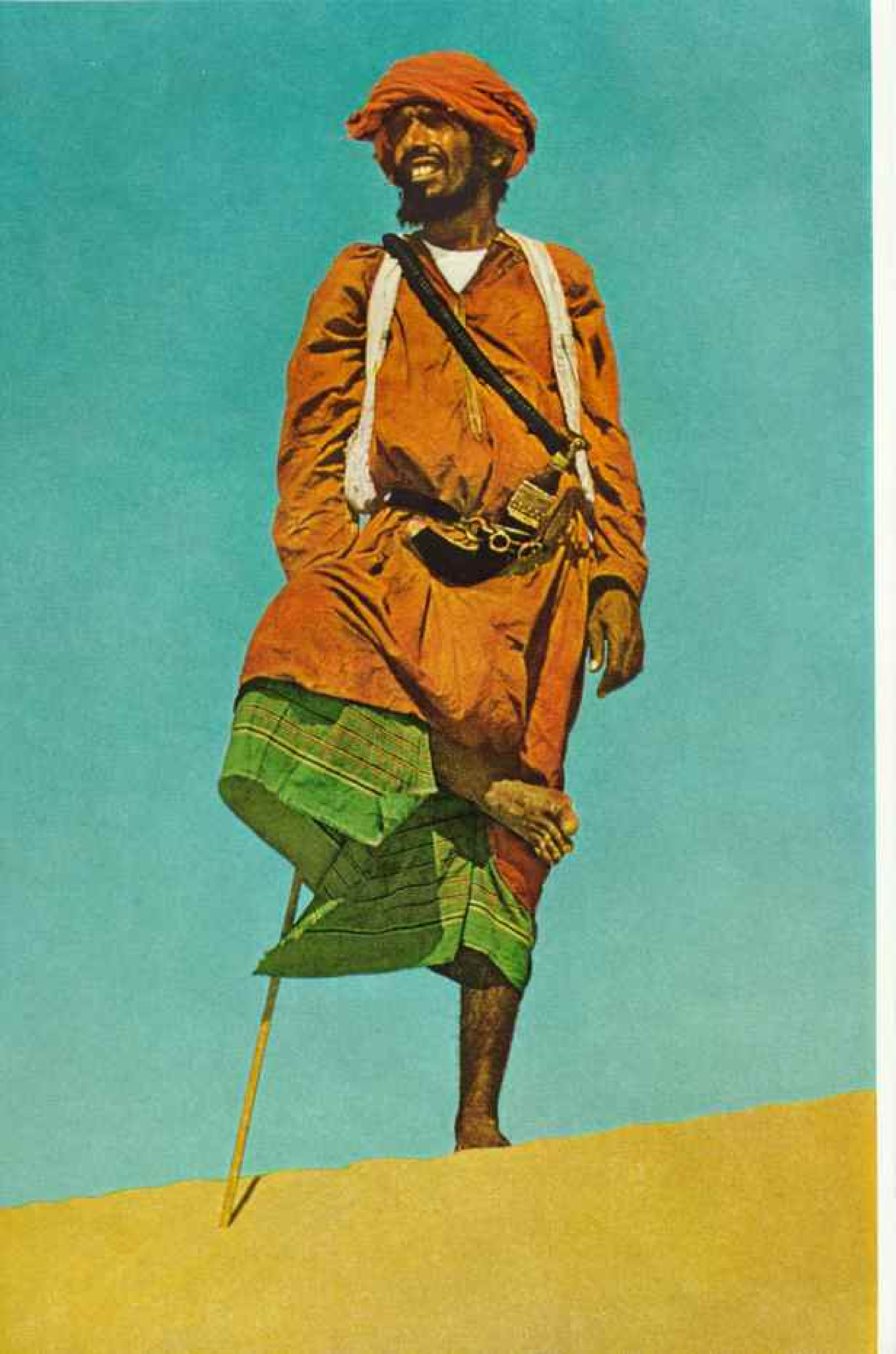
← Towers of coral or sandstone bound with gypsum mortar dominate the ports. Once brigands climbed towers like this to scan the gulf for merchant ships. A century and a half ago the pirate fleet boasted more than 850 craft, manned by some 20,000 men.

In times of siege, riflemen fire from the battlements. Ends of poles serving as floor joists dot the walls. Noselike projections ventilate the guardroom.

Red flags, with varying amounts of white, are used by the rulers of all seven coastal principalities. Middle banner of the three borne by this holiday crowd serves no function but decoration.

→ A canopy of palm leaves provides shade for the sentry on a round tower surmounting the Dibai jail.

Like a Biblical Plague, a Swarm of Locusts Fills the Sky Above Dibai



But feasting and entertaining are far from being the only features of an Arab's life. When Ramadan, the Moslem month of fasting, comes, nowhere is this tenet of Islam observed more strictly than in Trucial Oman. From the moment it is light enough to "distinguish a white thread from a black thread," Moslems must fast, foregoing until sunset all food and drink.

Falconry Survives in Desert

Falconry owes its origin to the East, and nowhere is this ancient pastime more enthusiastically enjoyed than in Trucial Oman.

The season begins in the fall. The falconers, with their hooded hawks perched arrogantly on canvas cuffs, never leave their charges, and new birds quickly become familiar with their masters (page 93). While the birds are being trained, cords are attached to their legs, and all their food is given them from inside the falconer's cuff. Later, when they can be relied upon to return when called, they are flown without a cord. Should a hawk escape, a pigeon, its favorite delicacy, is used to lure it back.

At last the day of the hunt arrives. A tribesman has rushed into town to inform the ruler that he has spotted tracks of game, usually bustard, in the sands. Immediately all is excitement. The Bedouin is rewarded for his information, the hunting party is chosen, and preparations are made. Affairs of state are left in abeyance as ruler and retinue disappear in clouds of dust.

The end of the day finds the sheiks and their falconers gathered around the campfire and sipping coffee as they boast of the achievements of their birds. So associated do the falconers become with their charges that a man will pull away from the campfire and sit silent in the night if the others chaff him about an inept performance by his hawk.

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← **A Bedouin Stands Storklike, Seeking Relief from Blazing Sands**

Navigating by eye and memory, the Bedouin picks routes through Arabia's wastes where one dune looks like another and wells are sometimes hundreds of miles apart. Sand temperature soars to 170° F.

Leaning on the stick with which he guides his camel, Obaid al Mutawwa surveys the arid wilderness. Like most desert Arabs, he wears a beard. On his beard oaths are taken, threats are uttered, and greasy fingers are wiped after a meal.

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Another sport of Trucial Oman, particularly favored by the sheiks of Dibai and Sharja, is camel racing. One such event, which was typical of many I have seen, began shortly after dawn. About a dozen camels, with riders mounted precariously on their rumps, set off at a gallop across the desert. There was no advance organization; all at once the race simply started.

The sheiks and I, with the other spectators, rushed for a group of waiting trucks, and the overloaded vehicles set off in pursuit of the camels. Bumping over the rough ground, we had a magnificent view of the race from this lurching grandstand.

The idea seemed to be to drive immediately behind the camel one was supporting. Once in position, a few yards off the beast's hindquarters, everyone in the car would make as much noise as possible to spur it on. The horn was blown continuously. Everyone shouted and slapped the sides of the car, and some fired their rifles.

Near the finish line the din increased as a swarm of boys wielding camel sticks joined the chaotic mixture of racers and watchers. Some of the cars were so close to the beasts that they seemed to be pushing them.

At the finish I was so busy swerving to avoid boys and camels that I could not identify the winner. This was soon apparent, however. The victorious camel was led into the fort, where the women sprinkled him with rose water and plastered his head with henna.

Drums Hypnotize Dervish Dancers

In Dibai I have witnessed many unusual ceremonies, the strangest a dervish rite performed by a mystical Sufi sect of Islam. It took me five years to make arrangements to see it. Not surprising, perhaps, as only a few Arabs had witnessed it, and many orthodox Moslems frown upon the activities of this sect.

The ceremony took place at night. It was conducted by a religious leader, an old man whose beard was dyed with henna, assisted by his two sons. The performers, known as "apprentices," were mainly Negroes, but there were Arabs, Iranians, and Baluchis among them. They seated themselves on carpets spread under the palm trees, the participants arranged in two lines facing each other (pages 86 and 87). Those in one row held small hand drums, which they warmed over little charcoal fires. At their head, with a sword and several stilettos on the ground before him,

← Slow Death from Thirst Awaits Travelers Lost in This Sea of Sand

The author was the first Westerner to make a thorough exploration by motor of the Jiwa district, 200 miles from the Persian Gulf.

Here a truck belonging to the Sheik of Abu Dhabi leads Mr. Codrai's party toward Jiwa. Oversized, underinflated tires carry it across the crumbling surface.

Beyond the horizon lies Saudi Arabia's Rub' al Khali, or "Empty Quarter," a forbidding Texas-sized wasteland stretching 750 miles.

Jiwa borders this desert region. So too does the much-disputed Buraimi oasis. Saudi Arabia and the Sheik of Abu Dhabi both claim Jiwa as well as Buraimi, whose springs, palms, camels, and guides hold a key to oil prospecting in large areas.

←Page 78, lower: Sometimes Bedouin burrow 60 feet or more to reach water. Here a trickle appeared at a mere 12 feet.

↓Bedouin give water to each other and to travelers as a sacred duty, not as a gift.

"*Alhamdu li'llah!*" (Praise be to God!) this thirsty nomad exclaims after drinking his fill.

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Improvised Showers Refresh Travelers at a Desert Well

High spot in any journey across the dunes is arrival at a well. Moslems must wash before praying; if they have no water, they wash in sand.

A guide and his son, members of the author's party, enjoy these ablutions.

sat the leader. He raised his hand for silence, and the ceremony began.

In time to the slow, loud beats of the drums, both rows began chanting religious verses in Arabic. Then they joined hands, swayed from side to side, rose to their knees, stood upright and looked upwards, as though appealing to the heavens, and continued such movements for a considerable time, singing to the rhythm of the drums. This melancholy singing, combined with the deafening resonance of the drums, was the most impressive sound I have ever heard. It had an even greater effect on the assembled company, many of whom were distinctly glassy-eyed. It lasted for about two hours.

Then the leader took his sword from its scabbard and rose to his feet. His two sons silenced the performers, ordered them to rise, and arranged them in a circle around the leader. Everyone linked hands. The drummers beat an even slower rhythm, and, swaying from side to side, the performers filled the night with a strange sound: first a high-pitched guttural noise, as they drew in their breath, followed by a sharp grunt. As they proceeded, the high-pitched sound predominated and became a most woeful sighing—a mournful, plaintive cry, all the more eerie against a background of night. The perspiring performers, bowing and swaying with as much vigor as when they began, wore vacant expressions.

The leader had been tapping the ground with his sword, but suddenly he pointed it at one of the performers, a boy of about fourteen. Still swaying, the apprentice lurched toward the leader, who picked up a stiletto and drove it through the lad's shoulder. The boy continued to sway back and forth for several minutes before the stiletto was withdrawn and he rejoined the circle. There was no trace of blood, although the point of the weapon had protruded from his back.

The leader pointed to another performer (this act of pointing signifying immunity from harm), and the apprentice drove a stiletto into his own shoulder. The blade was withdrawn and he was handed the sword. In time with the drumbeats he slashed at his back, bending over and raising the sword above his head. Then, holding both ends of the sword, he several times jabbed it against his naked belly.

(Continued on page 89)

Winter Rains Sprout → This "Desert Orchid" in an Arid Waste

Only a few inches of rain fall each year on Trucial Oman. But when water comes, vegetation springs swiftly from the sands. Then herdsmen safely range far inland, subsisting on camel's milk and dates while their animals crop the new growth.

Parasitic *Cistanche lutea*, a member of the broomrape family, grows from the roots of desert shrubs. Mufarah, admiring this yellow bloom, wears a European jacket.

↓ Armed Bedouin Bows Low for a Drink

As if in prayer, this nomad kneels to reach the water in a goatskin bucket just hauled from a well.

Some desert waterholes taste sweet, others salty. Some yield water so brackish and foul-smelling that it must be forced down the throat of even a thirsty camel.

A tribesman never goes abroad unarmed. Alert against raiding parties, he keeps a well-filled bandoleer at all times.

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↑ **Graceful Lateen Sails Speed a *Kutiyah* Home from the Sea**

Carrying wooden poles, spices, coconuts, and cloth, an Arab two-master returns from Africa after a 10-month voyage.

↓ **"Grandsons of Sindbad" Learn Seamanship with Toy Boats**

These boys may become sailors or pearl fishermen. Camel sticks serve as masts for their homemade vessels.

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↑ Chanting as They Tug, Arab Fishermen Draw a Netload of Sardines from the Persian Gulf

One end of the net was anchored to shore; the other was loaded into a small boat. When a school was sighted, the boat circled it and raced toward the beach. Here all hands have been summoned to haul in the catch. ↓ Thousands of sardines flap vigorously on the sand, the noise rising above the excited chanting of the men. Dried in the sun, the fish will be fed to camels or serve as fertilizer.

↓ Masked Women Journey Homeward from Market on a Pathway of Tide-smoothed Sand

Trucial Oman's only roads are dusty camel trails or tracks worn by motor vehicles.

Local Moslem custom requires that women be covered in public except for hands and feet; they wear a mask with eyeholes rather than the veil commonly seen in other Arab lands. These women stride erect under heavy loads; fish or dates sold in Dibai paid for their purchases.

Entranced Dervishes Slash at Their Bare Bodies with Swords

Devotees of this mystical Sufi sect cut and stab themselves, believing that Allah protects them from harm. Few Westerners have witnessed the ceremony; most Moslems disapprove the practice.

← Page 86: Lengthy chanting precedes the rite in Dibai. Drummers tune their instruments by warming them over burning charcoal. Occasionally participants put embers into their mouths.

→ Hypnotized by the din of drums and voices, a dervish strikes his back with a sword. Welts may appear temporarily; real injury rarely results.

↓ Intent on proving his immunity, a disciple rhythmically strikes the sword blade against his belly. Incredible though it seems, the author earlier saw the man drive a stiletto through his shoulder, but no wound shows.

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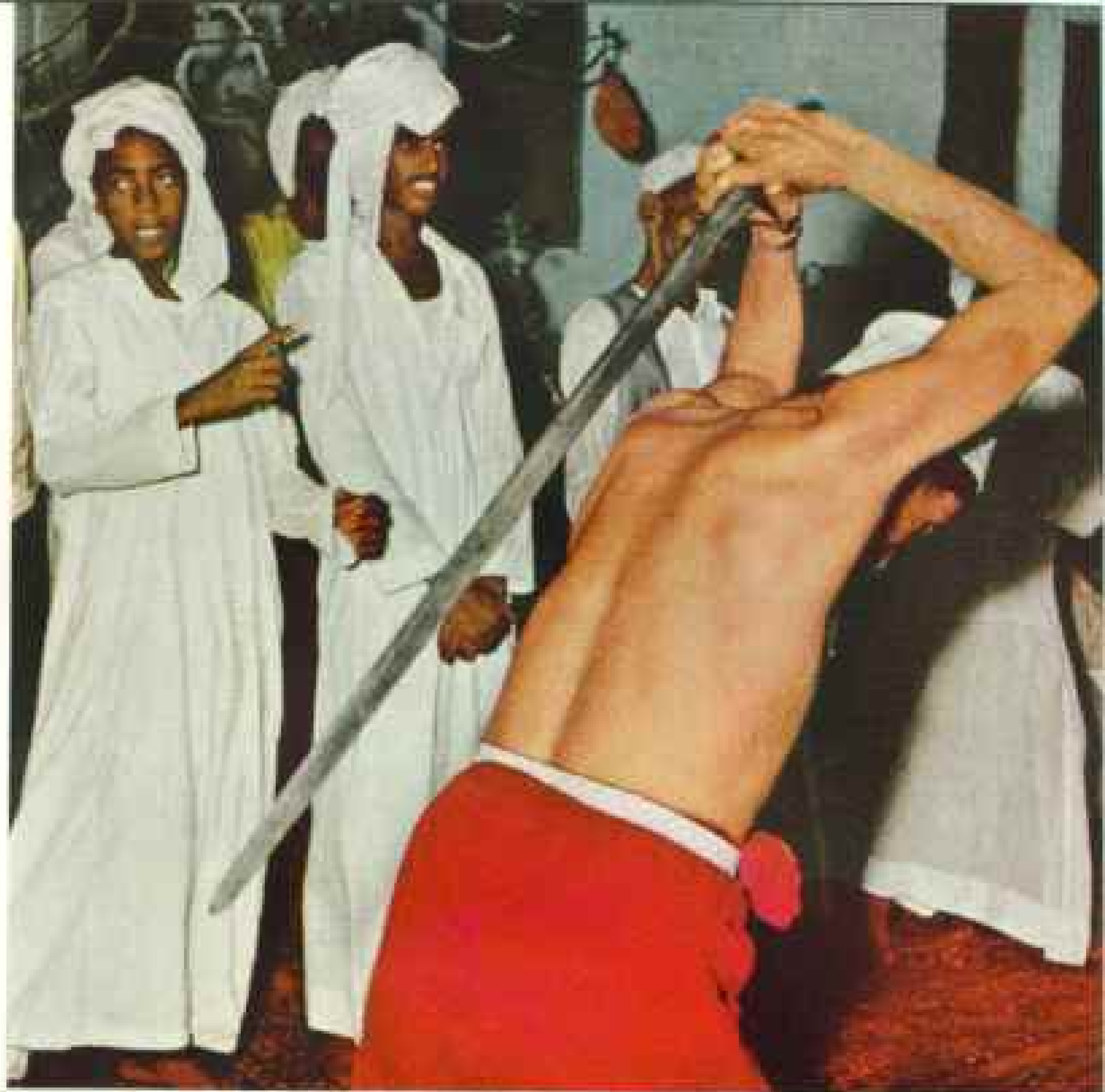

← Solid Gold Coins Adorn Young Dibai Aristocrats

Until they are 12 to 14, girls of the Trucial Coast may publicly display not only their faces but also bright fabrics and gaudy jewelry. After that, they wear dark outer dress and make no public show of their wealth.

Yet jewelry forms part of a woman's dowry, and she often wears her finery at home or when she visits the women's quarters of other families. Her husband continues to buy gold and silver ornaments for her as a form of savings as well as adornment.

These young relatives of the Dibai ruler pose proudly before their teacher, who wears a mask but, being a domestic slave, may let her jewelry be seen. Girls' feet are dyed for toughening as well as for decoration.

↓ A Shy Pupil Hides Behind Her Koran

A recently opened government school for boys in Sharja marks a new era in education for the Trucial Coast. Heretofore only a few children received formal training. Those who did —called *koranis*—were usually limited to a study of the sacred book of Islam.

Here a girl in a Koran school recites a verse of Moslem scripture; her classmates listen with serious faces.

© National Geographic Society

One by one, half a dozen others repeated his performance.

My attempt to photograph the ceremony faltered as several of my flashbulbs failed. I turned to the Arab who was assisting me, to find him violently shaking, his lips quivering. Used bulbs were mixed with the unused ones, and he was haphazardly handing me any one he happened to pick up as he stared blankly ahead. I had him led away.

The next performer to enter the circle drove in the stiletto and, when he withdrew it, a trickle of blood ran down his chest. This was the first sign of any injury that I had seen. After the apprentice had beaten himself with the sword, without suffering further injury, the leader rubbed a handful of sand into the wound. When I saw this person later he was still bleeding.

After one more youth had entered the circle, the leader stopped the ceremony and everyone fell exhausted onto the carpets, where they were served coffee and sweetmeats. Then they disappeared into the night.

Demonstration in Author's Home

There was a sequel to this ceremony, two months later. An old Iranian, whom I had helped earlier when he had been ill, came to my house and said that he had heard that I was interested in the *mureed* (apprentice) ceremony. In his trembling hands he held a stiletto. The other people I had seen were nothing, he informed me, and he would repay me in the only way that he was able. The leader I had seen had been his pupil many years ago.

Without further ado, and before I could stop him (for I was uneasy lest his intentions should prove too much for his frail body), he drove the stiletto into his shoulder and stood there trembling. When he removed it, I examined the spot and saw a dark mark, about the size of a dime, where his skin had been broken. Lower down was a cluster of small scars. No, he replied in answer to my question, they were not caused by stilettos. They were the marks of revolver bullets fired at him by a former leader!

Many times I made reconnaissances on wheels into the hinterland, as well as one or two by camel, during my stay in the Trucial sheikdoms. Among the most exciting of these were trips to the westernmost of the Jiwa villages, inland from the town of Abu Dhabi.

Traveling westward along the coastal strip from Dibai, our trucks passed through a bleak land of mirages. One can journey along this coast for hundreds of miles without finding sweet water. Unrecorded numbers of Moslem pilgrims have perished in this wilderness on their way to Mecca. Sun-bleached camel bones are the only milestones.

About 150 miles west of Dibai our route turned inland. Here the guide took over, and the convoy of three vehicles slowly made its way through the dunes. Despite low-pressure tires, all the vehicles were sometimes stuck at once in the white, powderlike sand and had to be dug out.

Shade temperature rose to 120° F. When pushing the vehicles, we had to hold the burning metal with pieces of cloth.

Three days later we reached the mountains of sand that envelop the Jiwa settlements. Some of the giant dunes in this range are 500 feet high (pages 78 and 79).

It was here that I heard the most amazing of all desert sounds—the roaring of sand. Encamped at the foot of one of these high dunes, I heard what sounded like a low-flying aircraft and instinctively glanced upward. The Bedouin laughingly pointed to the dune and explained that the rumbling was caused by sand sliding down its steep face.

It is in regions such as this that the bearded Bedouin is frequently found traveling alone. No, never alone, he will tell you. He always travels with God. Five times a day the devout Arab kneels on the cruel sands and pledges his faith.

Camels Make Life Possible

On occasion I have encountered a young boy many miles from the nearest tent, grazing his camels in some desolate wilderness. The key to his existence would be on his head, a small metal bowl into which he would milk the camels and so provide his food and drink. Wherever he is, the Bedouin depends upon camel's milk as the staple of his diet.

The camel, apart from its use as a steed and as a load carrier, furnishes many benefits for the Bedouin. Its milk and meat provide food. Its dung is mixed with herbs and used to dress wounds; dried, it becomes fuel. Camel's hair is woven into a coarse cloth. On rare occasions the animal's reserve of water can be used to save the life of its master. When desperately thirsty the Bedouin thrusts his camel stick down the beast's throat and drinks the water it regurgitates.

It is usually possible to know when one is approaching a well by an increased amount of camel droppings. Here one finds what is probably the most active form of life in the desert. Black scarabs work in the heat of the sun, pushing balls of camel dung up the slopes of a dune. Inside the ball the scarab has deposited an egg; rolling the pellet down the dune compresses the dung around the egg. Eventually the beetle buries the ball.

Other residents of the sands are the *dhabb*, (a large, barb-tailed lizard), small yellow snakes, and scorpions and their enemies, large, hairy-legged, spiderlike creatures we call "gerrymanders." Occasionally one encounters a lark with a most attractive whistle.

Nowhere in the Arab world is the date palm more important to life than in the isolated Jiwa communities (page 102). Some of the dates are eaten fresh. The remainder are packed in *tamr*, which is the staple diet until the next crop ripens.

The groves lie hidden in thick belts of dunes, crowded close to water. The wells,

↑ **Hypnotized Performers Chant and Sway as Stabbings Climax Dervish Rites**

Oriental rugs carpet the earth for a display of faith by this Sufi sect. Drums throb; members loudly extol Ali, Mohammed's cousin, whom they honor as their founder. Suddenly the leader points to a disciple, who lurches forward. With one powerful thrust an assistant drives a stiletto into the man's shoulder (pages 77 and 86).

→ Another devotee, a young boy, takes his turn. With blade driven completely through his shoulder, he sways glassy-eyed for several minutes. Then the weapon is withdrawn, and he rejoins the circle.

ranging from sweet to brackish, vary in depth from about 4 to 60 feet. Goatskins are used for hauling up the water.

Many of these groves are imperiled by the relentlessly moving dunes, and lines of fronds have been stuck in the sand to hold back the enemy. Some settlements are occupied only temporarily by nomads who come to gather the date harvest.

On arrival at a settlement we would stop to refresh ourselves at one of the wells beneath the sand cliffs. If there were people in residence, there would be an immediate rush from the dunes above to bestow on us whatever hospitality the humble land afforded. If camels were grazing in the area, women or children would arrive with bowls of warm milk. If there were goats, two or three would be placed before us as gifts.

Mortar Rings a Welcome

At one settlement, figures carrying coffeepots descended on us from each of the houses, and we quickly had a dozen pots simmering on our fire. One old man surprised even his neighbors by producing a small bottle of brilliantine. With great ceremony he placed a little on the head of each of his guests.

If we arrived at a settlement early in the day, we would accept an invitation to shelter from the sun in one of the palm-frond houses. Our host and his family would push aside

their few household possessions and spread a blanket for us over the floor of sand. Then he would convey his pride in having guests by pounding coffee beans in a large brass mortar. With every third or fourth stroke his pestle would hit the side of the mortar and ring forth the joyful message. Then, with great relish, he might open a little leather pouch and add a few seeds of precious cardamom.

Within and without, Jiwa's houses are of the simplest design. Pegs around the walls hold the few necessities of life: a rifle, ammunition belt, dagger, cloak, waterskins, camel saddles, and ropes. A large tin, buried in the sand, serves as a stove. Outside are little shelters for the goats.

Another feature of Jiwa is its salukis. As one approaches a settlement, these greyhound-fleet hunting dogs rush barking from the houses; if the sun is high, they go leaping home again, to lie on their backs in the shade, cooling their paws in the air.

Locust attacks, which devastate the palms and ruin the date harvests, are dreaded by the people of Jiwa. For two years most of the groves had been ravaged by the insects, but one old man told me that his palms had escaped. Had he burned fires under them? Not at all. He had sat beneath his palms and read aloud from the Koran!

Desert Dwellers Are Pearl Divers

One of the surprises of these isolated desert settlements is to learn that some of the tribesmen are pearl divers, and a few own boats. There has been a considerable decline in the pearl trade in recent years, but some of the settlers still travel once a year to Abu Dhabi or Dalma Island, where they spend the season on pearling vessels. It is a hard existence, but they move through life with an unhurried pace and a philosophical acceptance.

When I eventually returned to the coast from Jiwa, I saw Dibai through the eyes of a Bedouin. It was no longer the quiet little seaport I remembered, but a massive city, a center of life, and a great storehouse for the necessities of desert existence.

Another trip took me into the barren mountains behind Ras al Khaima. Few Westerners had ever visited this region, and little was known of its inhabitants, an isolated hill people called the Shihuh.

On the day our reconnaissance began, fighting broke out between the Shihuh of Ash Shamm and Bu Bakha, to the northeast of the town of Ras al Khaima. The security of the whole area was affected.

Throughout the region the Shihuh were on the alert. Even though we were accompanied by the ruler of Ras al Khaima, it took much time and patience to negotiate our entry. The Shihuh were suspicious, yet once won over they immediately became hospitable and most friendly. However, they were in a bad way. The wadi had long been dry, and their small flocks of goats could no longer find adequate grazing.

The ruler and I were solemnly entertained at a meal that consisted of a small pile of rice topped with two fried eggs. Some 15 people sat down, yet such were their manners that the eggs remained uneaten at the end, although a little darker in color for having been handled and passed around.

Shihuh Speech Is Difficult

Slowly we picked up a little of the Shihuh language, which is not Arabic, although most of the tribesmen on the fringes of Shihuh territory speak a guttural form of Arabic, through clenched teeth.

An odd thing is the way the people of these hills describe one another as "wild." The men in the next wadi are wild, one of them would say. He himself would be clothed in a loincloth held up by a bandoleer of wicked-looking ammunition, with a knife thrust in his belt. In one hand would be a carbine, in the other a small ax!

In appearance the Shihuh are swarthier than the Arabs of the plain. Many of them are fishermen and carry their sun-dried catches to their families high in the hills.

Gradually we learned something of Shihuh customs. One of these is intended to make anyone marrying a Shihuh girl demonstrate his keenness for the union. The Shihuh sometimes live in caves, otherwise in roofless houses of piled rocks. The girl remains inside the shelter while a male relative waits outside the entrance with a club. The demonstration of ardor comes when the bridegroom attempts to make his way through the guarded door to see his beloved!

Some of the Shihuh were resentful when I first pointed my camera at them. But once they realized that after every 12 exposures I threw away the tin in which the film had been packed, they were as enthusiastic as I about exposing film.

(Continued on page 101)

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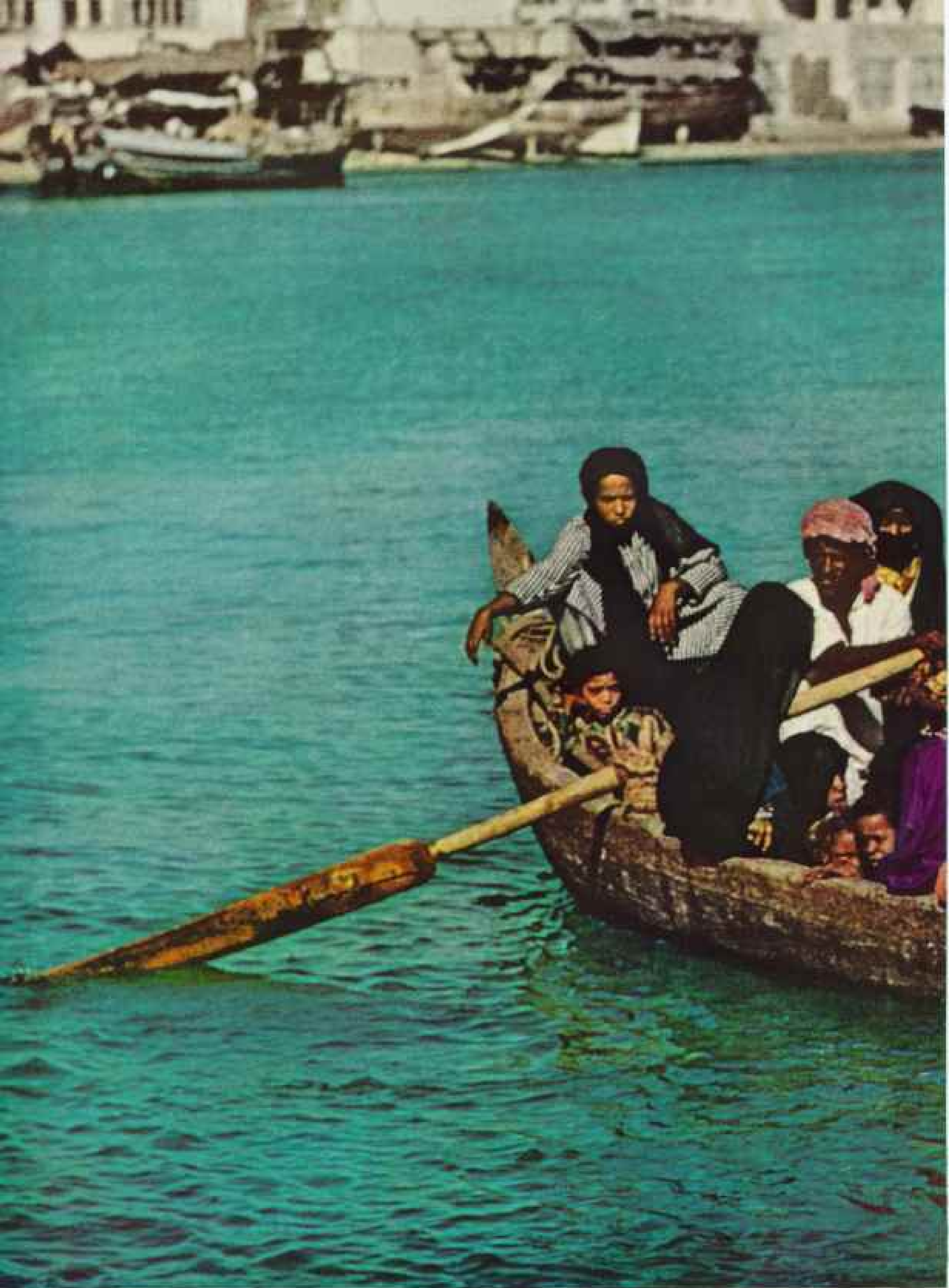
Bearded Falconer and the Saker Hawk on His Cuff Appraise Each Other Coldly

Bedouin hunters trap wild hawks and train them to catch bustards or hares. A falcon trainer carries the new bird wherever he goes; when he sleeps it perches beside his head. Prize birds may make 10 kills a day.



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Shallow Salt-water Inlet, Once a Pirate Haven, Divides Dibai Town Down the Middle

Freebooters of old retreated to the lagoon after daring raids on coastal shipping. Gaily arrayed schoolgirls and veiled chaperons crowd this boat. A slave girl crouches on the bow behind the oarsman.

Touring Both Halves of the Port, Koran School Pupils Show Off Finery and Learning

Ashore, two honored graduates will chant religious verses while classmates respond, "Amen, amen." Merchants and prominent householders will give the teachers small presents. Girls wear their mothers' jewelry.

Pirate Fleets Are Vanished, but the Sea Still Takes a Toll →

A reef guards each of the inlets on which Trucial Oman's principal towns are situated. Shallow-draft pirate vessels in days gone by easily crossed these barriers, while pursuing British vessels were forced to stop at least a mile out. Omanis still design their craft to navigate the shallows safely, but occasionally a ship comes to grief when the *shamal*, prevailing wind of the Persian Gulf, drives it ashore.

This boat, carrying rice, sugar, cloth, and wooden poles used in housebuilding, went aground off Dibai. Because wrecked craft are sometimes pirated, the crowd on the beach includes several guards posted by the ruler.

Eventually villagers salvaged almost all the cargo, although it was in a ruinous condition. Waves later destroyed the ship.

Many lives are lost each year on the gulf; in 1950 nearly 200 people drowned during a severe windstorm.

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← Guard of Honor Escorts a Visiting Potentate Across Dibai Inlet

Petty wars and blood feuds have frequently roiled relations among the Trucial Oman states.

Desert warriors often hire out as soldiers of fortune; rulers compete for their support with gifts and hospitality.

Succession by force is common. Of the past 15 rulers in one sheikdom, 8 were assassinated and 4 violently deposed.

Until recently the sheiks did not dare travel from one state to another without the protection of huge retinues.

Here the bearded Sheik of Ajman crosses Dibai inlet on his way to visit the author. As peace prevails, his armed stalwarts serve merely as an honor guard.

Square ventilating towers in the background rise above the houses of Dibai. Open on all four sides, these primitive air conditioners capture welcome breezes and direct them into windowless rooms below.

Beached boats await scraping and a protective coating of shark oil mixed with lime.

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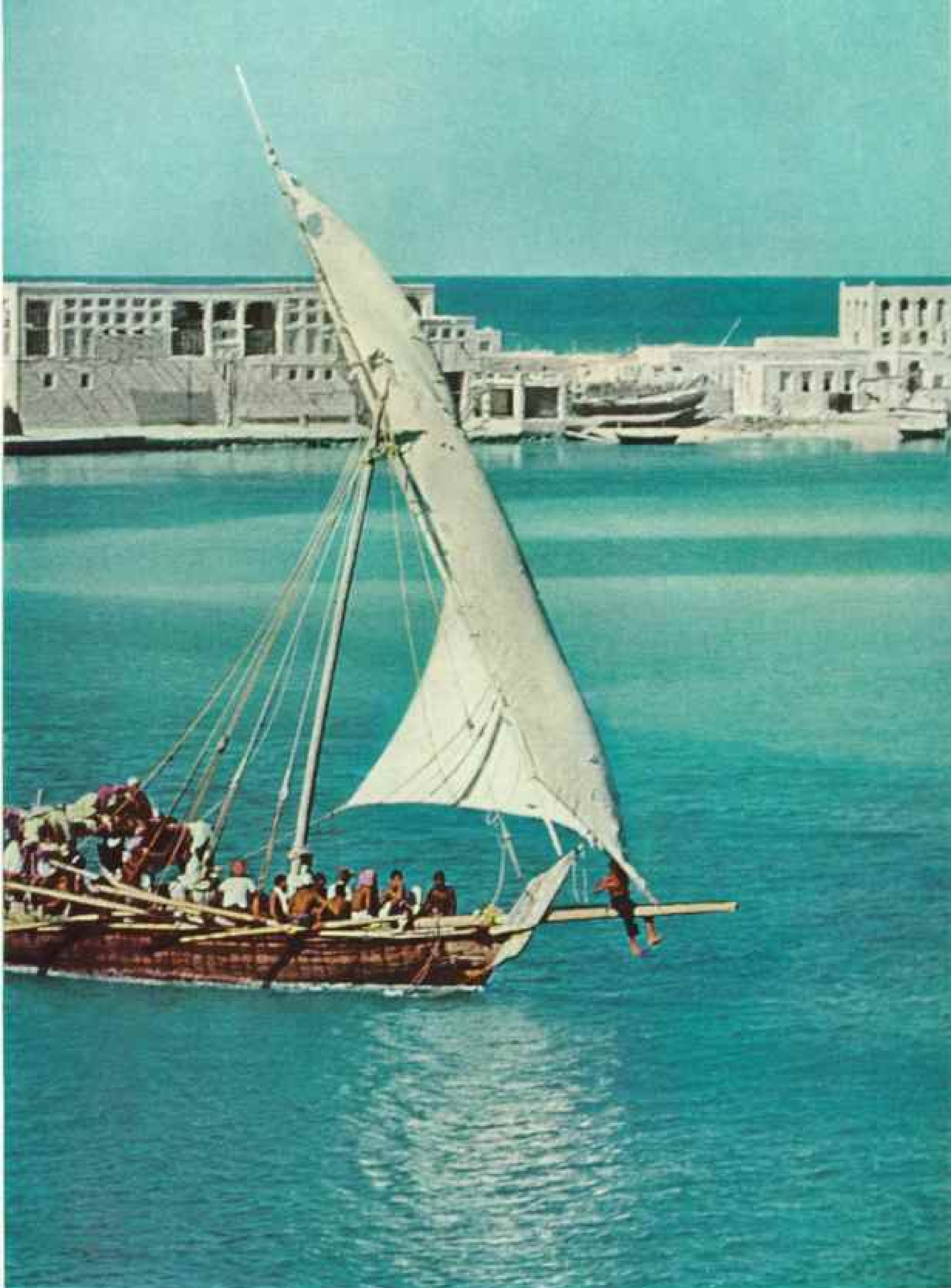
Neither Sharks nor Stinging Sea Nettles Halt the Rugged Pearl Diver

Divers, using only a nose clip made of bone or wood, descend as far as 100 feet; exceptional dives last more than two minutes. White suit (upper) protects against irritating contacts with jellyfish.



Gleaming Gems Worth a King's Ransom Have Come to Dibai in Boats Like This

This packed *jalibut* returns from Persian Gulf pearling banks after months at sea. The divers, each going under water 70 times or more, brought up as many as 7,500 shells a day. Owner, captain, and crew will divide the profits.

© National Geographic Society

Palace Guards Stand Ready to Protect a Prince with Rifles, Knives, and Their Very Lives

This son of Fujaira's ruler holds a powerful German air rifle; his father's retainers carry Czech and British weapons. The boy is about seven; his exact age is uncertain because Omanis rarely count birthdays.

We penetrated deeper and higher into the mountain range. Here were few signs of life, though we frequently heard the Shihuh crying out to each other, an eerie sound that echoed around the wadis. Occasionally a figure would appear silhouetted on a near-by peak. He would observe our movements and suddenly be gone, to warn of our approach.

Eventually we reached an area where the foothills meet the red sand dunes of Ras al Khaima. Here we were back with the Omani Bedouin. At this stage the reconnaissance necessitated bringing two tribes together, the Khawatir and the Mazaria, and of course both stayed for dinner. I had ordered five goats killed for the ruler of Ras al Khaima and his followers. It was nearly sunset when I realized that we had more than 200 guests. But our smiling cook seemed unperturbed.

When I sat down with the first group of guests, the reason for his confidence became apparent. He had saturated the rice in a rich fat that dried hard and yellow on the backs of the fingers. It was possible to eat only a few handfuls before feeling ill. Consequently, there was plenty for all.

Few Villages Break Desolation

The shores of the Trucial Coast consist mainly of long stretches of bare, uninhabited beach, broken by occasional fishing villages composed of little clusters of frond huts. To the northeast the shore disappears entirely, and bleak limestone hills dip steeply into the sea. On the coast of Fujaira I have seen another use the Arab makes of his precious date palms: small uncalked boats made entirely of bundled fronds, in which the owner sits half-immersed in water.

During the winter the villagers catch and dry little spratlike fish that are used as fertilizer and food for livestock. The whole village takes part, the men hauling the great nets to shore and the young and aged gathering and drying the catch (page 84).

When my stomach has been able to withstand the uncertain motion, I have enjoyed journeys along the coast in local craft. It is a sign of the times that the most popular of these is becoming the "launch"—an English word now assimilated into Arabic. Usually these are native craft into which a gasoline engine has been fitted. But most of them retain their lateen rigs, with masts at rakish angles, for the older Arabs are still a little distrustful of the engines.

The most picturesque of the Arab craft is the *boom*, a twin-masted vessel that bears as many as five sails. Built of sturdy Malabar teak, the boom ranges the Arabian Sea as far as Zanzibar. Dates and dried fish, particularly shark's meat, are the principal cargoes from the Persian Gulf. On the return it carries poles used in building palm-frond huts, spices, reed mats, and many other things that a more fertile land provides.*

Arab Sailors Trust in Allah

The navigation of these vessels is frequently a precarious thing. Sometimes the captain's only aid, other than his compass, is a simple sextant with which he takes bearings each day at noon. Living such hazardous lives, the sailors, like the men of the sands, are fatalists whose entire faith is in Allah.

On one of the trips I made around the peninsula, a *shamal*, the prevailing northwesterly wind of the Gulf, caught our sails, and we ran for the shelter of Abu Musa, the Father of Moses. As we lay in the lee of that island, the captain told us of a storm the year before, when an unexpected shamal had taken the lives of 200 people.

Beyond Abu Musa, in Oman territory, Shihuh fishermen approached in little canoes, offering fish for sale. On the so-called Island of Goats a Shihuh shepherd gravely told me that his animals stood in the sea and sucked salt water up through their front hoofs when they needed moisture!

Chanting Crews Ready Pearling Craft

Every summer Dibai and the other little ports along the Trucial Coast hum with activity as chanting boat crews prepare for the pearling season. The Persian Gulf banks have been fished since earliest times and have yielded some of the finest pearls in the world. Farther along the coast this ancient trade has been all but extinguished by the prosperity that oil has brought to other states.

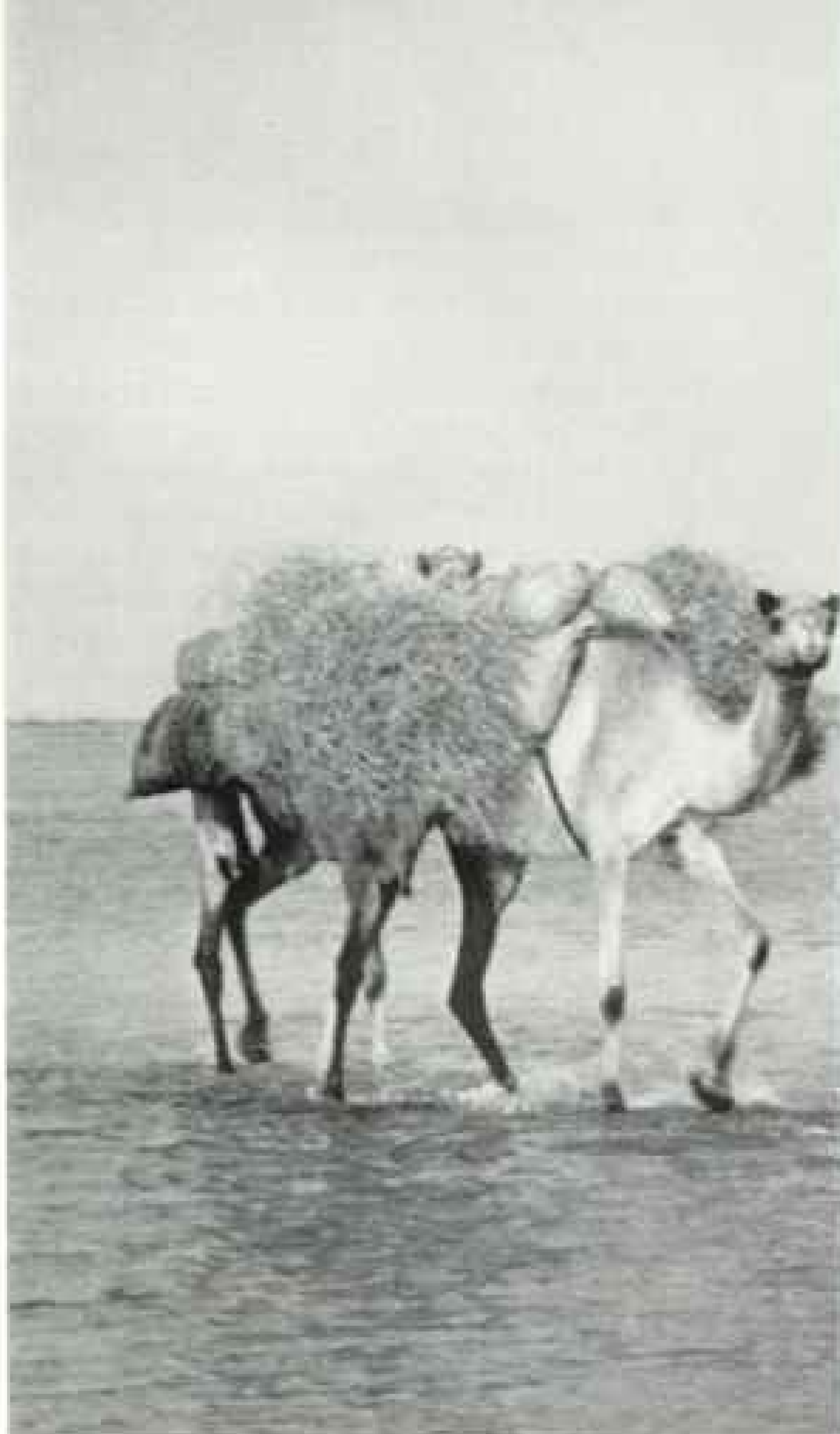
One summer I visited the pearling fleet. A large number of vessels lay anchored on the still, green waters of the pearling banks. Some of the divers from Dibai, whom I knew by sight, shouted greetings. Their captain beckoned me. The boat was packed with men and gear, and the smell of oysters was strong. About 20 divers were in the water.

* See "Sailing with Sindbad's Sons," by Alan Villiers, NATIONAL GEOGRAPHIC MAGAZINE, November, 1948.

The Arab method of pearl fishing, unchanged for centuries, is simple. The diver descends on a weighted rope played out by a "hauler." His only other aids are leather finger shields and a wooden or bone clip for his nostrils.

Breathing deeply for a minute or two, the diver takes a last light breath before the plunge. Sinking to the sea bed, he places the oysters in a net bag attached to the hauling line. When he can remain down no longer, he jerks on the line and is quickly brought to the surface (page 98).

Seated on the poop of the vessel with the captain, I asked about the depths to which the divers can descend. I had long given up inquiring how long a diver can remain under water, for the replies had been anything up to two hours!



A Camel Train Sloshes Toward the Island Town of Abu Dhabi →

A small stone causeway—built since this picture was taken—now reaches the commercial center of the sheikdom of Abu Dhabi. Previously camels and cars had to push through water as much as 13 to 14 inches deep even at low tide.

↓Date palms give both food and shelter to desert dwellers in the Jiwa district adjoining Abu Dhabi (page 90). Here, outside a house made of palm trunks, fronds, and fibers, Bedouin take coffee.

Diving operations, he told me, usually take place in from 25 to 50 feet of water, though exceptional divers are able to descend to 100 feet. Timing them, I found that they seldom submerged for more than a minute and a half, although several could remain for a little over two minutes.

The capability of a diver depends as much on his daring as on his constitution, and slaves who dive in deep water are rated well above normal market values.

While we were talking, the divers were busy, bringing up from 2 to 20 oysters at a plunge, although occasionally one of the bags would be empty.

"Do sharks ever attack the divers?" I asked.

"Very seldom," the captain told me, "although there are sometimes incidents. Barracudas, sting rays, and sawfish, which lurk deeper, are greater dangers. The most troublesome of the undersea enemies a diver must face are the jellyfish. They inflict very painful stings." And he pointed to the divers wearing cotton suits as protection against the troublesome sea nettles.

The divers have other problems. Frequently they develop painful ear trouble. If it does not quickly cure itself, the tip of a red-hot iron is applied to the affected part.

Discipline aboard the pearling boats is severe, and flogging is the usual punishment for an inattentive hauler who risks his diver's life. Flogging is also resorted to when one of the crew is caught trying to steal a pearl.

Crew Shares Profit—If Any

Financial arrangements on the boats I visited are prescribed according to a fixed system. When the pearls have been sold, the owner of the boat takes half the total. From the other half the owner recovers the cost of the food for the season and deducts a fifth of the remainder as expenses for the boat. The balance is divided among the crew so that the captain gets two shares, divers one and a half shares, cook and haulers one share each, and the boys a quarter-share. In a bad season expenses may exceed proceeds from the pearls; then the crew gets nothing except their food for the season's work.

Banked at the Oars Like Galley Slaves, Returning Pearlers Row into Dibai Harbor

Hardships and privations of the summer-long pearling season lie behind. The high-spirited crew hauls down the sail and rows the last two or three miles toward the docks where cheering crowds await.

I cannot escape a feeling of regret as our sojourn in Trucial Oman draws to a close. My wife and I are seated at the porch of our tent in the desert, where I have been taking advantage of a holiday to write this article. A breeze whips sand from the dunes.

Pots Simmer on Fragrant Wood

Our Arab companions have broken their circle around the campfire and are at prayer, leaving us to guard their beloved coffeepots, which are simmering on sweet-smelling *ghadha* wood. At our side perch hooded falcons, each on its own stool stuck in the sand.

But thought of the uncertain future intrudes into the restfulness of our desert surroundings. What sort of change lies ahead for these little principalities of the Trucial Coast? How long will the ancient pattern of life continue unchanged?

Trucial Oman is still a land without boundaries in the Western sense. What need has there been to divide waterless, uninhabited deserts? But today the prospect of oil has caused each of the seven rulers to look to his frontiers.*

The final delimitation of their domains will be a difficult and delicate matter. And should any of the sheikdoms reap the riches that come from "liquid gold" lying beneath either the sands or the seas, the present mode of life will change drastically.

Until then, the pattern of existence on the former Pirate Coast remains as ever before—unhurried and unchanged by the passage of time.

* See, in the National Geographic Magazine: "*Calypso* Explores for Underwater Oil," by Capt. Jacques-Yves Cousteau, August, 1955; and "Troubled Waters East of Suez," by Capt. Ernest M. Eller, April, 1954.

The Enigma of Bird Anting

A Canadian Naturalist Obtains an Exciting Color Record of the Mysterious Use of Ants by Birds

By Hance Roy Ivor

WHAT is bird anting? One of Nature's strangest mysteries, it fascinates and confounds ornithologists: a bird, clutching an ant in its bill, contorts itself into ludicrous positions and strokes the insect against wing and tail feathers. As it does so, the bird seems to experience an almost trancelike ecstasy.

A wide variety of passerine, or perching, birds indulge in anting at times. A limited number of other birds—for example, the wryneck, green woodpecker, and various species of parrots—also do it. Yet the performance is not often observed among birds in the wild, and comparatively few persons have been able to study it. So far, no one really knows why birds ant.

Diary Reveals First Observation

Nearly 25 years ago, with the permission of the Canadian Government, I established a songbird observatory at my home near Erindale, Ontario. Here I have kept many birds, some in partial captivity, to study their habits and emotions. Yet with tame birds about me all the time and wild birds inhabiting the surrounding wooded acres, I was unaware of anting until about 18 years ago.

I find that on July 9, 1938, I made the following entry about one of my rose-breasted grosbeaks in my bird diary: "I opened Sherree's entrance at 6:30 a.m. to let him out to feed in the woods. His mate coaxed to get in. She did not go at once to her nest. She fed briefly, then flew to the ground and seemed to pick up small particles of earth and run them over her feathers. She would tumble doing this.

"When I put fresh earth in the observatory, the female robin did the same thing. Once when I had several grackles, I gave them wild cherries; they would take a cherry and run it over their plumage, drop it, and do the same with another. I can make nothing of these performances."

I realized later that I had observed my first anting, though I had failed to recognize it as such. The supposed particles of earth I had seen the grosbeak and robin pick up were in fact ants. I have since learned that birds also occasionally "ant" with the juice of oranges, lemons, and English walnuts, and with such things as sumac berries. Except for the time when my grackles used chokecherries, however, I have not seen a bird perform with anything except ants.

During recent years I have spent much time observing this enigmatic activity among my songbirds. I have watched upwards of 30 species of birds ant and seen thousands of individual antings. Not only is it an amusing sight but a beautiful display, particularly when practiced by such a bird as the rose-breasted grosbeak, which is highly colored under the wings. The brilliance of the plumage is revealed to its best advantage during the performance.

Let us watch Unu, my tame blue jay, for a moment as he alights on a patch of sod amid crawling ants. Quizzically he cocks his head to eye the insects at his feet. Then with incredible swiftness he makes a darting stroke to pick up one of the ants. At the same instant he stretches out one wing and twists his tail awry beside his legs. Clutching the ant in his bill, he rapidly rubs it against the underside of an outer primary feather, stroking downward toward its tip.

In quick succession he picks up ant after ant to caress first one wing, then the other, and stroke the underside of his tail feathers. Occasionally in his ludicrous contortions he steps on his own tail and tumbles backward like a comic acrobat (pages 106, 107). In this strange act of anting he seems to gain an exaltation that might almost be likened to the ecstasy of a cat over catnip.

Enmity Forgotten During Anting

While they ant, birds often seem to become so stimulated that all enmity among them is forgotten. In my observatory as many as 20 or more birds of several species sometimes ant together within the space of four or five square feet. Rarely is there any interference or quarreling, even though they continually bump against one another. Even my rose-breasted grosbeak, often an irascible bird, becomes so engrossed that he seldom makes a belligerent move against his neighbors.

A Blue Jay Rubs His Feathers with Ants in a Mysterious Rite Few Men Have Seen

These unique photographs reveal one of the strangest performances in Nature. A wide variety of passerine, or perching, birds stroke their feathers with ants, yet no one knows why they do it. How they do it is shown by these tame birds at the author's observatory near Erindale, Ontario.

Using high-speed flash, the photographers here record each step of the amazing antic. Above, Unu the blue jay searches out a suitable insect in the middle of an ant bed. Ant in bill (right, upper), he tucks his tail to one side and spreads his wing. Then he sweeps the undersides of his feathers (right, center and lower). Stepping on his tail, he topples over backward (left), a mishap soberly enjoyed by two Baltimore orioles.

According to the author, Unu "seemed to gain an exaltation from this activity that might almost be likened to the ecstasy of a cat over catnip."

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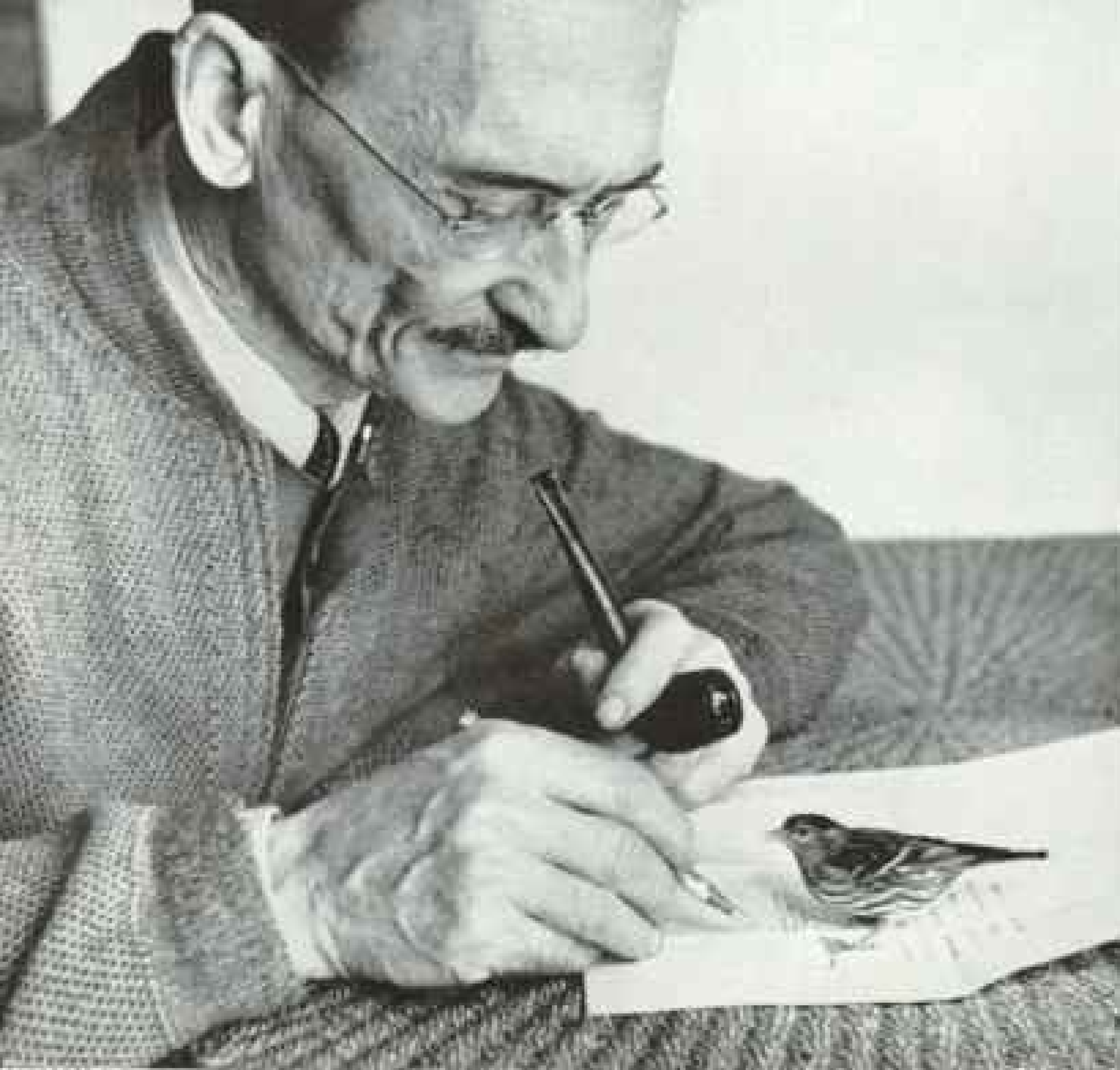
Bruce R. Young, Robert F. Gunn (right, center), and Risty Perotin (right, lower)



Unu's Bill, a Dainty Vise, Lightly Clamps an Ant →

Page 109: This slave-keeping ant, *Formica sanguinea*, ejects formic acid. Some ornithologists believe that birds stroke ants against their feathers to remove the acid before eating the insect. Others think the acid benefits the skin.

To compound the enigma, birds frequently use ants of species that do not excrete formic acid (page 114). Moreover, tame birds occasionally "ant" with such things as sumac berries or wild cherries.

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Bruce R. Young

←A pine siskin visits Mr. Ivor at his desk. The author has maintained his songbird observatory for nearly a quarter of a century. Many of his birds, such as this kibitzer, are completely trusting.

 Hugh M. Halliday

I have found starlings among the most enthusiastic anters. Unlike most other birds, which usually clutch only a single ant in their bills at one time, they collect a sizable ball of the insects before caressing their wing and tail feathers (page 116). Usually the birds seem to eat the insects after stroking the feathers, though often they discard them.

From time to time I have had photographs made of the birds in this odd activity. Several months ago, with the cooperation of six photographer friends from Toronto, I set out on a more ambitious venture—to record bird anting in natural color. We used high-speed electronic flash lamps to "freeze" the swift action, as Bernard Corby and I previously had done in photographing bluebirds.*

Birds Often Refuse to Perform

We spent innumerable hours of patient, tiring work in cramped positions to obtain a comprehensive series of photographs showing the birds in the various attitudes they adopt while anting (pages 110, 111). Often our subjects only ate up our supply of ants. At other times, too many crowded into the narrow field covered by our camera lenses to allow us to show individual action.

Unu, the blue jay, afforded us comic relief but often became a nuisance. A natural performer and complete extrovert, he hopped in and out of pictures, investigated the electronic lamps and cameras, and alighted on our shoulders and heads to tease for meal worms (pages 114, 115). When I tried to ignore him, he even plucked at my spectacle frames.

Once, when Robert Gunn placed a quarter on the anting sod to focus his camera, Unu snatched up the coin and carried it to a high ledge. We had to use a stepladder to retrieve it. Finally, after obtaining a sequence of photographs of his anting, we exiled him to a cage while we worked with other birds. An overeager starling also had to be banished.

In all, we obtained more than 250 photographs of various birds in almost every stage of anting. Although these photographs do not solve the mystery of why birds ant, they reveal vividly what the birds do, and they clear up many misconceptions among observers who have watched the rapid anting movements only by eye, often at long range.

Audubon seems to have been first to mention the attraction of birds to ants. Though he did not refer to anting in its accepted sense, he told how young turkeys rolled about in ant nests.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Seeing Birds as Real Personalities," by Hance Roy Ivor, and "Bluebirds on the Wing in Color," by Bernard Corby and H. R. Ivor, both April, 1954.

Cooperating in making the remarkable series of color photographs on anting accompanying this article were Robert F. Gunn, Reginald D. Corlett, Bruce R. Young, Risty Perotto, Sherbourne Drake, and Bristol Foster.

W. Robert Moore, National Geographic Staff

↑ Camera Corps Focuses on a Sod Platform Where Tame Birds Perform the Act of Anting

Six photographers, working in shifts, put in weeks of patient labor in the author's observatory to film the anting rites. Here Robert Gunn (left), Reginald Corlett, and Risty Perotto keep cameras trained on an oriole about to ant. Mr. Ivor stands at right; Baltimore and orchard orioles alight on his hands and beg for ants. Cages house only sick or belligerent birds.

→ At times as many as 20 birds, of several species, crowded the sod—their natural enmity forgotten in the apparent ecstasy of anting. Here a female cardinal (left) draws tail and right wing forward preparatory to anting; a female and two male Baltimore orioles move in on the ant hill.

Abbott Frazar, in 1876, stated that ants were seen to seize parasites on a bird and carry them away. Since then there has been an ever-growing list of reports of anting.

No Final Answer Found

Ornithologists have advanced numerous theories as to why birds ant. A few observers have suggested that the birds place the ants under their wings as a source of food on migration. This explanation, obviously, may be easily dismissed. The comparatively few insects that could be carried under the wings, if indeed they are ever placed there, would be of little value as sustenance on a long flight. Furthermore, birds would ant only at the time of migration. Actually, some of my songbirds will perform almost every time I provide them with ants.

The most widely advanced explanation for this strange habit is that the birds use the ants to rid themselves of parasites. Some observers, like Frazar, have stated that the ants seize the parasites; others believe that the formic acid exuded by many species of ants drives the parasites away.

Some persons also have suggested that the birds rub the insects on

← Twisted as in Pain, a Robin Begins His Insect Rubdown

Some people have assumed that birds place ants in their plumage because the insects rid them of parasites with squirts of pungent acid. Indeed, a few observers have reported seeing birds stabbing ants into their breast feathers. However, these photographs show birds dressing only wings and tails and ignoring the body, where parasites are usually found.

Here a robin pivots his wing to caress the underside of each feather. He draws a curtain—known as the nictitating membrane—across his eyes, possibly to protect them against contact with his feathers or injury from the ant's acid.

↓ This female robin uses a different ant for massaging each feather. The insect in her bill will be eaten before another is selected.

© National Geographic Society

Bruce R. Young (left) and Sherbourne Drake

A Baltimore Oriole → Accepts a Handout from the Author

Here Ori selects a dormant carpenter ant, *Camponotus*, dug from a log. While in this winter state the insects do not eject their acid. So tame is Ori that he stages his anting ritual on the author's hand.

Throughout 18 years of studying the anting habit, Mr. Ivor has observed that birds do not always caress their feathers when given a supply of insects. Sometimes they merely settle down to feast.

The fact that some species eat ants may have encouraged the now discredited notion that anting is a method of storing insects under the wings as a food supply on migration.

↓Eyes concealed by the nictitating membrane, another tame oriole appears transported in rapture during his bizarre performance on an artificial anthill.

© National Geographic Society

Harold Wiste (right) and Bruce H. Young

their feathers before eating them to remove the formic acid which might be injurious internally, while others believe it may be done for the beneficial effects of the acid. Some suggest that the act is done purely for enjoyment.

Few ornithologists, however, feel assured that any of these theories—or should one say guesses?—explains the true purpose of this mysterious performance.

Danish Scientist Offers Theory

Holger Poulsen, a Danish ornithologist, has been more positive in his statements. In a paper read before the International Ornithological Congress in Basel, Switzerland, in 1954, he reported on his experiments in spraying formic acid, vinegar, and Formalin on birds' heads, inducing them to perform the anting actions. He concluded: "Anting is not a special reaction to ants, but to stimuli irritating the bird." Further: "The significance of anting is rubbing off and/or avoiding the irritation."

He also remarked: "The anxious tripping about, when rapidly picking up the ants, also shows that the bird tries to avoid squirting from the ants while eating them."

The world-renowned scientist Julian Huxley has since stated: "Poulsen has given a definitive solution to one of the outstanding puzzles of ornithology."

From my careful observation of hundreds of antings among the songbirds in my observatory and from examination of the 250 photographs we made, I doubt that the answer is as definitive as Dr. Huxley believes.

None of our photographs shows the bird rubbing its head against the quills of wing and tail as if attempting to remove an irritating substance from its head feathers or skin. The bird holds the ant (or ants) in the very tip of its bill and, so far as I have been able to determine, does not crush it to any great extent before anting. Only the tip of the bill and the ant touch the feathers. The stroking is done on the undersurface of the quill, beginning about two-thirds of the way toward the tip, where resistance is reduced, rather than against the firmer base (page 112).

When the insect is rubbed on the vertical surface of the tail feathers or on the under tail coverts, the tip of the bill holding the ant points downward; consequently, not even the base of the bill, much less the head, touches the feathers.

Nor do all the ants used by birds excrete the possibly irritating formic acid. The *Acanthomyops interjectus*, for example, excretes a pleasant-smell-

"What Have We Here?" Unu the Blue Jay Inspects a Flash Lamp

Insatiably curious, Unu hopped in and out of photographs and constantly harried the cameramen (opposite). When engaged in anting, however, the bird seemed completely oblivious of action about him (pages 106, 107).

Photographers used electronic speed lights flashing at 1/2000 of a second to capture the swift movements of anting birds.

W. Robert Moore, National Geographic Staff

Enthusiastic Unu Helps a Photographer Get Close to His Subject

Alighting on Robert Gunn's camera, the uninhibited bird blocks the view finder.

Later, when Mr. Gunn placed a quarter on the ground to check his focus, Unu swooped down, snatched up the coin, and whisked it to a ledge high overhead. Banishment soon followed.

W. Robert Moore, National Geographic Staff

ing liquid with an odor somewhat like that of citronella.

On a number of occasions I have experimented also with dormant carpenter ants (*Camponotus*), a large black species of which I dug from fallen logs in winter. The dormant ants obviously were unable to excrete their acid on the birds' head feathers. Yet the birds anted with them in the same manner as with active ants (page 113).

The popular belief that birds ant to rid themselves of parasites also poses many questions. Were anting done to enable the ants physically to seize the parasites, the chance of their doing so, it seems to me, would be exceedingly scant. If it were done in order that the formic acid or other ant substance might destroy or drive away the parasites, the bird would rub deep under its wings and other parts of its body where parasites are most likely to gather.

I have watched many antings closely, even to having one of my orioles perform while perched on my hand, but I have yet to see birds apply the ants to their bodies. It would certainly be much easier for them to place the ants on or among the body feathers than to contort themselves into the absurd positions they do. Our photographs show the birds applying the ants only to the underside of the wing quills and tail feathers, and apparently to the under tail coverts.

Yet there can be exceptions. Lovie M. Whitaker, of Norman, Oklahoma, has written to me that her orchard oriole has applied ants to the front of the legs on the feathers just above the heel bend, and also to the belly. Such exceptions, however, must be rare and an individual characteristic of the particular bird. I have never seen my orioles rub the insects against their legs.

Most Birds Resist Crawling Ants

While birds seem to derive an exaltation from anting, few small passerine birds will tolerate ants crawling over them. Whenever I have seen ants crawl onto the legs of my songbirds, the birds picked at the ants, as if trying to get rid of them, or flew away.

← A Starling Grooms His Winter Garb with a Billful of Ants

Audubon remarked in 1831 on the attraction of birds to ants after seeing young turkeys rolling in anthills. In 1876 ornithologist Abbott Frazar wrote that ants seized parasites on a bird and carried them away. But reports of anting are comparatively few because of the speed of the act and the difficulty of recognizing it in the wild.

Working with tame birds, which appear to ant more frequently than wild ones, the author has become an authority on the habit. He finds that starlings ant more intensely than other species.

This male was so eager to perform that he interfered with the photographers and eventually had to be banished to a cage.

↓ Unlike other birds that pick up only one or two ants at a time, the starling gathers a ball of insects in his bill. After sweeping feathers to their very tips, he gulps down the "brush."

In summer the starling's buff feather tips diminish, revealing iridescent purples and greens.

© National Geographic Society

Reginald D. Corlett (left) and Sherbourne Drake

Birds Swarm About → the Author at Feeding Time

Mr. Ivor shelters nearly 100 birds of more than 25 species in his observatory. During nesting periods the songsters feed in near-by woods, but they always return.

Here a cedar waxwing rides the naturalist's shoulder. Another waxwing and an oriole perch on his hand. A bluebird clings to his sleeve.

W. Robert Moore, National Geographic Staff

The crow and some magpies, however, are notable exceptions. My crow not only enjoys having its head, back, and wings stroked, but crouches on an anthill, closes its eyes, and seems to derive much pleasure from having the ants crawl over its plumage. But it does not ant in the accepted sense. Yet the European magpie, a relative of the crow, has been seen to ant like the smaller passerines.

Several persons in the United States have advanced the theory that anting may be a form of dressing the plumage. Mrs. Whitaker has treated feathers by rubbing ants on them. Her orchard oriole will grasp one of these treated feathers with its foot, probe between the barbs, and run its tongue there and on the flat surface of the web. The oriole's throat muscles move as in swallowing, and the bird obviously is attracted by the odor or taste of some ant substances. I have dampened earth particles with formic and citric acids, but my birds do not react to them.

There are many other aspects to this odd ornithological puzzle. While many of the passerine birds ant, others apparently do not. One wonders why their behaviors should differ.

The catbird and brown thrasher, for example, are considered to be related. Both are insectivorous, they nest in somewhat similar situations, and they live during the summer in a similar environment. Here in my songbird observatories both have access to the same earth containing ants. My catbirds ant, but my brown thrashers do not.

Anatomically, the American robin and bluebird are both thrushes. My bluebirds mingle with my robins but do not join in the anting (pages 118, 119). If the robins and catbirds ant against their wing and tail feathers to rid themselves of some irritating substance, as Poulsen states, why does not the same substance irritate the bluebird and brown thrasher?

Puzzle Remains Unsolved

To me, it seems remarkable that the bluebird, thrasher, and many other species do not need to ant for any of the suggested purposes, while the catbird, robin, and many others do. It is equally puzzling that some birds ant frequently and others do so only rarely. In nearly 18 years of observation, for example, I have seen the evening grosbeak and the cedar waxwing ant only once.

In many ways it seems that anting is a primal form of behavior, lost by some birds but retained by others.

We must, in my opinion, continue to seek the "definitive solution to one of the outstanding puzzles of ornithology."

These Birds Come to the Ant Banquet, but Decline to Dress Feathers Before Eating

Although the bluebird (right) and the brown thrasher (below) are related to other passerines that ant, the author's studies indicate that neither engages in the feather-rubbing "ceremonials" enjoyed by their cousins.

→Bonnie, Jr., played a starring role in Mr. Ivor's story, "Seeing Birds as Real Personalities," published in the NATIONAL GEOGRAPHIC MAGAZINE, April, 1954. Now nine years old, the bluebird was brought to the Ivor observatory as a three-week-old foundling. During his first spring he seemed to regard the author as his mate, bringing him worms and raisins.

© National Geographic Society Bristol Foster

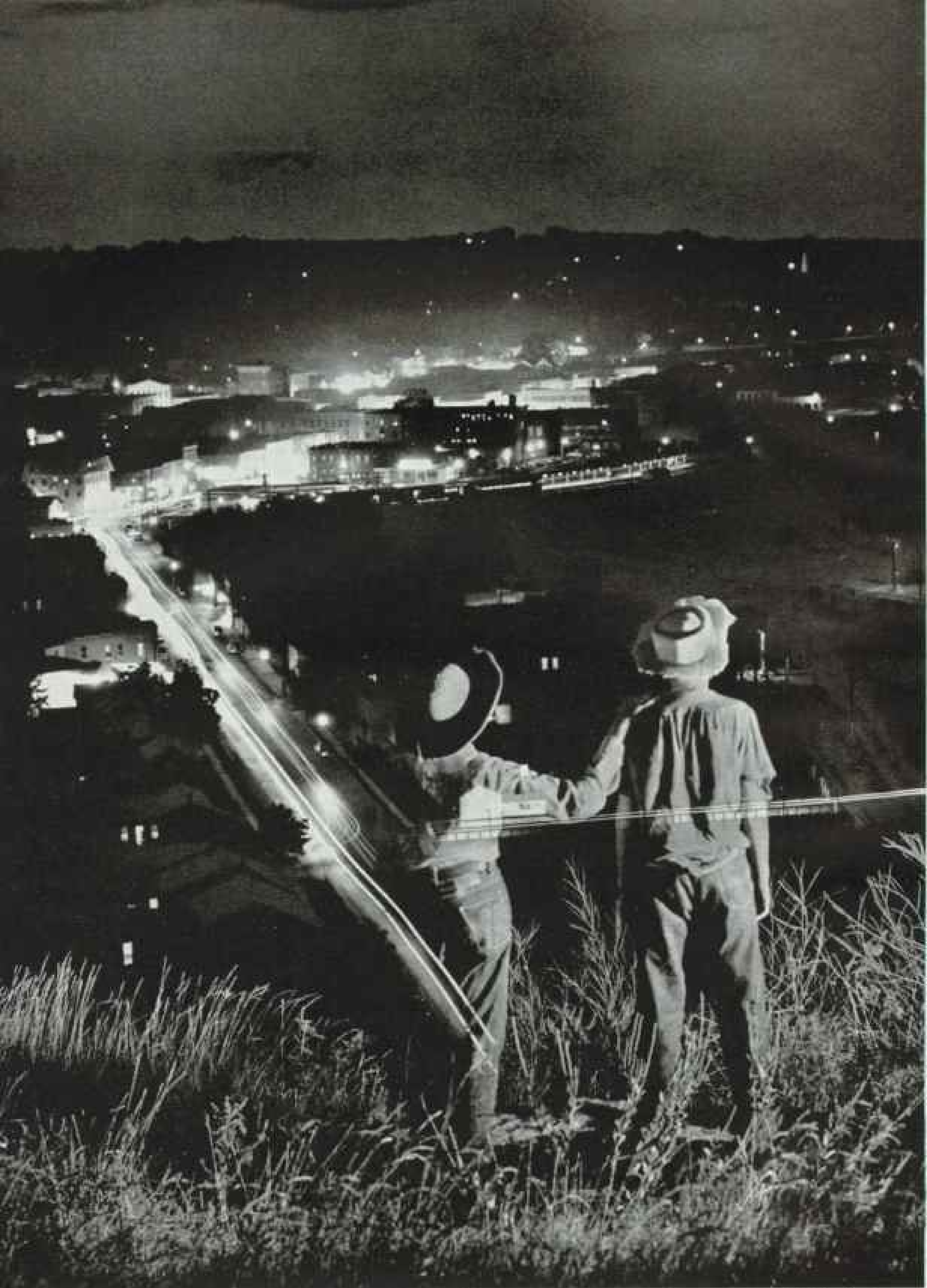
↓ Robin Redbreast, Regal as a Queen, Splays Her Pinions Before Beginning to Ant

Standing in an ant bed, this bird strikes an opening pose unlike that of any other anter observed by the author.

Although many passerines are addicted to the ant massage, few will permit the insects to roam freely through their plumage. The author reports that, whenever ants crawl on the legs of his songbirds, invariably the birds dance and pick at the invaders or fly away.

Such observation casts doubt on the theory that birds ant for the pleasure of feeling insects moving on their bodies.

Only a few of the larger passerines, such as the crow, appear to derive satisfaction from playing host to live ants.



Gerald R. Massie

Tom and Huck, Returned After 80 Years, Gaze Down on the Glittering Lights of Hannibal . . .

. . . Fabled Playground of Their Youth

Tom Sawyer's Town

By Jerry Allen

MARK TWAIN remembered it some seventy years ago as a "white town drowsing in the sunshine of a summer's morning." Last year Hannibal, Missouri, tucked away in the heart of the country, attracted more American travelers than Hawaii, a fourth as many as Europe. The high roads and the back roads brought 127,000 visitors.

The white town that draws like a magnet lies off the beaten track. Scheduled airplanes do not land there, most boats pass it by, and few trains stop. A 1,000-mile trip by plane and train lay behind me when the conductor tapped my shoulder.

"This is Hannibal."

Lazily the train crept to a station near the center of town, easing to a halt. Three other passengers got off—a brisk salesman with new valises, a woman returning with St. Louis purchases, and a limping farmer with an injured spine.

"Hi, Jeff! Your back any better?"

"No, it ain't. Doctors can't seem to find out what's the trouble."

Town's Leisurely Way of Life Reflects the Placid Mississippi

The man called Jeff talked at length with an unhurried freight handler, detailing his hospital experience. The train stayed on, resting, while conductors and passengers stretched their legs. Supper-bound townsmen passed on Main Street and glanced with casual interest at the train that had settled on the tracks with the unconcern of a country dog.

On the Mississippi a few feet away a down-river towboat blinked its headlights in cheery salute as it headed toward New Orleans. The broad river shone in the spring moonlight, a still, unrippled highway, heavy with fresh rains.

Smells of supper came from open kitchen windows, tantalizing smells, and the town in

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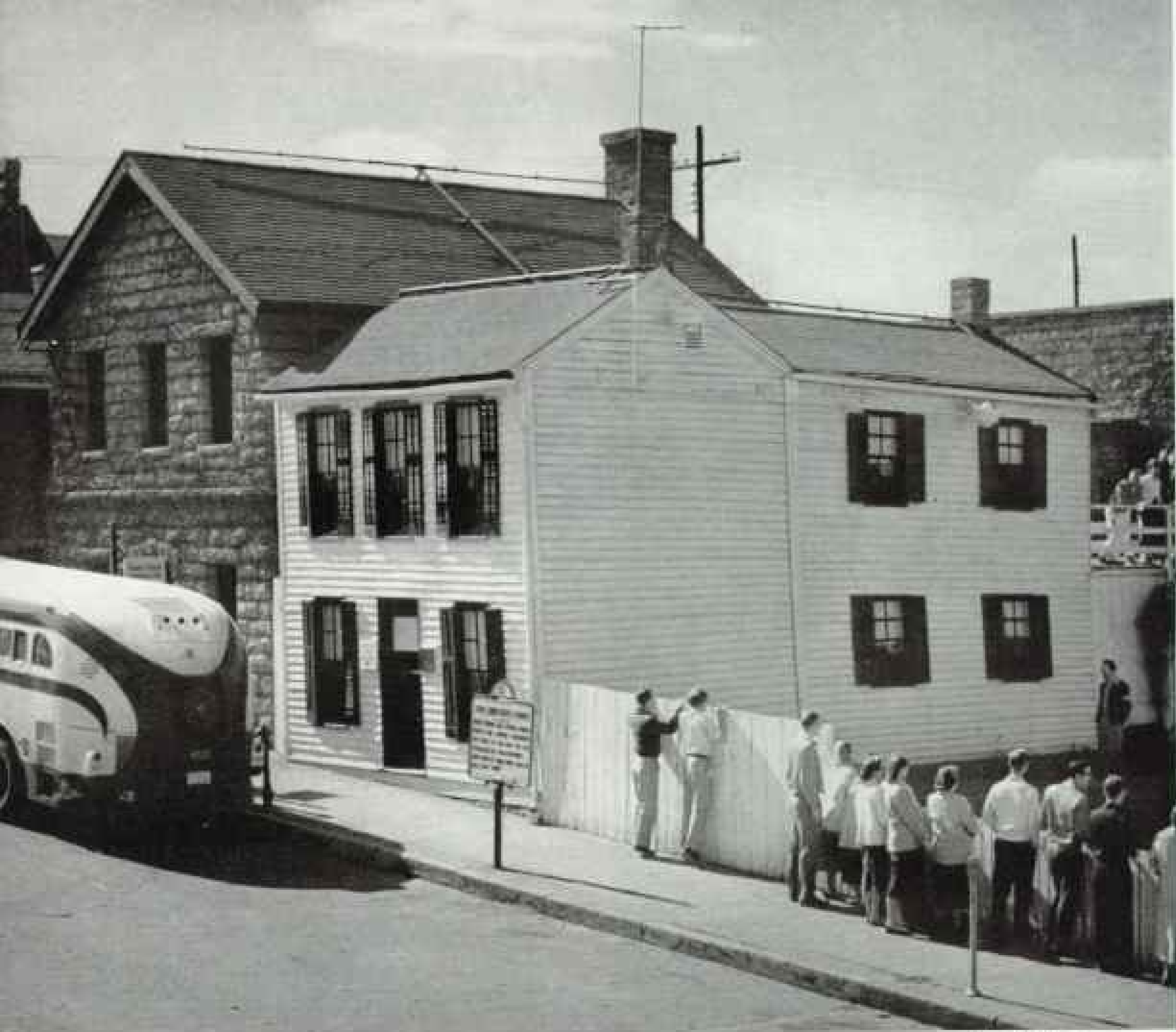
The Author

Jerry Allen is the author of the biography, *The Adventures of Mark Twain*, published by Little, Brown & Company in 1954. In the course of her research for the book, she visited many of the places where Mark Twain lived.

Miss Allen, for several years a foreign correspondent in London and Paris, holds degrees from the University of Wisconsin and Columbia University.



Gerald R. Massie

Hannibal's Most Famous Address: 208 Hill Street, Mark Twain's Boyhood Home

Here, on many a still summer night more than a century ago, a catcall signal pierced the air. Young Sam Clemens climbed out of the upstairs bedroom window and joined his pal Tom Blankenship in the nocturnal adventures that Mark Twain recalled so vividly in *Tom Sawyer*.

High white fence is a replica of the one Tom hoodwinked his chums into whitewashing (page 135). Stone museum next door houses relics of Twain's days as a Mississippi River pilot and writer.

appetite waited. From his porch a stranger called a neighborly greeting as I passed.

"Fine evening!"

Here in the spatter of lights circling back from the river lay a town with legends as world-known as the Alps-crossing Carthaginian general, with his laboring elephants, from whom it took its name.

Cupped on the shore of the often-flooding Mississippi, Hannibal lies in a valley edged by 225-foot-high Lovers' Leap (map, page 125). It has neither beaches nor night clubs—and teen-agers are subject to a 10 o'clock curfew. Crowds come by the busload and in streams of family cars, not for the town's majestic scenery, its climate or resort life, but because here, little changed by time, are the haunts of Tom Sawyer and Huck Finn. Children, and the parents who tag along with them, have made it one of the most popular home towns in the United States.

Famed Through Fiction for 80 Years

Given its fame through fiction, through a book published 80 years ago, Hannibal is Tom Sawyer's town. In it Mark Twain, who is rarely remembered by his real name of Samuel Clemens, spent his boyhood years; later he wrote that boyhood into books, *The Adventures of Tom Sawyer* and *The Adventures of Huckleberry Finn* among them.

The Pied Piper call of those books has brought on a single day more than a thousand children to Hannibal, some from as far away

as New York. This year a special train brought 1,200 children from St. Louis. On a recent Memorial Day more than 1,500 visitors went through the 1844 home of the American writer better known abroad than any other of his time—a favorite of such men as Kipling, Darwin, Shaw, and Freud.

"He is the biggest man you have on your side of the water," Kipling wrote from England, "and don't you forget it."

Today an echo of Kipling's opinion comes from the East he immortalized. "How could I be hostile to a country that produced Mark Twain?" asked Ceylon's new Prime Minister Bandaranaike, describing his international views after his April, 1956, election.

So closely has Hannibal become linked with its author that the town is seldom thought of as having a history beyond 1839, when a four-year-old red-headed boy came there to live and stayed until he was 17.

Yet Hannibal, a river landing selected from the vast Louisiana Purchase territory, is older than the Oregon Trail. Its first settler, Moses Bates, arrived in 1819. The settlement that grew 100 miles northwest of St. Louis took

↓ **"Forty Times I've Said If You Didn't Let That Jam Alone I'd Skin You"**

In the restored Clemens homestead, Aunt Polly (Mrs. Cyrus Anderson) nabs Tom (Chris Winkler) under his bed. Actually, in *Tom Sawyer*, his hiding place was a closet.

In a city-wide competition this spring, young Winkler won the title "Tom Sawyer of 1956."

National Geographic Photographer Willard R. Culver

1. Tom Sawyer and Huck Finn Monument

2. Mark Twain Boyhood Home
Fence is that of the whitewashing episode in "Tom Sawyer."

3. Mark Twain Museum
4. Site of Huck Finn's House
5. Becky Thatcher House
6. Judge Clemens's Law Office
7. House of the Pilasters
8. Old Wharf

Items above are located on the map by number

Hannibal City Limits

Mark Twain Statue

Riverview Park

One mile to Turtle Island
On the nearby Illinois shore, "where it was woody and there warn't no houses," Huck was locked in an old cabin by his "Pap."

Wabash Bridge

Picturesque and commanding views of Mark Twain's beloved Mississippi River make this park Hannibal's pride and joy.

Mark Twain Memorial Lighthouse
(Site of Widow Douglas home)

Cardiff Hill
Playground for Tom and Huck

Mark Twain Memorial Bridge

Mark Twain Ave.

Hill Street

Bird Street

Main Street

Church Street

Lyon Street

Broadway

U.S. 36

Chicago, Burlington and Quincy Railroad

Industrial Section

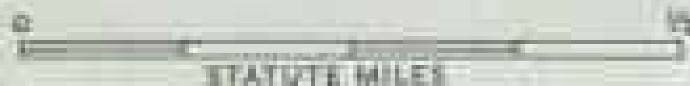
Bear Creek

Wabash Railroad

Hannibal City Limits

HANNIBAL, MISSOURI

The St. Petersburg of Tom Sawyer



Tom and Becky

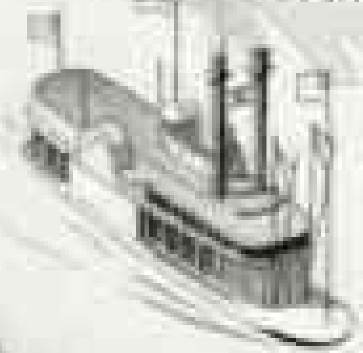
Birthplace of Mark Twain, Florida, Missouri

Wabash Railroad

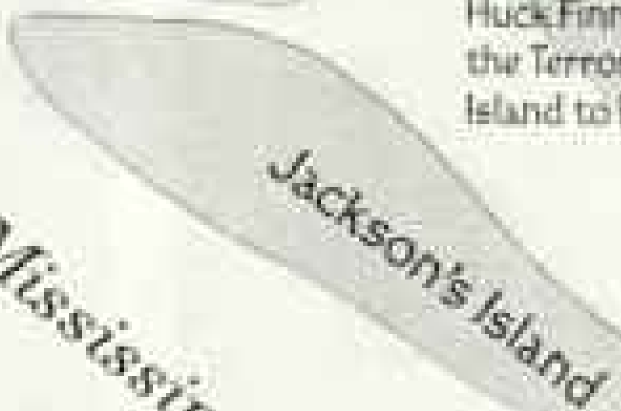
U.S. 36

"What is dead cats good for, Huck?"

Samuel Clemens's pen name was an inspiration of his pilot days. "Mark twain" is a river term indicating a depth of two fathoms–"a pleasant sound on a dark night meaning safe water."



Tom, the Black Avenger of the Spanish Main, Huck Finn, the Red Handed, and Joe Harper, the Terror of the Seas, went to Jackson's Island to become pirates.



Jackson's Island

Mississippi River

Chicago, Burlington and Quincy Railroad Yards

Lovers' Leap 225 feet high

Chicago, Burlington and Quincy Railroad

Mark Twain Trail

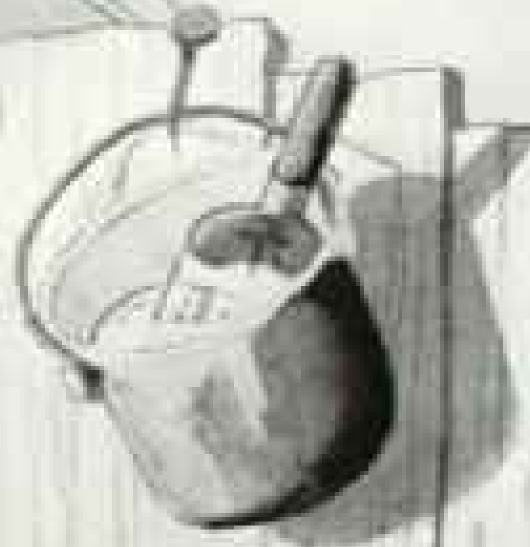
"Holler 'nuff!"

"Git up and hump yourself, Jim! There ain't a minute to lose. They're after us!" Huck and Miss Watson's Negro, Jim, scrambled to the raft and started their journey from Jackson's Island downriver.

After witnessing Dr. Robinson's murder by Injun Joe in the graveyard near Cardiff Hill, "The two boys flew on and on, toward the village, speechless with horror."

Tom, with Becky Thatcher, seeking a passage for escape, saw candle-lit hand appear from behind a rock. "Instantly that hand was followed by the body it belonged to—Injun Joe's!"

Mark Twain Cave



HOME OF TOM SAWYER

Diesel-powered Towboat Pushes Oil Barges Upstream →

Barges occasionally dock at Hannibal, a thriving port in the steamboat era, but most of the towboat traffic glides past the town. Here the Wabash Bridge swings open for the *Twin Cities* and a string of barges 1,200 feet long. Sounding shallow water by sonic depth recorder, pilots seldom hear the leadsman's call, "Mark twain" (two fathoms), that inspired Samuel Clemens's pen name.

↓Iron ring in Hannibal's cobblestone wharf recalls pre-Civil War days when packets tied up for tobacco and slaves. A lazy afternoon finds two straw-hatted youths waiting for catfish to bite.

Gerald R. Massie

the name of Hannibal originally given by a pioneer surveyor to the stream that flowed through the site, the stream that Sam Clemens and every boy since has known as Bear Creek.

It is more than a century since Judge Clemens and his family lived in the white house on Hill Street and his next-to-youngest son had the adventures he credited to Tom Sawyer. A pioneer village of some 1,000 people and an important steamboat port on the Mississippi then, Hannibal today is a thriving city of more than 21,000 residents, of 7,000 homes, 8,000 telephones, 5,300 motorcars, 360 stores—and an unused wharf.

A lone iron ring remains in

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Mississippi Valley Barge Line Company

the cobblestone wharf, the last of many to which steamboats were tied when cargoes were tobacco and slaves. The wharf now serves as a parking space for cars.

Stern-wheelers, puffing black smoke, are rare on the river today, though the city seal still bears the steamer that became its emblem in 1845. Now 3,000-horsepower towboats pound by, pushing strings of loaded barges. In one recent year towboats moved 82 million tons of cargo along the 1,800 miles of Mississippi between New Orleans and St. Paul.

↓ At Night the Hooded Radar Screen Guides This Captain

In new towboat style the active days of Mark Twain's *Life on the Mississippi* are back again on the river where 98 years ago he steered such packets as the *Aleck Scott*, driving them over the twisting reaches by a pilot's schooled memory for landmarks. Today diesel-engined workboats, costing as much as $1,500,000 each, churn along, steering by radar, flashing strong headlights at night, tooting helloes as they pass by day.*

Widow's Lamp Guided River Pilots

For the powerfully lighted towboats the white Mark Twain Memorial Lighthouse on Cardiff Hill is no longer urgent. In celebration of the 100th anniversary of the writer's birth, Hannibal erected the lighthouse in 1935 on the site of the home of Mrs. Holliday, the original of the Widow Douglas in *Tom Sawyer*. When Mark Twain was on the river, she kept each night a lamp burning in her window as a guide to steamboat pilots.

As much in the past as Mrs. Holliday's lamp is the leadsman's call of "Mark twain!" that once told a pilot of a channel's safe water depth of two fathoms, or 12 feet. Sounding by echo, towboat pilots seldom need a leadsman or hear that call.

Like a bystander, Hannibal watches the busy Mississippi traffic, which has doubled since 1946. The shore trembles as the waterborne train goes by with as many as eighteen 200-foot barges in a tow.

The Mississippi is almost a mile across at Hannibal, and the surging river has often flooded the town, overflowing the levee, calling for boats to be used on Main Street. At its spring crest of 18 feet it hurries floating trees and logs along and even shifts the land. The river is forever building towheads, young islands, that old-timers in Hannibal have watched grow.

One island still dominates the others—Jackson's Island, near the Illinois shore. Wild land and federally owned, it is the tangled jungle where Huck and Jim camped before starting their never-forgotten raft trip down the Mississippi. Of its many names the one given it by the author of *Tom Sawyer*—Jackson's—has lasted (below).

Known during Mark Twain's boyhood as Glasscock's Island, it is still adventure ground for boys. On hot summer days Hannibal boys

* See "Down Mark Twain's River on a Raft," by Rex E. Hieronymus, National Geographic Magazine, April, 1948.

Summer Sun Sits High and Hot as Modern-day Adventurers Raft the Placid Mississippi

Jackson's Island near the Illinois shore was a favored retreat for Tom Sawyer and his gang. Hannibal boys still swim and fish from its banks and play pirates and Indians as did young Sam Clemens long ago.

National Geographic Photographer Willard R. Culver

Gerald R. Maerle

Black Smoke Pouring from Twin Stacks, a Stern-wheeler Churns Round the Bend

"Steamboat a-comin'!" The exciting cry once sent shore dwellers racing to the water's edge. Here the *Golden Eagle* swings past Hannibal on one of her last trips. Later she struck a rock near St. Louis and sank.

go over to it in boats, campfire cook the fish they catch, swim naked from its muddy banks.

"Whether their folks know it or not, boys are always swimming in the river," Chester Sankpill, owner of Hannibal's boatyard, says as he looks out over the stream that goes so swiftly by his door.

"Every little while I get called to run my boat out after someone drowning. Boys are all the time swimming in the Mississippi, out in boats, exploring the islands, fishing. They don't change much."

Fishing in the Mississippi is an industry in Hannibal, in addition to being the pastime of every man and boy. Motorboating alongside a fishermen's pier, I watched men who get their living from the river sorting out the day's catch. In the haul was a 25-pound catfish, one of the Mississippi blue cats, which occasionally reach several times that size.

Big fish are common in the river and in the branches and the creeks that feed it. Bear Creek is a favorite with anglers, and on its banks of a summer afternoon, you still find old-timers leaning on canes, watching staked lines for the quiver that means a bite. Fathers, using bread balls for bait, habitually fish after work, rowing their sons along the stream in which Mark Twain said he "drowned ... every summer."

Man-sized Pilot Wheel Awes Youths in the Twain Museum

Wrote Twain in *Life on the Mississippi:* "When I was a boy, there was but one permanent ambition among my comrades in our village on the west bank of the Mississippi River. That was, to be a steamboatman ... Pilot was the grandest position of all."

Behind a wheel like this, Twain the apprentice steersman learned to "read" the river and to maneuver his boat until he could "shave steamships as close as you'd peel an apple."

George Pickow, Three Lions

Two miles south of downtown Hannibal, on the Mark Twain Trail, is the cave *Tom Sawyer* made famous and Mark Twain knew so well. It has fascinated Hannibal youngsters since Jack Simms, a hunter chasing a fox, discovered it in 1819.

A number of legends have grown up about the cave. One story says that it was a hideout of Jesse James, the Missouri-born outlaw of the 1870's. The cave is also believed to have been a station on the Underground Railroad of slavery days.

In the eerie miles of underground passages Mark Twain as a boy had the adventures he wrote into *Tom Sawyer.* "Under the Cross" Tom and Huck found the treasure buried by Injun Joe—and the rock seams still form that ceiling cross that was a landmark for boy pirates a century ago.

A few years ago the cave was bought by the late Judge Evan T. Cameron, who strung a mile of its corridors with elec-

tric lights. Long before, the original entrance and the openings that once admitted small boys crawling on their stomachs were sealed and the present entrance was opened. Last year more than 40,000 paid admission to follow guides through the bat-infested maze.

"It's easy to get lost down here," says Karl Jacobson, a high school boy who takes visitors through during vacations. "I played around in the cave for two years, learning it by candlelight and flashlight, before I could become a guide. We don't take anybody into the dangerous parts, where the ledges are narrow and slippery. Sometimes people stray down here, but we've never lost anybody permanently."

The limestone formations in the cave have names as old as the first visitor—the Pantry, the Alligator, Aladdin's Palace, Fat Man's Misery—but the one that halts wide-eyed child tourists is the rock Love Seat where Tom Sawyer and Becky Thatcher huddled together as their last candle burned to the end, leaving them in the blinding dark.

The scene of the two lost and starving children is one every American schoolboy knows, but it stemmed from an actual day when Sam Clemens and Laura Hawkins (the original of Becky Thatcher) shivered in a dank tunnel of the cave waiting to be found by the search party hunting them.

Jerry Allen

Huck and Tom Stride Down from Play on Cardiff Hill

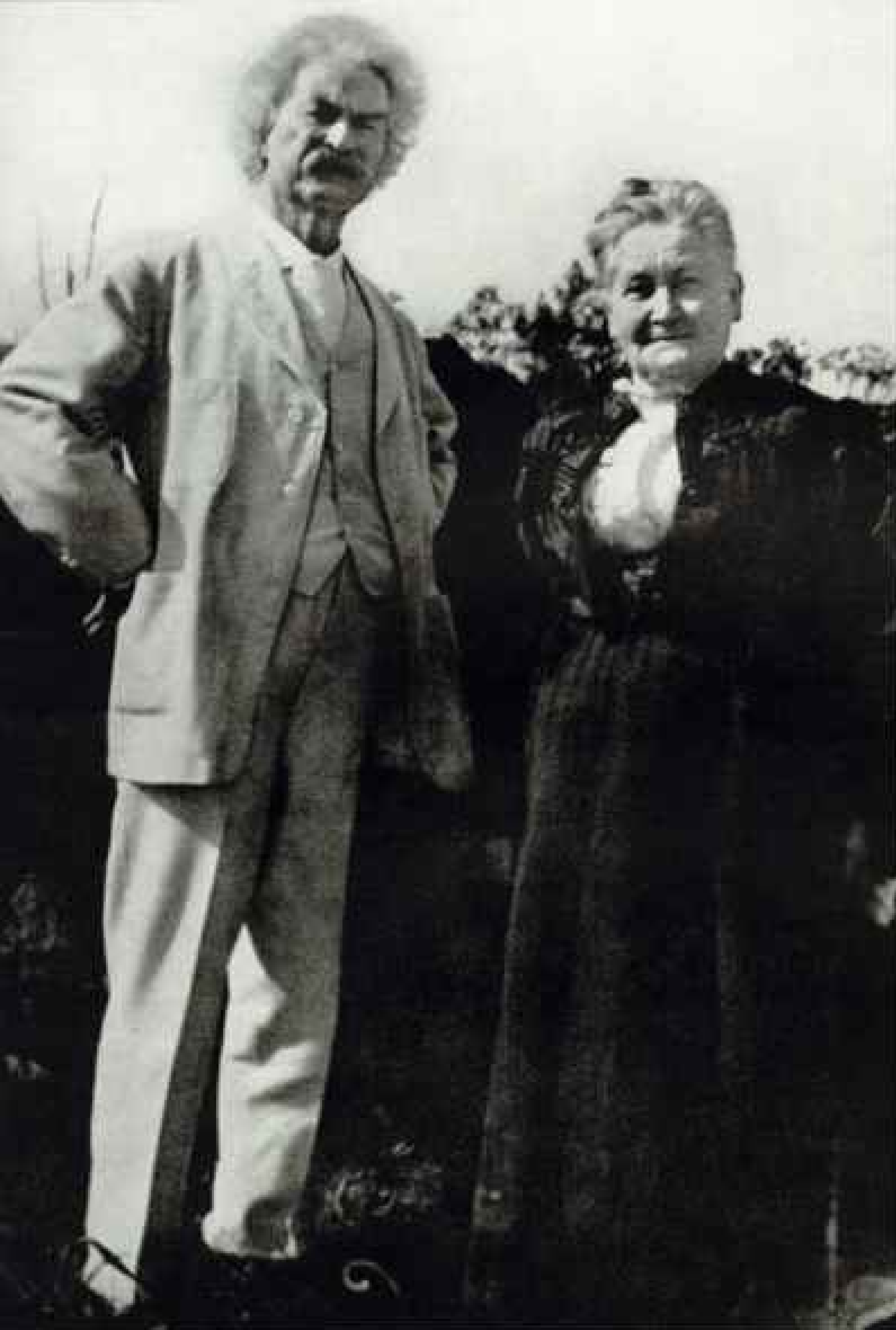
Barefoot, toting huge walking sticks torn from trees along the way, the carefree youths might well be plotting a hunt for pirate loot or a moonlight rendezvous in a melon patch. Frederick C. Hibbard's bronze figures march along only a stone's throw from the Mississippi.

Twain's Friends People His Books

Like Laura Hawkins, the "best girl" of his boyhood, many of Mark Twain's early friends were pictured in his books. Tom Blankenship, a Hannibal boy with a twin sister named Martha, became Huckleberry Finn. One of eight children in a family too poor to own shoes, Tom went barefoot, roaming the countryside during the sunny hours of school. Tattered and woods-wise, he was the envy of every boy in town. Years later Twain said he had heard that Tom Blankenship moved west as a young man and became a justice of the peace in Montana.

The old Hannibal home of the Blankenships, a rickety dwelling at the end of Dead Man's Alley, was torn down long ago. In 1926 a statue of Tom and Huck was put up at the foot of Cardiff Hill. Today the town that Mark Twain in fiction called "St. Petersburg" is still haunted by the ragamuffin Blankenship boy whom everyone knows as Huck.

A ghost no less active is Injun Joe. More than a character out of *Tom Sawyer*, he was a man once known to many now living in



132 Mrs. Frank W. Fisher

Childhood Sweethearts Meet Again in the Twilight of Life

Laura Hawkins lived across the street from Sam Clemens in Hannibal in the 1840's. She saw him first one hot summer day when he showed off his acrobatic skill in front of her house, just as Tom Sawyer did for Becky Thatcher's benefit. Lifelong correspondents, they met for the last time at Twain's Connecticut home in 1908. Twain died there two years later.

Hannibal. A kindly old ragpicker toward whom children were cautious, he was looked after for years by the townspeople, who liked him in spite of their protest that "he never did a day's work in his life."

Fables of Injun Joe Live On

Injun Joe died in the town of his fame some years ago, an aged and wrinkled half-breed Indian. Yet the awesome fables about him continue hardy and spiked with menace, as a comment I overheard one day on Cardiff Hill shows.

"This is the place where Indian Bill murdered the widow," a schoolgirl, garbling her facts a little, told her parents. It was a clear day, a soft time of year, and the locust blooms were fragrant on the hill. But the mother looked warily around for "Indian Bill" and uneasily herded her family from the treacherous ground of fiction.

Guides at the cave invariably point to a spot near the entrance where "Injun Joe died just where you're standing." And, invariably, adult visitors and children alike step hastily away.

Laura Hawkins, born Annie Laurie Hawkins, also has a strong inheritance in present-day Hannibal. More than a century ago she was a little girl in pigtails who lived across the street from Sam Clemens and became his first sweetheart. Being in love with her, and having an apple, he gave her the core.

As Becky Thatcher, she is ever a little girl to readers. But Hannibal knew her for many years as Mrs. Laura Hawkins Frazer, she who managed the city orphanage, an outstanding figure in the community until, at the age of 91, she died in 1928 (above). Her granddaughter, Mrs. Clara Frazer Fisher, grew up in Hannibal and lives there still. Today, with not a Clemens or a Blankenship living in the town, she is perhaps the most direct descendant of a famous cast (opposite.)

Many of the buildings Mark Twain knew in Hannibal are still in use. The house where Becky Thatcher lived, the old Hawkins home, has a bookstore in one wing, a cafe in the other. Two upstairs rooms have been restored to the Mark Twain era, and in the

"Becky Thatcher bedroom" clothes such as Laura wore are draped across the bed.

The home where Mark Twain spent his boyhood is restored throughout, even to "the room Tom Sawyer slept in"—the bedroom he shared with two of his brothers. Through its back window Sam Clemens, at a catcall signal from Tom Blankenship, dropped to the woodshed roof and the ground for frequent moonlight prowls. Tom Sawyer did it too (pages 122, 123).

Adjoining the white clapboard boyhood home, with its memories of Judge Clemens and his perpetual-motion machine and of Mrs. Clemens with her kitchen livened by 19 stray cats, stands the Mark Twain Museum opened by the city in 1937. Along with the scarred cherry desk on which *Tom Sawyer* was written, a pilot's wheel from an old Mississippi steamboat, the author's spidery early typewriter, and a lock of his hair, are hundreds of other items associated with Mark Twain (page 130). Most of the exhibits from his private life were lent by Mrs. Clara Clemens Samossoud, of Mission Beach, California, the only one of his four children still living.

Both the museum and the home are city-owned, and admission is free. Built by Mark Twain's father when the town was a pocket in the wilderness, the home was given to the city in 1912 by a Hannibal lawyer, George A. Mahan, and his family, with the stipulation that it should never be used for profit.

Famous Fence Kept White

The "fence Tom Sawyer whitewashed" stands beside the home on Hill Street, a replica of the one it was young Clemens's chore to brighten (page 135). Today's fence has been painted, but it is beginning to peel. When it looks properly aged it will get a coat of whitewash of the original formula.

In Hannibal the art of whitewashing has not been lost. Walking up a residential street on a Sunday morning, I saw a boy with a long-handled brush and bucket of white-

Century-old Memories Fill the Upstairs Parlor of the House Where Becky Lived

In the parlor where Laura Hawkins—real-life counterpart of Becky Thatcher—studied by candlelight, her granddaughter Clara Fisher examines a family album by electricity. Mrs. Fisher still lives in Hannibal.

National Geographic Photographer Willard R. Culver

wash giving a last quick swash to a garden wall. I could hear the juicy swipes and see a fishpole leaning against the porch. A moment later the fishpole was gone—and the boy.

The small frame law office where Judge Clemens carried on his practice and presided as justice of the peace during Hannibal's frontier days was moved last year from its original site on Bird Street. Age and the recurrent high waters of the Mississippi had weakened the dark decaying courtroom that Mark Twain recalled in *Innocents Abroad*, the courtroom where he, a schoolboy, came upon the corpse of a stabbed man lying on the moonlit floor.

Gerald R. Massie

Judge Clemens's Law Office Recalls Frontier Days

Townspeople last year moved the structure to this site on Hill Street to spare it from repeated flood damage.

Volunteers Saved Landmark

The precarious slant of the waterlogged 1840 building gave warning to Hannibal in the spring of 1955. The town speedily set about saving it; some people gave their labor, some donated land, and many contributed money. It was taken down in sections and rebuilt on a donated lot beside the Becky Thatcher house. Today its restored courtroom appears as it was when the stern father of Mark Twain climbed on his three-legged stool and rapped for order and a jury of pioneers sat on a puncheon bench before him.

The printing office where Mark Twain learned his original trade of setting type was pulled down in 1954. In that building on Main Street he was, at 12, a printer's devil on the *Missouri Courier*. His pay for a seven-day week was room and skimpy board, plus a suit of hand-me-down clothes each year.

His older brother Orion started a rival paper, the *Western Union*, and Mark Twain moved over to it. A skilled printer and shop foreman at the age of 15, he began his writing career on that paper and at that age. The parlor of the home on Hill Street, now so severely neat, was for a time the printing office of the merged *Western Union* and *Journal*, where the three Clemens boys ran their paper through the press.

It was not a great success, in spite of Orion's boast in one of his 1851 issues that "we have a larger circulation, by *over one hundred*, than any other paper published in this section." That still gave the paper on which Mark Twain wrote "Our Assistant's Column" a circulation of only 550, give or take a few.

Hannibal in those days owed its livelihood to the Mississippi. In the year 1847 steamboats took from its wharves freight valued at $1,200,000—a staggering figure then, although today one towboat on a single haul has pushed cargo worth twice that sum.

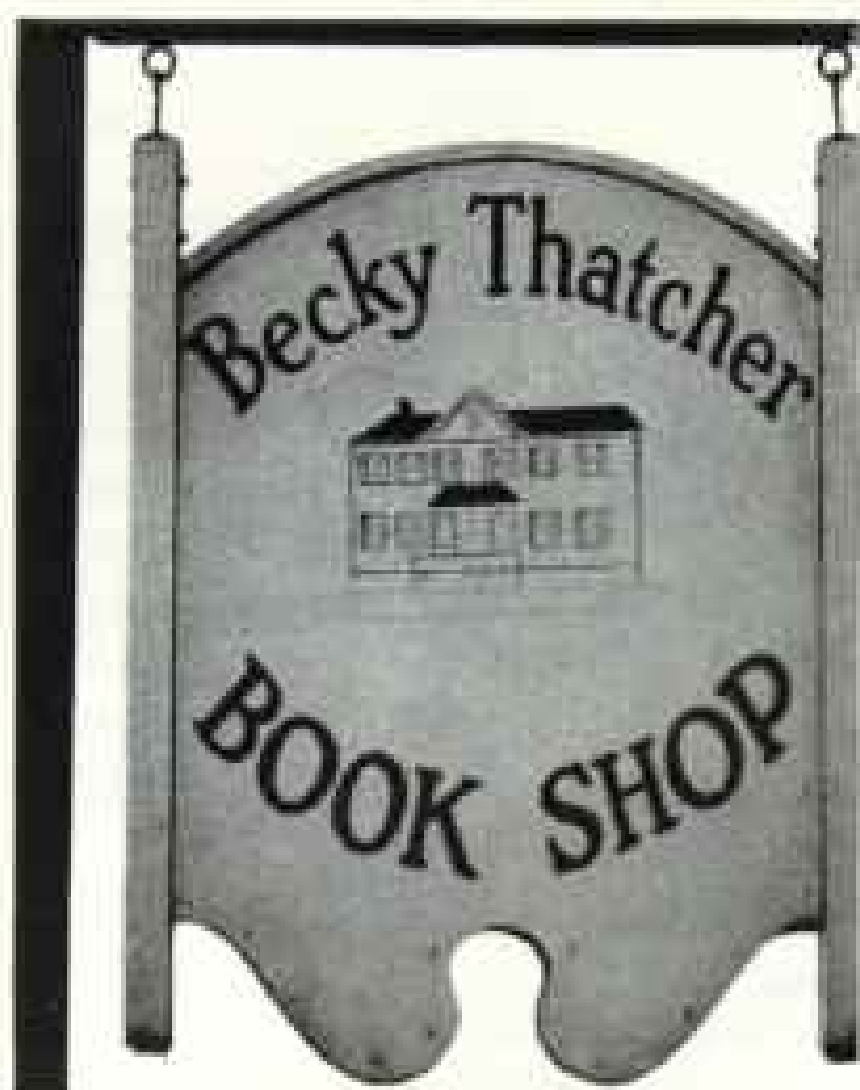
The river was responsible, too, for the site's discovery and settlement. Local historians credit Louis Hennepin, a Franciscan Recollect friar born in Belgium, with being the first white man to step ashore at the site of present-day Hannibal. Hennepin was 39 when he sailed in 1679 with La Salle from Canada

"Tom Gave Up the Brush with Reluctance in His Face, but Alacrity in His Heart"

"'Aunt Polly's awful particular about this fence,'" Tom told Ben Rogers. "'I reckon there ain't one boy in a thousand, maybe two thousand, that can do it the way it's got to be done.'"

Thus tricking his pals into doing his chore, Tom grudgingly accepted an apple, a kite, firecrackers, tadpoles, a broken knife, a dead rat, marbles, and other assorted treasures for the privilege of whitewashing.

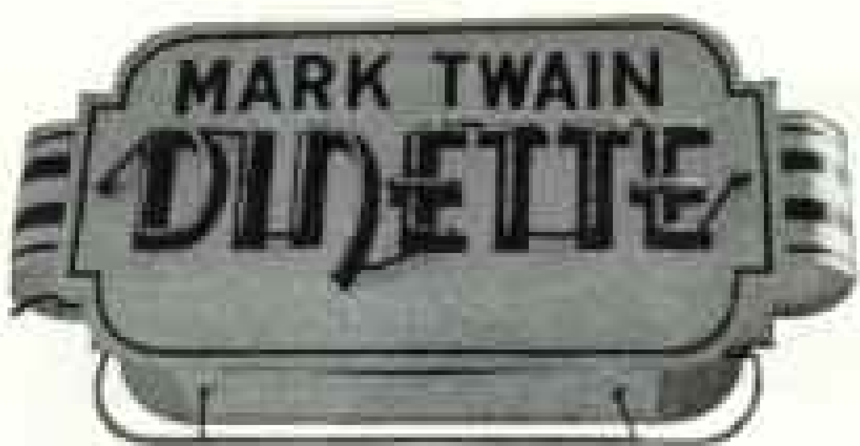
National Geographic Photographer Willard R. Culver



through the Great Lakes to explore the unknown West. At Lake Peoria on the Illinois River the expedition divided, La Salle sending Michel Aco and Father Hennepin down the Illinois to its junction with the Mississippi, and up that great river toward the north. On their canoe voyage upstream to Minnesota, Hennepin made a landing at the Hannibal site. La Salle was killed by his own men in Texas, but Hennepin recorded their Mississippi discoveries and published his descriptions of the Louisiana country in France in 1683.

Not until 1818 was any move made to settle Hannibal. In that year Abraham Bird was granted the

Mark Twain and Hannibal Are Inseparable . . .



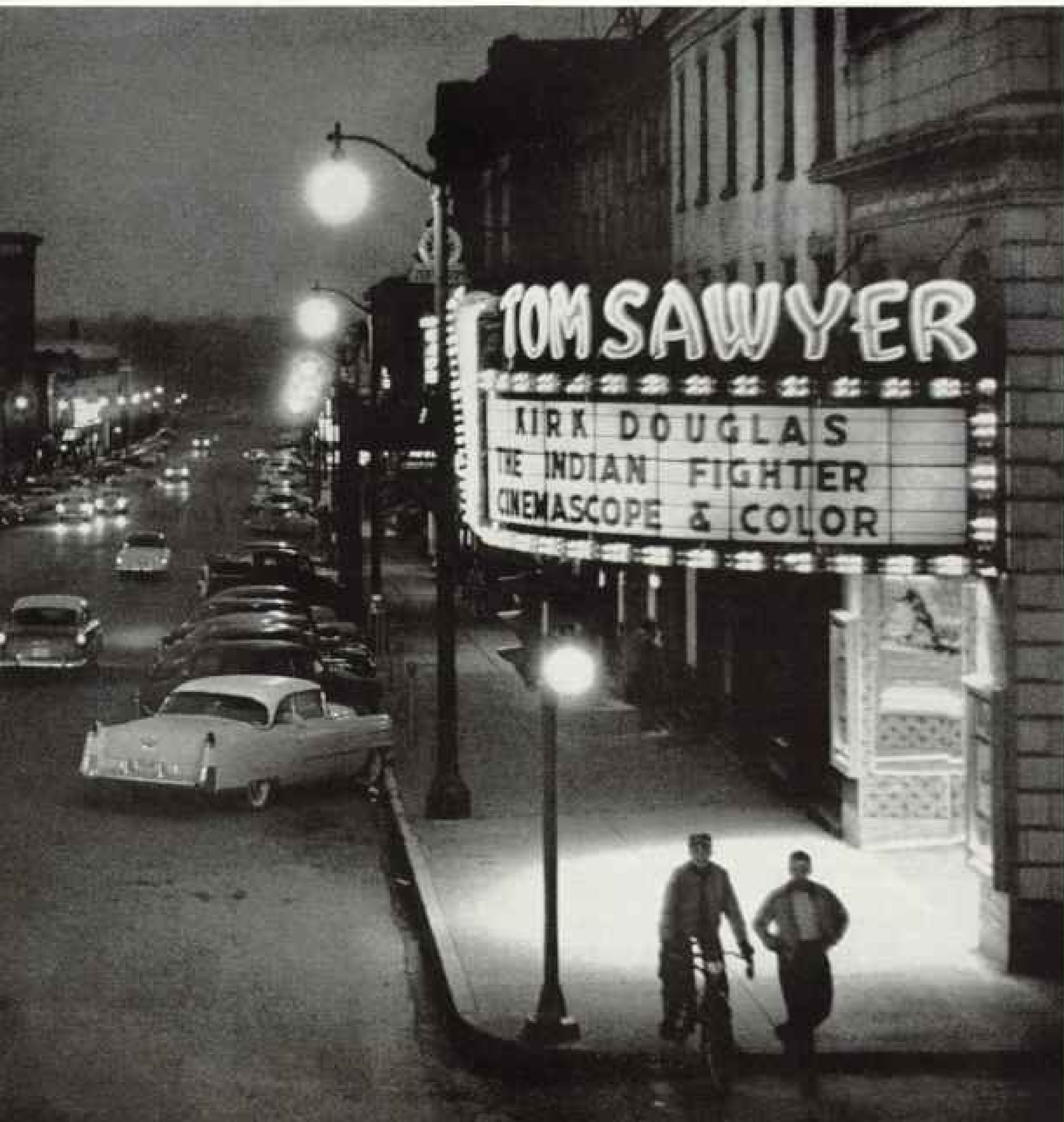
area around Bear Creek in exchange for land he had lost at New Madrid, Missouri, during earthquakes that in 1811 and 1812 shook the bed of the Mississippi. By 1827 five families had located there; by 1830 there were "thirty souls," trigger-alert for Indians. Nine years later the Clemenses arrived.

Originally settlers were drawn to Hannibal by a lumber boom. Later came the flour mills, the slaughter houses, and distilleries, then the railroad yards. The Burlington Line's freight repair yards are still in business. Other major industries are a branch of the International Shoe Company, a planing mill, a drill tools factory, and a cement plant.

Farming is as important to Hannibal as its industries. In the rich soil surrounding it, corn, soybeans, oats, wheat, and dairying supply a living for the farmers who trade in the town. Prosperity shows in the total deposits of $18,500,000 in its three banks.

The roster of Hannibal businesses pointedly indicates the citizen who brought it world fame. Shop signs tell of the Mark Twain

. . . And the Once-sleepy River Hamlet, Now Grown and Thriving, Displays Its Pride



Printers, Mark Twain Jewelry Co., Mark Twain Rest Home, Mark Twain Cleaning Co., and Mark Twain Confectionery. Other establishments bearing the famous name are a dinette, gift shop, hotel, insulation company, produce company, supply company, and a taxi company. There are also the Tom Sawyer Theatre and the Huck Finn Burger Bar.

The Mark Twain Memorial Bridge across the Mississippi, completed in 1935 at a cost of $1,000,000, is the entrance to the town on U. S. Highway 36, the entrance that now—rather than the Mississippi—is the town's link with the Nation.

River Trade Is Incidental Now

The very speed of the towboats that pass under the bridge, with its necklace of lights at night, has isolated Hannibal from the growing river trade. When Mark Twain was a pilot on the Mississippi, a steamboat made 10 round trips a year between St. Louis and New Orleans. Today a towboat makes a round trip every 10 days. Diesel power enables them to make long-distance nonstop hauls, and they are not compelled to put in at small ports like Hannibal.

Nor are river hazards the same. In a stretch of the river within sight of one farmer's home, 29 steamboats were lost. Today the Mississippi between Baton Rouge and St. Paul has a navigable channel with a minimum depth of nine feet. Twenty-six dams with their accompanying locks ensure dependable navigation on the upper Mississippi. And the safety work goes on.*

Another hazard vanished through the progress of engine design. Steamboat boilers, overstrained for speed, often blew up. Mark Twain's younger brother Henry died as a result of steam burns when the *Pennsylvania*, on which he was the 20-year-old "mud clerk," or apprentice purser, exploded in 1858.

Henry is buried in Hannibal, as are Jane and John Marshall Clemens, Mark Twain's mother and father, and his brother Orion. Four small headstones mark their graves. Mark Twain died in his home in Connecticut in 1910 at the age of 74. He is buried beside his wife and three children at Elmira, New York.

A giant bronze statue of the writer in his later years stands in Hannibal's Riverview Park, overlooking the Mississippi from a height of 200 feet (opposite). The work of Frederick Hibbard, it was the 1913 gift of the State of Missouri and bears the inscription: "His religion was humanity and a whole world mourned for him when he died."

Riverview Park of some 250 acres is also a gift to the town. A woodland Mark Twain knew as a boy, it was presented by the W. B. Pettibone family and is maintained by them. Its shrubs, lawns, and native trees make it one of the most beautiful parks in the United States. Like other sights connected with Mark Twain's life in Hannibal, with the single exception of the cave, it is open to everyone without charge. Hannibal has not attempted to profit from his fame. The town owns many of its historic buildings and maintains them at taxpayers' cost.

Gifts that help support a project large for a town of this size have come mainly from Hannibal people. Much of the work is done by volunteers. The city pays only two full-time salaries, those of the custodians at the Mark Twain home and museum. All members of the Mark Twain Municipal Board serve without pay.

One of the custodians of the boyhood home was born in Hannibal and, like so many you meet there, has some connection with the author. She is Mrs. Cyrus Anderson (page 123). Her grandfather, Will Pitts, was a playmate of Mark Twain and wrestled with him at the town pump. Dr. John Canella, one of Hannibal's physicians, is a grandson of the storekeeper who sold Mark Twain his strong cigars, those pungent, cheap, "long nines."

Throngs of Visitors Surprise Residents

Parents like these, raising their children in the outdoor freedom that bears Tom Sawyer's stamp, are somewhat amazed by the unceasing crowds that come to their small town, a town not advertised nor publicized.

"People come here from every place you can think of," says John Winkler, chairman of the Mark Twain Municipal Board. "This past year, 1955, we had a terribly hot summer and only 127,000 came. It was the same in 1954, when we had 134,000. But in the fine weather of 1953 there were 143,000."

A building older in appearance than any in Hannibal is Mark Twain's birthplace at Florida, Missouri, 25 miles to the southwest. Florida holds but a handful of houses now and in size is little different from the wilder-

* See "Men Against the Rivers," by Frederick Simpich, NATIONAL GEOGRAPHIC MAGAZINE, June, 1937.

ness crossing to which John Marshall Clemens brought his family. An unsuccessful lawyer in Tennessee, he had come by horse and carriage and steamboat to Missouri, arriving with his wife and four children only six months before his famous son was born on November 30, 1835.

One of seven children, Mark Twain was a weak baby whom neighbors did not expect to live. Premature, he arrived when Halley's comet was in the sky and died when it reappeared 74 years later.

The two-room cabin with its two adults and four children was already crowded when Mark Twain was born. But before the Clemenses moved to Hannibal, another son, Henry, was born and their daughter Margaret died.

Today sparrows nest in the broken timbers of the frayed cabin, and field mice inhabit its many holes. It stands alone in the Mark Twain State Park outside Florida. Custodian John Schmidt, who lives down the road, gives visitors the key.

The two whitewashed rooms are barely furnished with odd items—a handless clock, a spinning wheel, a bellows organ, and a bed—that never belonged to the Clemens family. Their furniture was sold for debt during the Judge's unprosperous days in Hannibal.

Back in Hannibal, where the Mississippi is still the truant's highway, I joined a family going fishing. The youngest

National Geographic Photographer Willard R. Culver

Mark Twain Looks Out on His Beloved Mississippi

School children from Atlas, Illinois, touring Hannibal by bus, pay a call to the towering bronze statue in Riverview Park

National Geographic Photographer Willard R. Culver

With the Mile-wide Mississippi as a Back Yard, Growing Up Is Fun in Hannibal

Fresh-caught catfish will soon sizzle over a campfire for the midday banquet on Jackson's Island.

with a rod and reel was barely three, but everybody's hopes were high—as high as those of Huck Finn who, fishing off Jackson's Island with a skinned rabbit for bait, caught a catfish as big as a man. It was six-foot-two and weighed 200 pounds—"as big a fish as was ever catched in the Mississippi, I reckon."

Today's fish are a little smaller than that, though the yarns have not noticeably shrunk. A fair-sized catfish caught off Jackson's Island by anybody but Huck Finn weighs 30 pounds and is three-feet-four—as big as a boy. The world's record blue cat taken by rod and reel weighed 94 pounds, 8 ounces. But a fish that can growl, hum, or mew and travel across damp ground—as scientists say some species of catfish can do—lends itself to such tales as Mark Twain's, tales that linger still in the town he knew.

For, almost more than any other, Hannibal is suited to "the contemplative man's recreation," and its anglers still sound like the boy who 70 years ago meandered through the pages of *Huckleberry Finn*.

"We catched fish and talked, and we took a swim now and then to keep off sleepiness. It was kind of solemn, drifting down the big, still river, laying on our backs looking up at the stars, and we didn't ever feel like talking loud, and it warn't often that we laughed . . ."

Town Still a Paradise for Boys

On any fair day in this Izaak Walton town worms wiggle on hooks that hang in creeks, in branches, and in the big, still river itself. And the talk that is heard isn't loud.

In every country where Mark Twain is read—a circle of books that stretches around the globe—Hannibal is known in its dress of fiction under the many names its author gave it. Yet it was just a village on the Mississippi like many others until Mark Twain made it known as a paradise for boys. Today it is that still.

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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. It has aided and encouraged exploration literally to the ends of the earth, having contributed to expeditions of Rear Admiral Robert E. Peary, discoverer of the North Pole, and Rear Admiral Richard E. Byrd, first man to fly over the North and South Poles.

National Geographic exploration and scientific study made known to the world the natural wonders now preserved as Katmai National Monument and Carlsbad Caverns National Park.

The Society's notable expeditions pushed back the historic horizons of the Southwest to a period nearly eight centuries before Columbus by dating the vast ruins of Pueblo Bonito.

In Mexico, The Society and the Smithsonian Institution, January 16, 1939, discovered the oldest dated work of man in the Americas. This stone is engraved, in Mayan characters, November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything else dated in America and reveals a great center of early American culture, previously unknown.

On November 11, 1935, the stratosphere flight of the world's largest balloon, *Explorer II*, sponsored by The Society and the U. S. Army Air Corps, reached a world-record altitude of 72,395 feet. Capts. Albert W. Stevens and Orvil A. Anderson took aloft a ton of scientific instruments and obtained results of extraordinary value.

A notable undertaking in astronomy was completed in 1956 by The Society and Palomar Observatory of the California Institute of Technology. This project photomapped vast areas of space, making available to observatories all over the world, at less than cost, the most extensive sky atlas yet achieved.

The Society and individual members contributed $100,000 to help preserve for the American people the finest of California's sequoias, the Giant Forest in Sequoia National Park.

One of the largest glacial systems outside the polar regions was discovered in Alaska and Yukon in 1938 by Dr. Bradford Washburn, exploring for The Society and Harvard University.

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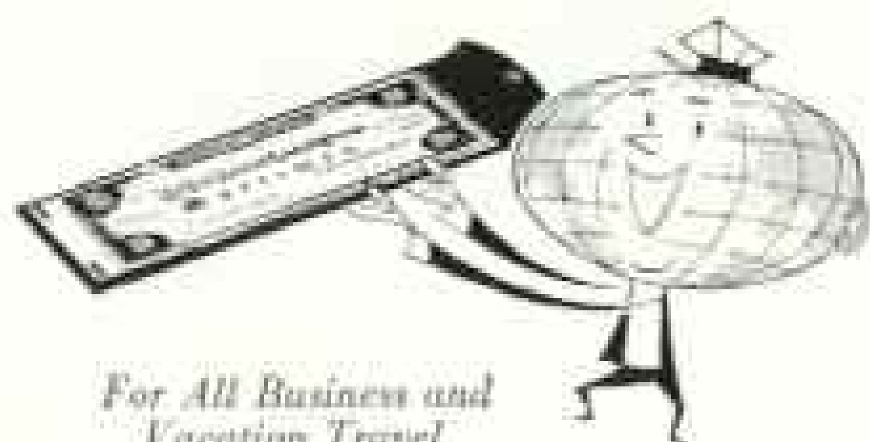

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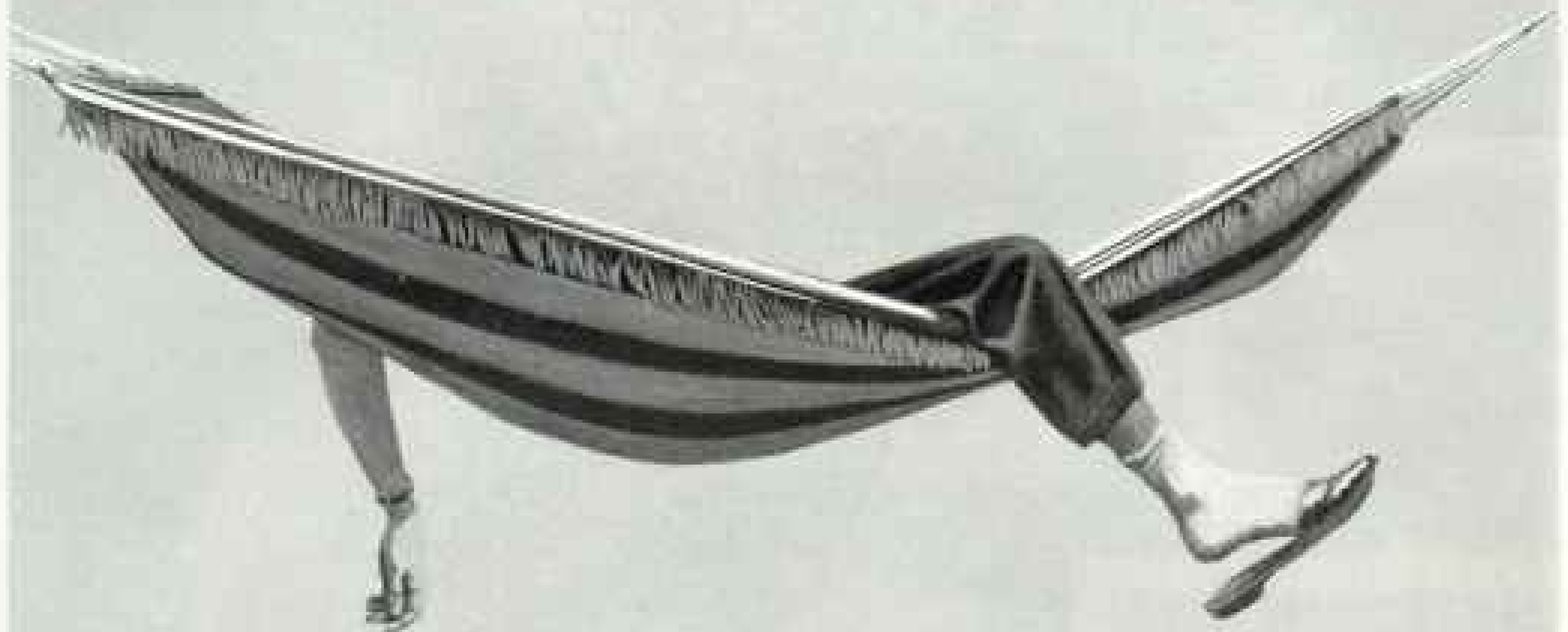

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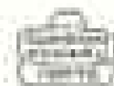

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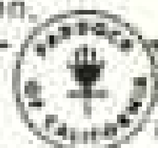

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Anyone with high blood pressure (hypertension) of the moderate, uncomplicated type . . . should face his situation in much the same way as the deep sea diver does his work.

This is because successful control of this disorder may depend upon knowing what and what not to do. In fact, by avoiding situations and conditions that adversely affect blood pressure, it is often possible to bring an elevated blood pressure down . . . or keep it from rising to excessively high levels.

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When hypertension occurs, the very small terminal portions of the arteries contract. Pressure within these narrowed blood channels rises . . . and the heart works harder to force needed amounts of blood through them.

If the blood vessels are strong enough to withstand the extra pressure, harmful effects may not be noticed for many years. The continuous strain, however, may eventually overwork the heart and weaken the blood vessels.

If hypertension develops, then what?

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Since tension, anxiety and worry are believed to be related to this disorder, it is important to live calmly and to be moderate in eating, working and everything else. One good rule is this: *do everything your doctor permits, but no more*. Following this rule alone often helps patients live long, comfortably and usefully with hypertension.

If more rest and recreation, and avoiding tension and strain, fail to control this disorder . . . then the doctor may try diet, drugs or surgery.

What about guarding against hypertension?

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So, everyone should have periodic health examinations . . . especially those who are middle-aged and older, are overweight or have a family history of the disorder.

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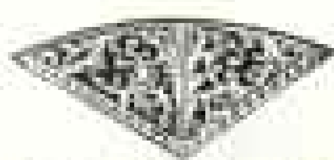

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Gaye qualifies in many ways. Even in her leisure hours, she finds time to help others, especially the handicapped and the needy. Another of her activities is rehearsing a 26-girl choir.

Gaye sums up one of her main satisfactions this way:

"It's nice to have people think of the telephone company as a place where they can always find courtesy and consideration. That's our job and we try to be good at it."

Helping the Blind. Raising money to provide "Guide Dogs for the Blind" has been one of Mrs. Evans' activities in the Venture Club—an organization of Oakland (Calif.) business women.

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