WALL MAP SUPPLEMENT: LANDS OF THE BIBLE TODAY (page 796)

VOL. 132, NO. 6 DECEMBER, 1967

NATIONAL GEOGRAPHIC

SEE "WINGED WORLD" MONDAY, DECEMBER 11, ON CBS TV (page 877A)

OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY WASHINGTON, D. C.

December, 1967

NATIONAL GEOGRAPHIC

Where Jesus Walked

By HOWARD LA FAY
National Geographic Senior Staff

Photographs by CHARLES HARBUTT, Magnum

FOR MANY SHALL COME in my name, saying, I am Christ; and shall deceive many. And ye shall hear of wars and rumours of wars: see that ye be not troubled: for all these things must come to pass. . . . MATTHEW 24:5-6

The Israeli city of Tiberias falls somewhere between a chic resort and an armed camp. Beside the waterfront cafes, rifles were stacked in pyramids, while soldiers, so recently locked in battle on the nearby Golan Heights of Syria, splashed in the Sea of Galilee. From my table I could look across the blue waters—gaily latticed by the wakes of water-skiers and pleasure boats—to those stark, war-torn bluffs towering above the eastern shore.

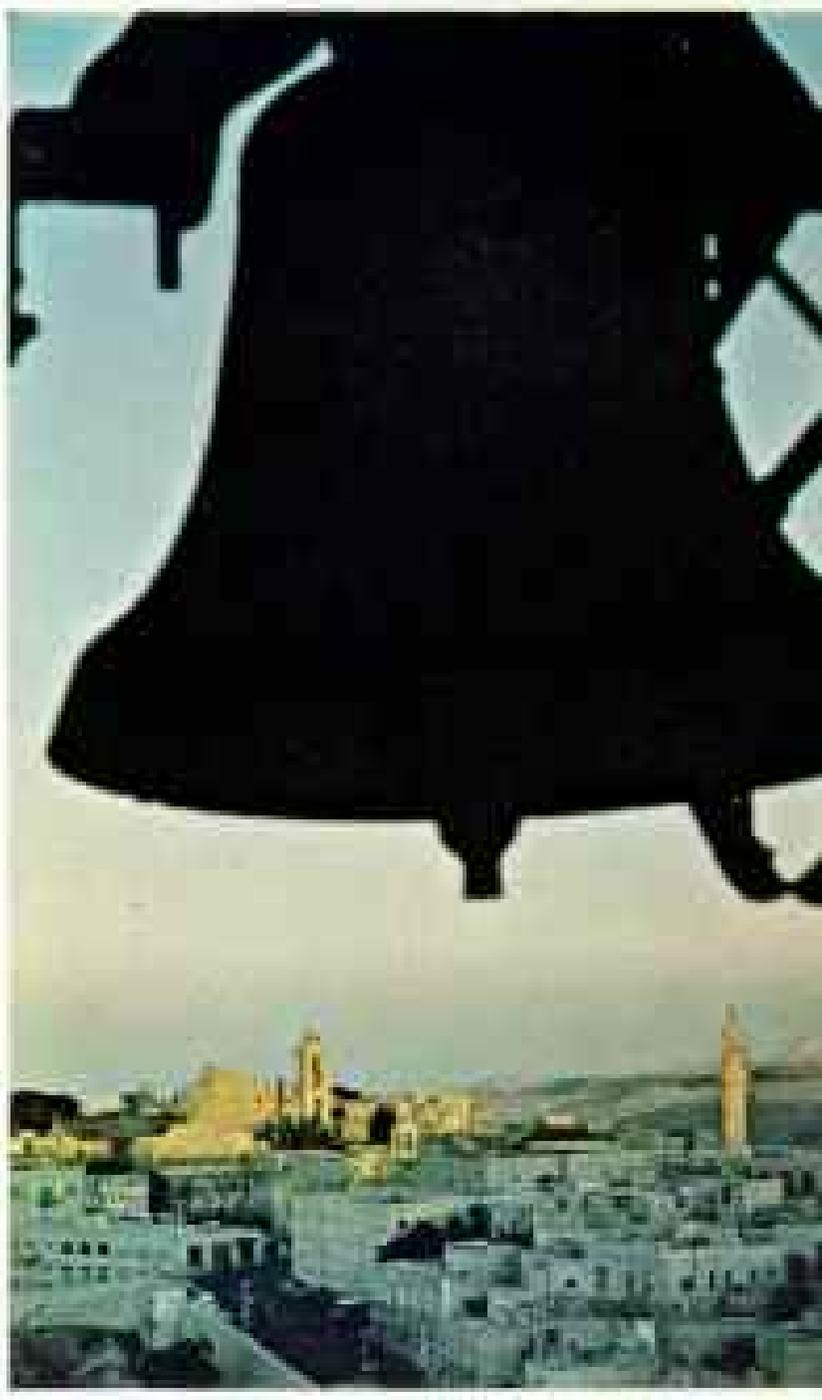
"If you had binoculars," the waiter told me, "you could see what's left of the Arab gun emplacements."

Even without binoculars I could see the newly bulldozed road that zigzagged up the face of the heights like a jagged wound. In endless procession, tourist buses, jeeps, and truckloads of picnicking kibbutzniks wound their way upward to view the shattered Syrian defenses and charred tanks overrun by the Israeli Army in the short, slashing campaign of June, 1967. (See "Eyewitness to War in the Holy Land," page 782.)

For 20 years the thunders of border war have been commonplace beside the Sea of Galilee. Farmers in Israel's frontier kibbutzim worked their fields with rifles slung on their backs and operated their tractors from armored cabs. On both sides of the frontier toddlers at play had the same instinct for defilade as veteran infantrymen.

Jesus of Nazareth, I reflected ruefully, would find scant difference between the Galilee of His day and ours. The long centuries have not purged this fairest of Middle Eastern provinces of violence, blood, and the awkward sprawl of death.

Two thousand years ago the Son of Man was born into a world —like ours—asunder. Roman legions under Pompey had conquered Palestine and taken Jerusalem in 63 B.C. Ruthlessly Rome suppressed an uprising 26 years later, and screaming Jews died



BELLS OF BETHLEHEM repeat the "good tidings" of Jesus' birth across the Judaean countryside. Columned tower of the Church of the Nativity rises above the grotto hallowed as the birthplace of the Son of Man. Ruins of Herod's tomb crown the peak at right.

CAREFREE AGE OF INNOCENCE leads children to a sunlit meadow outside Nazareth, where Jesus spent His childhood—the "hidden years" unchronicled by the Gospels. Jesus probably devoted much of His day to studying the Law of Moses, like most Jewish boys, or helping His

foster father, Joseph, in the carpenter shop. But there must have been time to play and dream in the nearby fields, where He came to know the birds and flowers, the fig tree and the mustard seed—the wonders of nature that He used to illustrate His teachings in later years.

on crosses "from Dan to Beersheba." But the stiff-necked, fiercely theocratic Jews never really accepted the yoke of the Caesars. They bore it, but with smoldering rebellion.

As the Christian Era dawned, sedition flared on all sides. Quicksilver messiahs, revolutionaries, and self-proclaimed prophets with names like Zadok, Simon, Theudas, and Judas the Galilean raised their standards everywhere. And everywhere they and their followers were brutally crushed.

In Galilee brigands and guerrillas infested the hills; fanatical rebels called Zealots spread terror with their short knives, killing Romans and any who collaborated with them. Tax gatherers mercilessly squeezed an impoverished peasantry, while Roman-appointed rulers—Herod the Great and his son Herod Antipas—lived in pagan splendor. New sects proliferated; some, like the Essenes, fled to the desert to prepare for the final "War Between the Children of Light and the Children of Darkness." Many believed they were living through "the end of days."

This was the land and this the people that awaited the coming of Jesus, called the Christ.

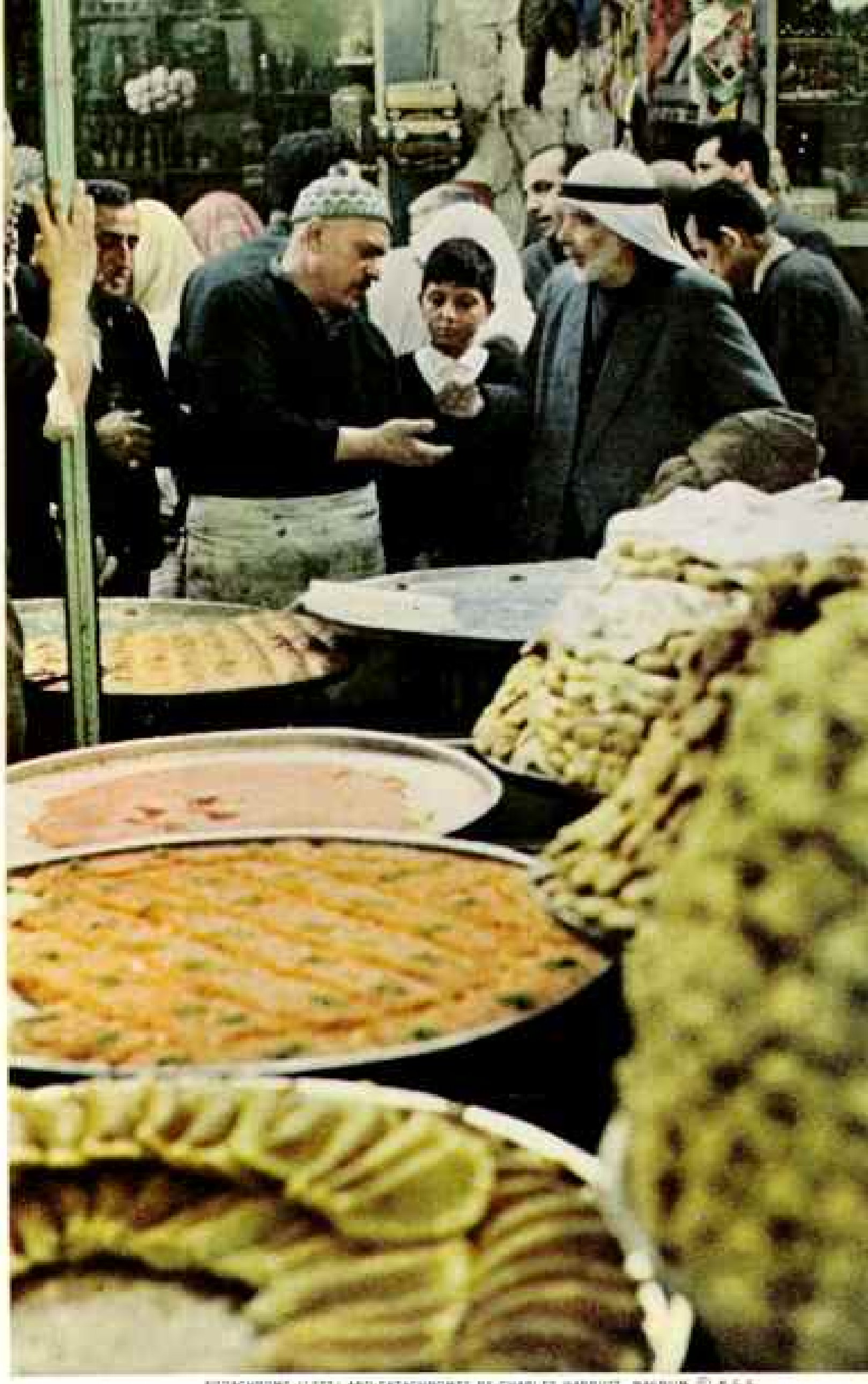
THERE WENT OUT a decree from Caesar Augustus, that all the world should be taxed. . . . And all went to be taxed, every one into his own city. And Joseph also went up from Galilee . . . unto the city of David, which is called Bethlehem; (because he was of the house and lineage of David:) To be taxed with Mary his espoused wife, being great with child. LUKE 2:1, 3-5

No one can know by what route the carpenter Joseph and his pregnant wife journeyed from the green fields of Galilee to the parched hills of Bethlehem. But Jerusalem stood only five miles from Bethlehem, and the Temple, overlooking the Valley of Kidron, was the focal point of Judaism. The pious couple from Galilee almost certainly would have paused there to offer prayers of thanksgiving. Then, via the direct route used by the Syria-Egypt caravans, they would have continued to David's city (map, page 745, and

TANTALIZING AROMAS lure a lad to a pastry stall in Jerusalem's marketplace. Such a buzzing bazaar, many times the size of Nazareth's, would have fascinated Jesus, when at 12 years of age He came with Mary and Joseph to the Holy City to celebrate the Passover.

JERUSALEM'S ANCIENT GLORY, reproduced in miniature, sprawls across the grounds of the Holyland Hotel. Archeologists and historians guided construction of the marble, stone, and wood model. School children stand near the entrance to King Herod's towered palace. Across the city stood the magnificent Temple, where the parents of Jesus "found him . . . sitting in the midst of the doctors, both hearing them, and asking them questions" (Luke 2:46).

RECITATION AND DISCUSSION, practiced in Jewish schools for centuries, help students in Jerusalem learn the ancient laws of their faith.



KODACHROME (LEFT) AND EKTACHROMES BY CHARLES HARBUTT, MAGNUM © N.G.S.

EXTACHROME © N.G.S.

WORN BY CHARIOT WHEELS, polished by the feet of centurions and countless wayfarers, the ruin of a Roman road runs through crumbling Caesarea. Another Roman road, the great Via Maris, or Way of the Sea, passed by the shore of the Sea of Galilee, where Jesus walked and taught.

the special wall map, **Lands of the Bible Today**, a supplement to this issue).

Two roads now link Jerusalem and Bethlehem. The older, more urbanized and more direct, has been reopened after a long limbo in the no man's land that divided Israel and Jordan. But anyone seeking the Judaea of Jesus should take the newer, circuitous road carved out of lonely, timeless hillsides by engineers of the Jordanian Army.

I followed it from Jerusalem as it wound tortuously down the Wadi an Nar, then up again, hugging the contours of khaki-colored heights. The terrain is old, sere, bereft of vegetation save for scattered terraces where olive and fig trees fight an unequal battle for survival.

Here and there along the road, houses cluster around the infrequent wells. I saw women in the flowing robes of Jesus' time drawing water. Then, balancing jugs or cans on their heads, they strode homeward—fiercely and pridefully erect—as had their mothers from time immemorial.

I slowed to watch a shepherd, staff in hand, steer his fat-tailed sheep across a ridge by adroitly casting stones where he didn't want his flock to go. I could hear the faraway, melodious clank of the sheep's bells.

The yawning mouths of caves and of tombs rifled centuries—perhaps millenniums—ago riddle marly slopes. To the south, the squarish mountain reshaped by Herod the Great dominates the skyline. Herod chopped the top off a neighboring peak and used the debris to heighten and broaden the mountain to accommodate the Herodium, a palace-fortress that became his mausoleum (page 739).

According to St. Matthew, when the wise men from the east told Herod that they had come to Bethlehem to worship the newborn "King of the Jews," Herod slaughtered all the male children in the vicinity under the age of two. No secular history records the event, but Herod the Great—whose reign ended when Jesus was perhaps two years old—was no stranger to mass bloodshed. Pathologically suspicious of any potential usurper of the throne, particularly members of the royal family, Herod had already put his favorite wife and her two sons to death.

But the king was a complex man; though steeped in blood, he rigidly observed the dietary prohibitions of the Mosaic Law and would eat no pork. This paradox provoked a rare witticism from Herod's friend and patron, Caesar Augustus. "I would rather," dryly observed the Roman Emperor, "be Herod's pig than Herod's son."

Sinister and unnatural above the bright Judaean landscape, Herodium is a fitting memorial to that cruel and brilliant monarch.

Finally the road forks, and to the left lies an ancient quarter of Bethlehem. Sprawling high on a hillside, the city dominates a broad plain sloping away to the east. Christians know this plain as the Shepherds' Field, and the Arabs call the village on the plain Bayt Sahur—House of the Shepherds.

Nearly 2,000 years ago shepherds were abiding in this field, the Gospel of St. Luke

Birthplace of Christianity

ANCIENT KINGDOM of the Jews, outpost of the Roman Empire—this was the land Jesus knew. The towns bear the names of His day; the roads follow the turnings He traveled. Roughly the size of Massachusetts, His homeland traditionally stretched from Dan to Beersheba, approximately 150 miles, a distance a man could walk in a week. Only 80 miles separate Nazareth from Bethlehem. Although the Romans improved the major trade routes, paving them with stones, much of the travel was on dusty tracks or rocky trails.

No one knows the exact route of the Nazarene during His brief ministry. The Gospels do not agree in chronology and often fail to refer to places by name. Locations of many revered sites of Christianity rely on tradition: the baptism of Jesus at the ford north of the Dead Sea; the town of the first miracle, Cana, north of Nazareth; the temptation of Jesus in the wilderness among the harsh hills near Jericho; and the Transfiguration on Mount Tabor or Mount Hermon.

But to the men who wrote the Gospels, the events of Jesus' life far outweighed concern with such details as where they happened.

Inset below shows boundaries as of June 4, 1967. For the June 10, 1967, cease-fire line, see page 785 and supplement map distributed with this issue.

tells us, "keeping watch over their flock by night. And, lo, the angel of the Lord came upon them, and . . . said unto them, Fear not: for, behold, I bring you good tidings of great joy, which shall be to all people. For unto you is born this day in the city of David a Saviour, which is Christ the Lord."

Since that first Christmas, the city of David has survived a rocky history. Romans, Byzantines, Arabs, Crusaders, Turks, Britons, Arabs again, and Israelis have ruled it in their turn.* During the Middle Ages, the population dropped to a scant hundred souls.

The Bethlehem of today, a febrile community of 23,000, flourishes primarily on tourism. All year long, buses disgorge pilgrims on the paved square facing the Church of the Nativity, and the sensibilities of newly arrived Christians are often outraged by the persistence of the souvenir sellers.

"But our lives and our children's lives depend on it," one of the frenzied merchants told me. "If the pilgrims don't come, or if they don't spend, we starve."

The Church of the Nativity itself dates mainly from Crusader times. Centuries of rebuilding have seen the only entrance grow smaller and smaller, and I had to crouch to go in. The purpose of the minuscule opening, some authorities say, is to elicit a respectful bow from all who enter. Others say that it served to thwart Turkish cavalry, ever fond of clattering through Christian shrines.

Inside, the church smelled of incense, and a jungle of votive lamps hung low from the ceiling. I followed a stairway down below the main altar into the grotto, held by tradition to be the birthplace of Jesus. St. Justin Martyr, writing 100 years after Christ's time, mentions such a cave. And about A.D. 248, Origen wrote that "they still show the cave in Bethlehem where he was born. . . ."

When St. Helena, the mother of the Emperor Constantine, built the first Church of the Nativity about the year 325, she raised it over this same cave revered by Christians from the second century. Thus the tradition is almost as old as Christianity itself.

Down in the grotto, richly faced now with marble, I came upon a lone woman—apparently a pilgrim from England—kneeling before the simple altar that stands above Jesus' birthplace. Below, a two-foot silver star frames a small segment of the cave's original rock floor, worn smooth by the kisses of generations of pious visitors.

Guttering lamps reflected on the old gold of icons clustered about the sacred spot and upon the lined face of the woman. The cave was absolutely still save for the susurration of her voice, as she read quietly to herself from the second chapter of St. Luke: "And she brought forth her firstborn son, and wrapped him in swaddling clothes, and laid him in a manger; because there was no room for them in the inn."

In the two millenniums of its existence, Christianity has split into innumerable sects. But despite conflicting theology, Christians agree on one thing: Here is where it all began.

AND HE CAME and dwelt in a city called Nazareth: that it might be fulfilled which was spoken by the prophets, He shall be called a Nazarene.

MATTHEW 2:23

Galilee in the time of Jesus did not enjoy a high reputation among the rabbis and sages of Jerusalem. The Galileans tended toward laxity in their observance of the Pentateuch's rigid laws, and felt a greater concern for their crops than for the scholarly legalisms of the priests. One incensed rabbi cried, "Galilee, Galilee, thou hatest the Torah."

But even in disreputable Galilee, Nazareth —then a smallish village—apparently bore a particularly bad name. When the disciple Philip sought out Nathanael of Cana to give him the good news that Israel had found its messiah in "Jesus of Nazareth, the son of Joseph," Nathanael wryly asked:

"Can there any good thing come out of Nazareth?" (John 1:45-46).

Nazareth today, I found, bears little resemblance to the hamlet inhabited by the Holy Family. Some 30,000 Arabs—half Christian,

*See, in the NATIONAL GEOGRAPHIC, "Hashemite Jordan, Arab Heartland," by John Scofield; and "Pilgrims Follow the Christmas Star," by Maynard Owen Williams, both December, 1952.

THREAD OF LIFE THROUGH HARSH HILLS, the Jordan River coils southward from the Sea of Galilee, creating a swath of plenty. Jesus was about 30 years old, according to St. Luke, when He came to the Jordan to be baptized by John the Baptist before beginning His ministry. Except for a northern segment, the entire valley lay within Jordan until last June, when Israeli troops swept in and seized the western bank, left.

KODACHROME BY THOMAS NEBBIA © N.G.S.

half Moslem—dwell in the city, which is set into a kind of natural amphitheater in the hills (pages 740-41). On a ridge to the northeast, 11,000 Jews live in a new quarter called Nazerat Illit, or High Nazareth.

In the East, each generation builds on the ruins of its predecessors, so that the Nazareth known to Jesus lies well beneath the present streets. Pious excavators, however, have uncovered two rival grottoes of the Annunciation, two competing homes of the Holy Family, a cave purporting to be Joseph's workshop, and a stone table whereon, tradition holds, the resurrected Jesus dined with his disciples.

I visited them all, and in each heard an impressive recital of their archeological credentials. But to me the city's most authentic echo of Jesus' time lies in the old Arabic marketplace, or *suq*. Here, in a labyrinth of narrow streets, peddlers in flowing kaffiyehs prod their tiny heavy-laden donkeys, and merchants importune passers-by from their booths. The air is loud with haggling and fragrant with the odors of fruit, pressed olives, spices, and new-baked loaves. Fresh-killed lambs dangle from the butchers' hooks, and children hungrily eye pastries basted with clear, golden honey. This is the true Nazareth—vivid, dynamic, timeless.

Thanks to archeological discoveries, early records, and certain ancient usages that still persist in the Holy Land, scholars can reconstruct with some accuracy the details of Jesus' life 2,000 years ago. For example, excavations

HARVESTING AT EVENTIDE, a woman reaps with tools unchanged since Bible times. Dull sickle under her arm rips barley up by the roots.

TO PLOW, TO SOW, TO REAP: Life for the Galilean farmer keeps an age-old rhythm. This fertile land witnessed the greater part

have shown that dwellings in Palestine have changed little in 3,000 years. As did those who went before and those who came after, Jesus probably lived in a blocklike one-room house of stone and dried mud.

Country life in first-century Galilee followed a regular rhythm. The Holy Family would have risen at daybreak and eaten a light breakfast—perhaps a chunk of bread and a handful of olives.

If, as the Gospels imply, Jesus followed His foster father's craft, the two would have adjourned to their workshop, each with a wood chip—the identifying badge of carpenters in that era—tucked proudly behind the ear.

According to a homely tale in the noncanonical *Arabic Gospel of the Infancy*, Joseph —although renowned as a good and virtuous man—was not a clever carpenter. As Jesus matured, however, He meticulously righted His foster father's mistakes in the workshop. Thus, in his old age, Joseph gained a formidable reputation for skill throughout Galilee.

At some time during the day, Jesus abandoned carpentry for study. Literacy was widespread in ancient Palestine; every town boasted a school—generally an adjunct of the synagogue—and most boys attended. Between the ages of 6 and 10, pupils concentrated on reading, writing, and the Scriptures; from 10 to 15, they studied rabbinical decisions on questions of doctrine.

Jesus displayed his brilliant grasp of Jewish religion when Joseph and Mary took Him to

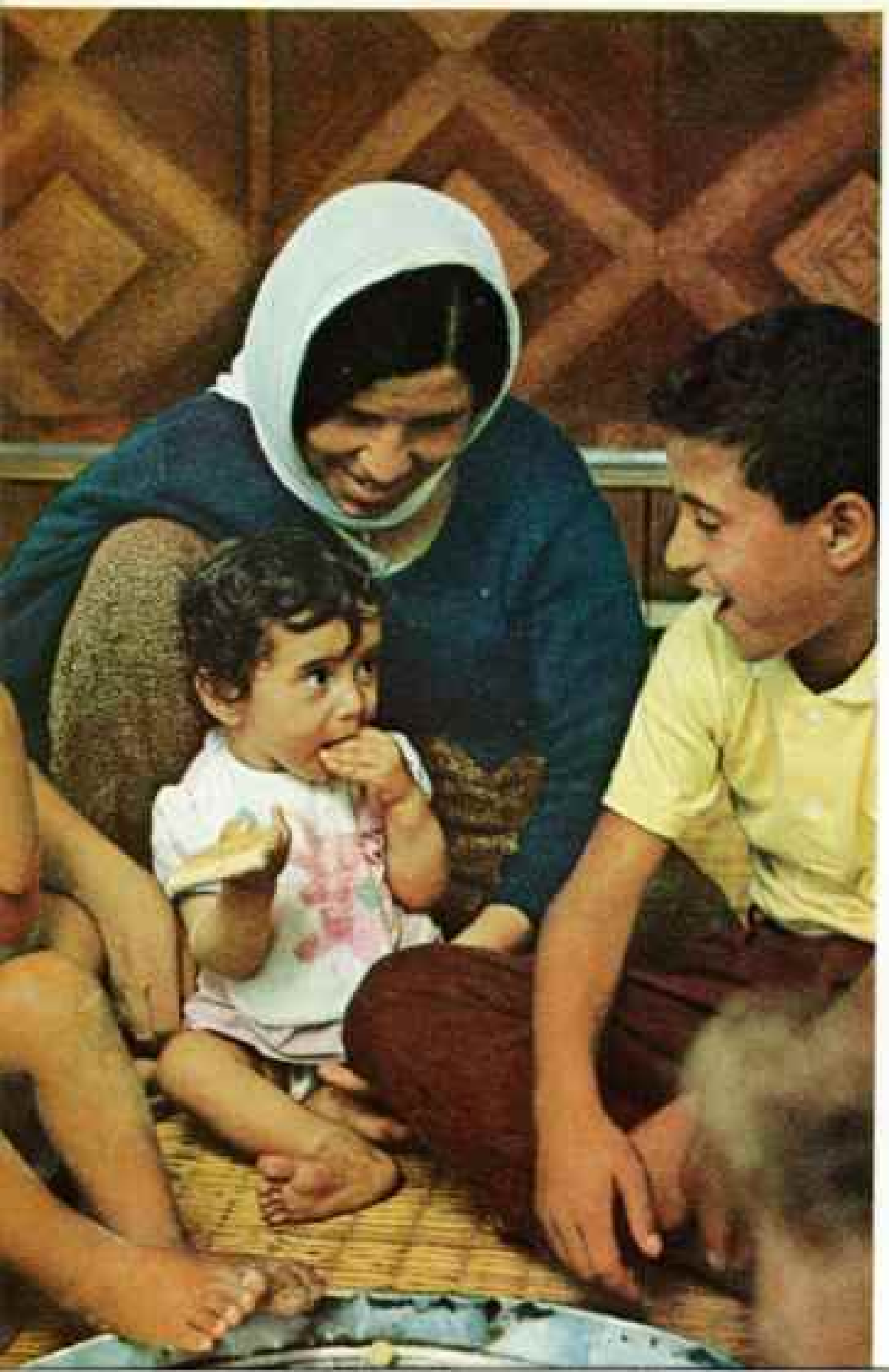
of Jesus' ministry. Many were the husbandmen who came to hear His words, and He taught them in parables, likening God's word to seed cast upon the ground. "He that received seed into the good ground is he that heareth the word, and understandeth it . . ." (Matthew 13:23).

Jerusalem in His twelfth year, lost Him, and "found him in the temple, sitting in the midst of the doctors, both hearing them, and asking them questions. And all that heard him were astonished at his understanding and answers" (Luke 2:46-47).

While menfolk immersed themselves in their labors, the heavy chores of housekeeping fell upon the women. And they were often quite young. Jewish maidens of that era married at an early age; when Mary bore Jesus, she probably was no more than 14 years old.

Each morning Mary ground corn or wheat or barley into flour for her family's daily bread. The meals of the poor were simple, usually a thick porridge made of wheat or barley supplemented by a vegetable, such as beans, lentils, or cucumbers. As with present-day Bedouin, the Holy Family almost certainly dined by helping themselves from a common bowl.

Activity ended at dusk. While the rich owned beds, the poor merely unrolled their mats and huddled under coverlets near the smoldering fire. Knowing this, we understand Jesus' meaning when He said to the man He cured of palsy, "Arise, take up thy bed."



FLURRY OF FLOUR rises from the hands of a woman as she makes her daily bread. Twirling the dough into a flat wheel, she places it on the metal oven. When done, it is peeled off and set on the platter to her right. References to bread fill the New Testament, for it was the foundation of every meal. Jesus taught His Disciples to pray, "Give us this day our daily bread." "I am the bread of life," He told the people.

A TIME FOR JOY AND LAUGHTER, the noon meal brings a family together in Kafr Kanna, believed by many to be the Cana of the New Testament. Mother and children dip into a common tray, filled with bread, vegetables, and olives.

Nazareth preserves precious—and unquestionably authentic—links with the Holy Family. Beyond doubt, the mother of Jesus drew water at Mary's Well. There is no other in Nazareth, nor has there ever been.

I have passed two long afternoons at that well. Ten years ago I watched Arab women filling their water containers while little girls waded joyously under the arched overhang. This year I watched in vain; not a single woman visited the well. In the interim, plumbing has come to Nazareth. And while sentimentalists might regret it, the local women most emphatically do not.

The city of Jesus teaches a lesson for our own age. There, amid all the savage strife of the Holy Land, Jews and Arabs have managed to live together in a kind of peace.

"Perhaps we're learning something about each other," a Nazarene Arab told me over a cup of thick coffee. "And perhaps what we learn can lead all of our brothers to a peace with justice. *Inshallah!* If God wills it!"

JOHN WAS CLOTHED with camel's hair, and with a girdle of a skin about his loins; and he did eat locusts and wild honey. . . . And it came to pass in those days, that Jesus came from Nazareth of Galilee, and was baptized of John in Jordan. MARK 1:6, 9

Standing on the riverbank at the Ford of Hijlah, the traditional place where John baptized Jesus, I couldn't help feeling that the narrow, mud-colored Jordan compares lamentably with majestic streams like the Mississippi and the St. Lawrence. While I was

mentally relegating the Jordan to last place among all rivers, a rowboat maneuvered out into the center. A Greek Orthodox priest stood in the boat, prayer book in hand. With him was a very old woman in a white linen gown.

Reciting prayers in the language of the New Testament, the priest dipped basil leaves into the water and sprinkled the woman's head and shoulders in symbolic rebaptism. She wept quietly throughout the ceremony.

Afterward I met her and the priest. She was indeed a very old lady, and she knew that death could not be far off. So, she told me, she had journeyed from Australia to cleanse her soul in the waters that had baptized her Redeemer. The white pilgrim's gown she wore would one day serve as her shroud.

"Now," she said, "I am at peace." A radiant smile lit her tear-smudged face.

When I turned again to the stream, I did so with respect.

Jesus was about 30 years old when His baptism by John launched His ministry. The wild, enigmatic figure of the Baptist looms large in all four Gospels. Most scholars believe that Jesus' early followers came from the ranks of John's disciples and—since the discovery of the Dead Sea Scrolls at Qumran, only eight miles from the Ford of Hijlah—some see in John a link between the Essenes, the apocalyptic Jewish sect that produced the scrolls, and Christianity.

According to St. Luke, John lived in the Wilderness of Judah before his public career. Khirbat Qumran, the Essenes' spiritual redoubt, stands in this same desert. Like the Essenes, John preached repentance and the coming of the messiah. To the Essenes, as to

HEADING HOMEWARD, plow on his shoulder, a farmer nears the red-domed Greek Orthodox church, one of two sites in Kafr Kanna cherished as the spot where Jesus turned water to wine.

"AND THOU, CAPERNAUM . . . shalt be brought down to hell" (Matthew 11:23). Only ruins remain of the lake shore city, heart of Jesus'

John and to the Christian Church, baptism by water was a central rite. Both Christians and Essenes held all goods in common.

Our new knowledge of this important sect dates from 1947, when a Bedouin boy named Muhammad Adh-Dhib cast a random stone into a cave overlooking the Dead Sea. He heard something shatter and ran away. Returning with a friend, he found several stone jars crammed with scrolls. Subsequent discoveries brought to light a 2,000-year-old religious library that has revolutionized our knowledge of the Jewish milieu into which Jesus was born.

The documents brought fortune to a series of middlemen who handled them—four early scrolls spirited out of Jordan sold for $250,000—and fame to the scholars who analyzed them. Everyone involved with the Dead Sea Scrolls won either riches or renown—with one notable exception.

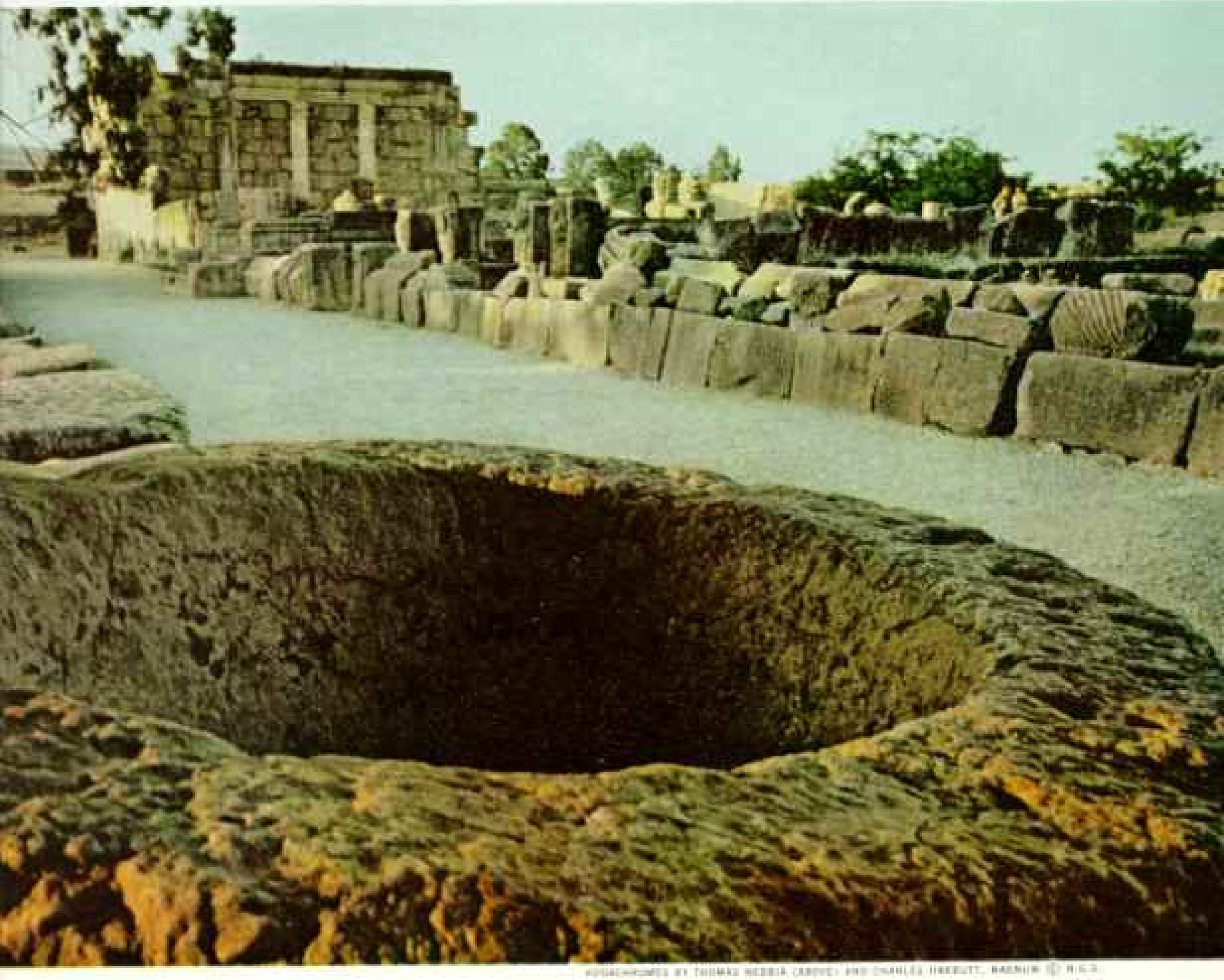
Experts have partially restored the Essene monastery that sprawls atop a parched plateau beside the Dead Sea at Qumran. I walked through the ghostly scriptorium where scribes had tirelessly copied sacred documents, past dusty baptismal pools, and into the great refectory where the long-dead "Children of Light" ate their ritual repasts.*

Later, I took a glass of sweet Arabic tea with the foreman in charge of the rebuilding. He told me of a recent visit by a foreign television crew preparing a film on the Holy Land.

"They found Qumran dull and unphotogenic," he said, waving apologetically toward the desolation of gray rock around us, "and

*See "The Men Who Hid the Dead Sea Scrolls," by A. Douglas Tushingham, GEOGRAPHIC, December, 1958.

Galilean ministry. Here He preached in the synagogue, taught by the seaside, and healed in the homes. But many who came to watch and listen did not believe, and Jesus pronounced His curse upon Capernaum. A basalt grain mortar stands beside the road leading to the columned synagogue, built two centuries after Christ's time, on the site of the one He knew.



KODACHROMES BY THOMAS NEBBIA (ABOVE) AND CHARLES HARBUTT, MAGNUM © N.G.S.

CAST IN BRONZE BY THE RISING SUN, the hills of Samaria march to the west beyond the village of Aqraba, near Mount Gerizim. Journeying from Judaea to Galilee, Jesus passed through the region of the Samaritans, an Israelite sect despised by the Jews because of their

intermarriage with Gentiles. Jesus, weary from His travels, stopped at Jacob's Well and talked with a Samaritan woman who had come to draw water. "I know that Messias cometh, which is called Christ," she told Him. And Jesus answered, "I that speak unto thee am he" (John 4:25-26).

they wanted dramatic coverage." So they engaged a middle-aged goatherd to cast a stone into the cave that had concealed the first trove of scrolls. They turned him this way and that; they had him cast the stone from various angles and with various motions. Finally satisfied, the TV crew gave the ragged Bedouin a few dollars for his work before the cameras, and he went back to tend his flocks.

His name was Muhammad Adh-Dhib, and once he had made the most important discovery in the annals of Biblical archeology.

AND THE THIRD DAY there was a marriage in Cana of Galilee . . . And both Jesus was called, and his disciples, to the marriage. And when they wanted wine, the mother of Jesus saith unto him, They have no wine. JOHN 2:1-3

Characteristically, Jesus had retired "into the wilderness" for 40 days after being baptized by John in the Jordan. At key moments in His ministry, He would steal away from His disciples to meditate in solitude. After healing a leper, reports St. Luke, "he withdrew himself into the wilderness, and prayed" (5:16). And later, after another miracle, "he went out into a mountain to pray . . ." (6:12).

According to St. John, Jesus attracted His first disciples—including John himself—on the occasion of His baptism. The public years, the proclamation of the New Covenant between God and man, were beginning. Beginning too was a brief age of miracles. For, as Jesus sadly pointed out, "Except ye see signs and wonders, ye will not believe" (John 4:48).

The first wonder came at Cana of Galilee, and Jesus performed it reluctantly, at His mother's insistence. Jewish marriage feasts of that era lasted from three to eight days, depending upon the affluence of the hosts. In the course of the banqueting, the wine ran out —an unforgivable mishap—and Jesus saved the occasion by miraculously transforming

ADHERING TO THE LAW OF MOSES, Samaritans at Passover offer unblemished sheep for sacrifice. Led by their High Priest, Cohen Amram Ishak (above), some 230 of the sect encamp atop their holy mountain, Gerizim, for the seven-day ritual in early spring. Their leader claims direct descent from Aaron, the brother of Moses.

water into the finest vintage. "And," adds St. John, "his disciples believed on him" (2:11).

Some scholars believe that shards on a rocky plain eight miles north of Nazareth mark the Gospel Cana, but popular tradition favors the Arab village of Kafr Kanna, on a hill four miles northeast of Jesus' home town.

I went to Kafr Kanna and climbed the narrow, twisting street to the Roman Catholic Church built on one of two rival locations of the miracle. In the crypt I saw a large wine jar, said to be a relic of the marriage feast. Few archeologists, however, would date it before the third century.

As I left the church, an Israeli Army lieutenant in meticulously pressed khakis accosted me. "Was it your decision to come here?" he asked abruptly. I admitted that it was.

"Why did you do it?" the lieutenant asked.

I explained that I was preparing an article on the Holy Land.

"I see," he nodded. "Your ignorance excuses you. Two families in Kafr Kanna are engaged in a blood feud. There have been five murders recently, one of them last night on this street. It's a bad idea to enter this area under any circumstances, but if you must come, do so with a group—a large group."

Does anything really change in the Holy Land? Writing in the century of Jesus, the Jewish historian Flavius Josephus had described similar murders of revenge: "Many were slain every day, while the fear men were in of being so served was more afflicting than the calamity itself, while everybody expected death every hour, as men do in war."

THEN COMETH HE to a city of Samaria, which is called Sychar, near to the parcel of ground that Jacob gave to his son Joseph. . . . And many of the Samaritans . . . believed on him. . . . JOHN 4:5, 39

After the miracle at Cana, Jesus proceeded to Jerusalem for the Passover. He returned to

EXTACHROMES BY CHARLES HARBUTT, MAGNUM, AND NATIONAL GEOGRAPHIC PHOTOGRAPHER JOHN E. FLETCHER © N.G.S.

Galilee by way of Samaria, and on the road occurred an extraordinary episode. Again, St. John recounts the event:

"Now Jacob's well was there . . . There cometh a woman of Samaria to draw water: Jesus saith unto her, Give me to drink. . . . Then saith the woman . . . unto him, How is it that thou, being a Jew, askest drink of me, which am a woman of Samaria? for the Jews have no dealings with the Samaritans" (4:6, 7, 9).

Nor had they had such dealings for more than 500 years. In the eyes of the Jews, the Samaritans—who had remained behind in Israel during the Babylonian captivity—had defiled themselves through intermarriage with non-Jewish neighbors. Bitter enmity sprang up between the Jewish factions, each convinced that it alone worshiped Yahweh in the true tradition.

Replying to the woman's question, Jesus said that if she knew who He was, she would ask instead for the gift of "living water."

Jacob's Well still stands near the road from Jerusalem. The Greek Orthodox have built a cypress-shaded church around it, and a priest will usher you to the well; he will even allow you to draw up, on a creaking windlass, a bucket of the cool water that quenched the thirst of Jacob and Jesus. Given the scarcity of water in the Middle East, the survival of a well presents no cause for wonder.

The true wonder is that the Samaritans survive—human anachronisms whose theology begins and ends with Moses. But about 230 of them still live in the city of Nablus, near the Sychar of the Gospel narrative. Nablus lies at the base of Mount Gerizim, the sacred mountain of Samaritan belief. As they have for 3,500 years, the members of this diminishing but righteous Old Testament remnant climb the mountain at Passover to sacrifice in the stark Mosaic tradition.

The dwellings of the Nablus Samaritans cluster around their synagogue, and they live in a tight-knit, inbred community. The High Priest, Cohen Amram Ishak, received me in his apartment by the synagogue (page 756).

"I am the 146th High Priest in a direct line from my ancestor, Aaron," he said proudly. "For us this is a golden age. We live in peace; no one persecutes us. But we are desperately poor. So poor that our young people cannot afford to marry. I fear that we can only continue to diminish."

The High Priest and I went up a spectacularly winding road to the top of Mount Gerizim. From the flat summit we could look west and see all the way across Israel to the Mediterranean; to the east lay the rich green ribbon of the Jordan Valley. All the Holy Land seemed spread before us, and a crisp, fresh breeze ruffled the grass.

"This," the High Priest told me, "is where Moses viewed the Promised Land for the first and only time. To Samaritans, Gerizim is the focus of all our faith. We believe that the Garden of Eden was here, and here 'Adam knew Eve' and begot the human race. At God's order, Abraham brought Isaac to this peak to sacrifice him, and Joshua built the true temple of Israel on this spot.

"One day," he said, "we will rebuild that temple. Meanwhile, every year at Passover we keep God's command in the ancient way. We don robes like those worn by our ancestors when they came out of the land of Egypt, we sacrifice unblemished lambs, and we eat them with bitter herbs."

As the rising wind whipped at our faces, I asked the High Priest if the Samaritans still expected a messiah. Three thousand years of keeping the stern Law of Moses in a scornful world, three thousand years of persecution and desperation and yearning, three thousand years of slow dying lay behind his reply.

"We wait," he whispered. "We wait."

AND HE preached in their synagogues throughout all Galilee, and cast out devils. MARK 1:39

Present-day Galilee is predominantly pastoral. The green patchwork of cultivated fields crowns the highlands above the Sea of Galilee, and the chug of tractors sounds an incessant, soothing obbligato on the soft air. Grain nods plumply in the breeze, no cloud mars the blue sky, and all Galilee seems an endless harvest (page 748).

Often I envisioned Jesus and His Disciples swinging through these same fields of grain

LONELINESS IN BROWN spreads beyond a goatherd and his flock in the sere region between Jericho and Jerusalem. As Jesus' ministry drew increasing crowds, He sometimes felt a need for solitude and would depart into the wilderness to pray. It was to such bleak reaches that He retreated after His baptism, to meditate for forty days and forty nights. And, the Bible relates, the devil tempted Him three times—to no avail.

on a long-ago Sabbath, lightheartedly plucking the new ears and eating them. When the Pharisees reproached them for thus violating the Law, Jesus placed all the rabbinical strictures on the Sabbath in a new perspective with the simple sentence: "The sabbath was made for man, and not man for the sabbath."

But Galilee of the first century was not merely a vast farm. The towns that clustered along the lake—from Capernaum at the frontier to the capital, Tiberias—were noisy, commercial, cosmopolitan.*

Caravans from Antioch and Gaza, from Damascus and other Greek cities of the Decapolis crisscrossed Galilee. The cities teemed with merchants, traders, transients. Roman legionaries wandered through the sugs along with German mercenaries of the Herods. The polyglot populace spoke Aramaic, Greek, or Latin. Hebrew was a dead language in Galilee; in the synagogues, readings from the Torah had to be translated into Aramaic for the benefit of the congregations. And, as Jesus' miracle involving the Gadarene swine attests, even that vile abomination of Judaism—the pig—rooted with impunity along the shores of the lake.

This was the world of Jesus' ministry—a world of centurions, publicans, pagans, and sinners, as well as pious believers. A world not unlike our own.

In synagogues, in fields, from fishing boats moored by the shore, Jesus preached His revolutionary message: "But I say unto you

*See "The Land of Galilee," by Kenneth MacLeish, NATIONAL GEOGRAPHIC, December, 1965.

LONELY FISHERMEN ply the bounteous Sea of Galilee with boat and net in the manner of their forebears; only the outboard motor speaks of today. To men such as these Jesus first turned, bidding Simon called Peter and Andrew, his brother, to follow Him and become "fishers of men."

"CAST AN HOOK," Jesus told Peter, "and take up the fish that first cometh up; and when thou hast opened his mouth, thou shalt find a piece of money" (Matthew 17:27). Galilee's *mousht* are also called St. Peter's fish in memory of the gift of money, used by the Master for taxes.

which hear, Love your enemies, do good to them which hate you, Bless them that curse you, and pray for them which despitefully use you" (Luke 6:27-28).

Unlike the prophets of the Old Testament, Jesus openly consorted with sinners and even publicans, the despised tax collectors. Why? demanded the outraged Pharisees. "Jesus . . . said unto them, They that be whole need not a physician, but they that are sick. . . . I am not come to call the righteous, but sinners to repentance" (Matthew 9:12-13).

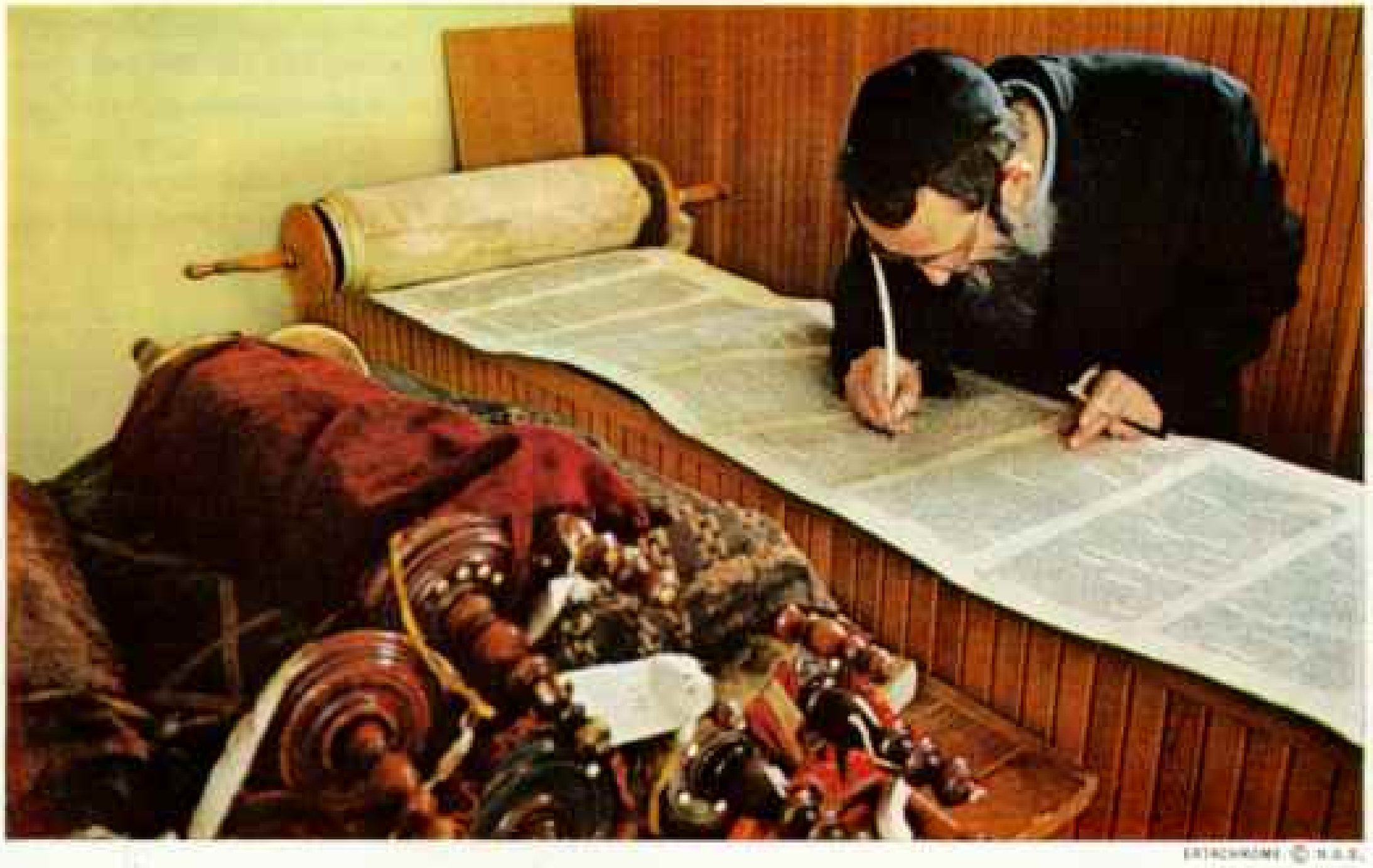
Biblical exegetes believe that Jesus' ministry in Galilee spanned approximately two years. During this time, He ventured out of the province only to pay short visits to Jerusalem, to preach along the coast of Phoenicia, and to journey with His disciples to villages around Caesarea Philippi (map, page 745).

Most of His Apostles Jesus drew from the Galilean melting pot. Matthew, a publican, had collected tolls at Capernaum; at least four others had cast nets in the blue waters of the lake. "And Jesus, walking by the sea of Galilee, saw two brethren, Simon called Peter, and Andrew his brother, casting a net into the sea: for they were fishers. And he saith unto them, Follow me, and I will make you fishers of men. And they straightway left their nets, and followed him" (Matthew 4:18-20).

Today the spiritual heirs of the first Apostles may rule dioceses, but the heirs of their flesh and of their gnarled hands still cast for fish in that same sea. Like the Apostles, they are Jews, and like the Apostles they push out into the darkling waters after the sun has set.

LABOR OF DEVOTION: Jewish scribe uses a quill to correct a handwritten copy of the Torah, the first five books of the Bible. He changes characters improperly formed and adds those left out, often working from memory. Speaking to the multitudes, Jesus said, "one jot or one tittle shall in no wise pass from the law, till all be fulfilled" (Matthew 5:18).

In the streets of the cities, as well as in museums, much remains that recalls Christ's teachings. A coin bearing the head of the Roman Emperor Tiberius: "Render therefore unto Caesar the things which are Caesar's . . ." (Matthew 22:21). An ancient oil lamp: "Let your light so shine before men, that they may see your good works . . ." (Matthew 5:16). A porter in Jerusalem: "They bind heavy burdens . . . and lay them on men's shoulders . . ." (Matthew 23:4).



EASTMAN © N.G.S.

You can see them any stormless night steering out in their small purse seiners in quest of the tasty little *mousht* that swarm through the lake.

Local Christians call the mousht "St. Peter's fish" (page 760), and legend ascribes to it the key role in an episode narrated by Matthew. When the annual tax to support the Temple in Jerusalem was demanded of Jesus—then sojourning at Capernaum—He instructed Peter to go "to the sea, and cast an hook, and take up the fish that first cometh up; and when thou hast opened his mouth, thou shalt find a piece of money: that take, and give unto them for me and thee" (17:27).

Today's mousht provide money in a different fashion; broiled they are the specialty of pleasant restaurants that line the quay in Tiberias. As I dined on them, I pondered Jesus' miracles beside these very waters.

Through the long months of teaching on the lake shore, the crowds demanded signs. And Jesus obliged. He cured lepers and paralytics, He raised the dead, and, by "casting out devils," brought lucidity to the insane.

Once a great multitude surrounded Jesus as He preached beside the lake. As evening neared, Jesus asked, "Whence shall we buy bread, that these may eat? . . . One of his disciples, Andrew, Simon Peter's brother, saith unto him, There is a lad here, which hath five barley loaves, and two small fishes: but what are they among so many? And Jesus said, Make the men sit down. . . . So the men sat down, in number about five thousand. And Jesus took the loaves; and when he had given thanks, he distributed to the disciples, and

KODACHROMES BY B. W. MELLETT (ABOVE) AND CHARLES HARBUTT, MAGNUM © N.G.S.

the disciples to them that were set down; and likewise of the fishes as much as they would. . . . Then those men, when they had seen the miracle that Jesus did, said, This is of a truth that prophet that should come into the world" (John 6:5-14).

According to tradition, this multiplication of the loaves and fishes occurred near Tabgha, about a mile south of Capernaum on the lake shore. In the fourth century, when a Christian pilgrim named Etheria visited Galilee, she found a church on "a field covered with grass and numerous palm trees. Alongside gush seven springs, all giving abundant water. It is the field where the Lord fed the crowd with five loaves and two fishes."

A monk exploring Tabgha about 75 years ago came upon a fourth-century mosaic depicting two fish and a basket of loaves. Excavations in 1932 revealed the startlingly beautiful mosaic floor of the Byzantine church mentioned by Etheria. Cranes, serpents, oleanders—all the flora and fauna of the Sea of Galilee—strut, writhe, and bloom across the vast floor. For sympathetic visitors, the priest in attendance will even run a wet mop across the mosaics so that they stand out in all their original chromatic brilliance.

Just west of Tabgha rises a gentle, grassy slope—the putative site of the Sermon on the Mount. Here, to His disciples, Jesus revealed the sum of His teaching: "Blessed are the poor in spirit: for theirs is the kingdom of heaven. Blessed are they that mourn: for they shall be comforted. Blessed are the meek: for they shall inherit the earth. . . . Blessed are the peacemakers: for they shall be called the children of God . . . (Matthew 5:3-9).

Comfort for the afflicted, the impoverished, the persecuted. Mercy. Charity. Peace.

I sat on the grassy slope where once the carpenter from Nazareth had preached that towering sermon and looked across the lake toward the bluffs of Syria. I knew that men had died horribly on those heights—Jews and Arabs alike—in the savage springtime war.

"THIS IS MY BELOVED SON," spoke a voice from the heavens, "in whom I am well pleased." With Peter, James, and John, Jesus went to a "mountain apart." There His Disciples beheld Him talking with Moses and Elijah. And His face "did shine as the sun, and his raiment was white as the light" (Matthew 17:2). Each evening re-creates the moment of the Transfiguration at the Franciscan basilica atop Mount Tabor. The rays of the sinking sun strike within the church, transforming the mosaic of Christ into a shimmering, lifelike being.

"AN HIGH MOUNTAIN APART," Tabor rises 1,929 feet above vineyards on the Plain of Esdraelon. Mount Hermon, (map, page 745) competes with Tabor for the distinction of being the site of Jesus' Transfiguration.

And I knew that with the fall of night, armed patrols—both Arab and Israeli—would play their lethal game of hide-and-seek along the embattled armistice line. As in Jesus' time, we live among "wars and rumours of wars."

Virtually everyone has heard the Sermon on the Mount. The terrible irony is that so few have listened.

THEREFORE speak I to them in parables: because they seeing see not; and hearing they hear not, neither do they understand. MATTHEW 13:13

After the Sermon on the Mount, Jesus began to teach almost exclusively in parables. From short narratives on familiar subjects, He drew the striking moral and spiritual truths that form the heart of the New Testament. He likened the joy in heaven at the saving of a soul to the rejoicing of a shepherd at finding his lost sheep; the discerning merchant will sell all his possessions to buy a single pearl of great price, which is heaven.

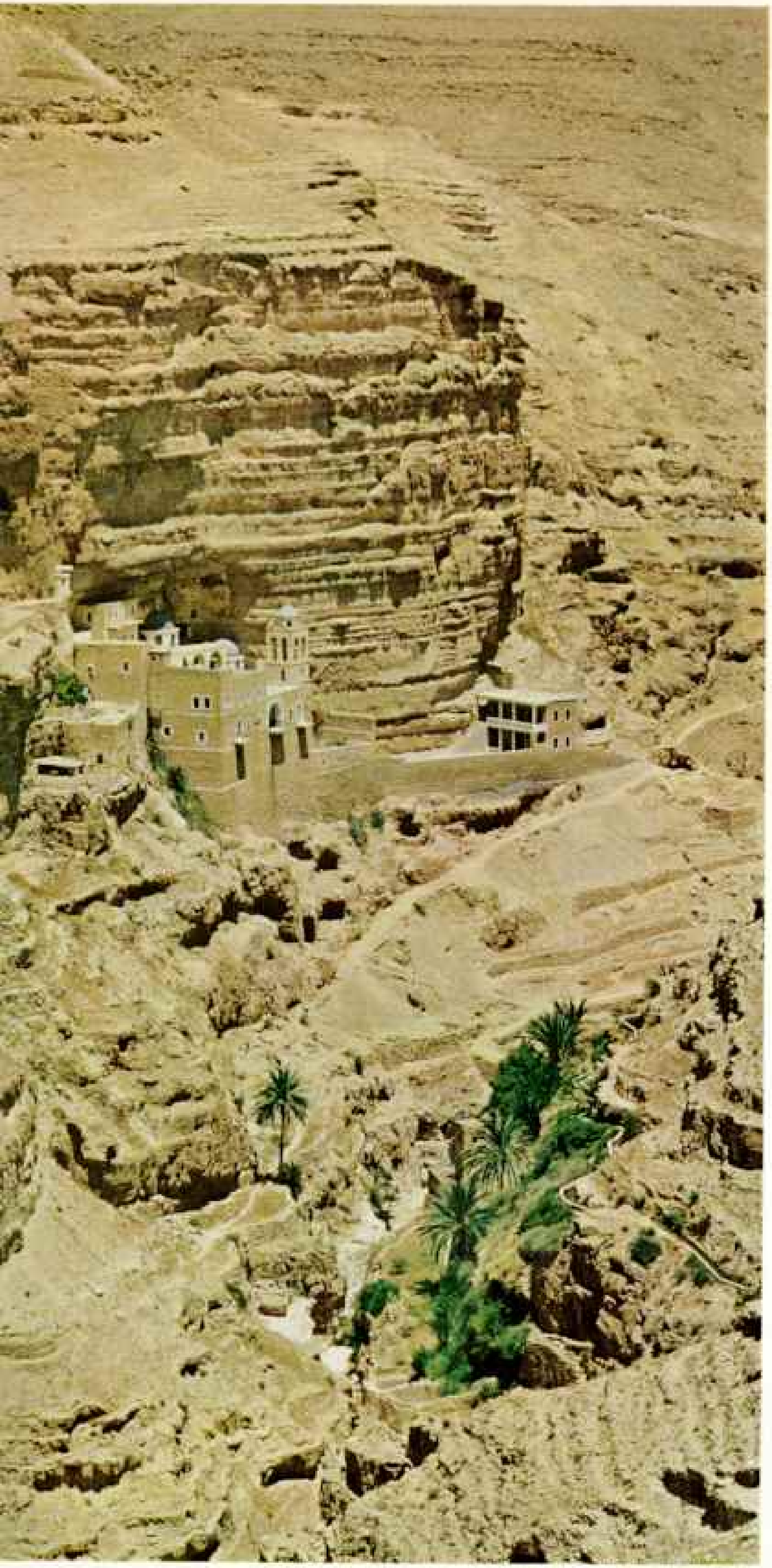
His subjects evoke the fields and skies and humble dwellings of Galilee: the farmer with his mustard seed, the housewife with her leaven, the birds of the air, the vineyard, the sower. "All these things spake Jesus unto the multitude in parables; and without a parable spake he not unto them" (Matthew 13:34).

Nowhere in Galilee did Jesus preach more frequently or perform more miracles than in Capernaum. Today it is known as Kafr Nahum, and it lies in ruins. I wandered through a shambles of stone flour mills, stoves, and mortars and pestles. All were carved from the local basalt, and its gritty blackness lent them a blasted, ominous air.

Ancient Kafr Nahum's buildings had also been constructed of this stone, and it must have been a hot and ugly place. At its zenith, the town had a population of 5,000 and stretched along the lake for almost a mile. Now only these scattered artifacts remain.

The synagogue at Kafr Nahum dates from some two centuries after Jesus, but the

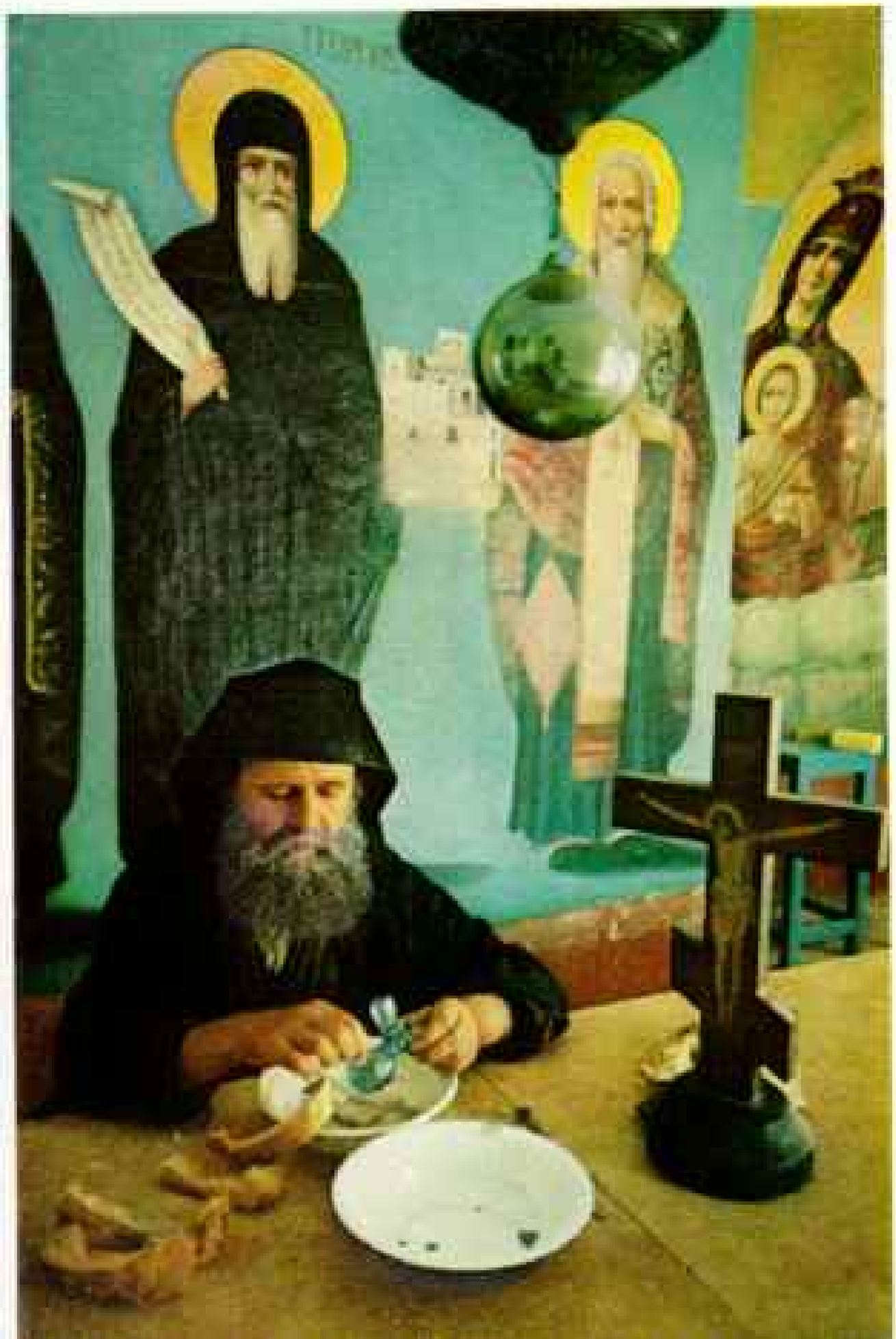
EXTACHROME (OPPOSITE) BY THOMAS NEBBIA; KODACHROME BY CHARLES HERBUTT, MAGNUM © N.G.S.



WASTELAND RETREAT, the Greek Orthodox Monastery of St. George clings to a cliff near Jericho. A meandering aqueduct brings water for a touch of life along the desolate route where Jesus walked on His final journey to Jerusalem.

For 1,600 years the Greek Orthodox have kept a community here, and once 6,000 monks slipped silently through halls to meditate and pray. Today only seven keep to the spartan monastic rule in the present century-old building. Three of them spend long periods of isolation in cells hollowed from the cliff face (above). In the monastery, Archimandrite Amphilokhios (right) eats his daily meal of bread, vegetables, and olives. Madonna and Child and two saints grace the wall.

DETACHRUME (LOWER RIGHT) AND KODACHROMES BY CHARLES HARBUTT, MAGNUM © N.G.S.



Franciscan priests who guard it believe that it was built upon the same site—in fact, upon the same foundation—as the synagogue in which Jesus so often taught. Walking through the quiet, weathered galleries and courts, I saw graphic evidence of the extent to which Greek thought and architecture had influenced Judaism in its homeland (pages 752-3).

Despite the Law's proscription of graven images, two stone lions crouch at the synagogue entrance; carved grapes, date palms, figs, olives, pomegranates, and shellfish deck the walls. One of four columns reconstructed in 1926 bore a 1,700-year-old inscription in Greek: "Herod the son of Monimos and Joustos his son with their children erected this column."

Leaving the synagogue, I passed again through the household utensils strewn so pathetically on the ground. Small purplish land crabs scuttled among them. The curse of Jesus on this town that had refused to heed Him seemed to ring down the centuries: "And thou, Capernaum, which art exalted to heaven, shalt be thrust down to hell" (Luke 10:15).

But Capernaum was not alone in disregarding the Son of Man. One of the most

poignant episodes in the Gospels concerns Jesus' rejection by His native Nazareth.

In the synagogue at Nazareth, Jesus read the lesson from the Scriptures to the congregation—as is the right of a devout Jew. Jesus took a text from Isaiah (61:1): "The Spirit of the Lord God is upon me; because the Lord hath anointed me to preach good tidings unto the meek; he hath sent me to bind up the broken-hearted, to proclaim liberty to the captives, and the opening of the prison to them that are bound. . . ."

Closing the book, He announced: "This day is this scripture fulfilled in your ears."

Reports Mark: "Many hearing him were astonished, saying, From whence hath this man these things? and what wisdom is this which is given unto him . . . ? Is not this the carpenter . . . ?"

Luke adds that the wrathful congregation "rose up, and thrust him out of the city, and led him unto the brow of the hill whereon their city was built, that they might cast him down headlong. But he passing through the midst of them went his way" (4:29-30).

Jesus' own sorrowful comment could have applied equally to His experience throughout Galilee: "A prophet is not without honour, but in his own country, and among his own kin, and in his own house" (Mark 6:4).

JESUS TAKETH with him Peter, and James, and John, and leadeth them up into an high mountain apart by themselves: and he was transfigured before them. MARK 9:2

The time came for Jesus to leave Galilee. John the Baptist lay dead, executed by the same Herod Antipas who would one day sit in judgment on the Son of Man Himself. But before He turned toward Jerusalem, Jesus climbed—for yet another time—a lonely mountain. At its top, the Gospels say, Jesus was transfigured before the terrified eyes of His Disciples. They watched as He spoke with Moses and Elijah and quaked when a voice out of a cloud told them, "This is my beloved Son: hear him."

WAY OF DESTINY: Stony track down the Mount of Olives from Bethphage led Jesus toward Jerusalem. He approached the city in triumph amid a palm-waving multitude that cried: "Blessed is he that cometh in the name of the Lord; Hosanna in the highest" (Matthew 21:9).

Boy Scouts solemnly bear their standards along His path on Palm Sunday. Some of the devout lining the route carry woven fronds of palm (right) in memory of Christ's joyous entry.

ENTIRE CONTENTS © NATIONAL GEOGRAPHIC SOCIETY

One tradition locates the Transfiguration on snowy Mount Hermon; another on Mount Tabor. Most scholars accept the latter site—a rounded 1,929-foot peak rising abruptly out of the Plain of Esdraelon.

Long ago, pilgrims climbed Mount Tabor on their knees, but now a road hairpins to the top. The crumbling wall of a fort built by Saracens in the 13th century encloses the broad summit and the Franciscan Basilica of the Transfiguration. Within the church, a huge mosaic of the transfigured Christ arcs above the central altar.

An impressive work of art, to be sure, but in the end merely colored stones—except for a few fleeting minutes each day when the light works a small miracle.

As the setting sun dips toward the horizon, it blazes golden through a stained-glass window at the rear of the church. The shaft of sunshine creeps up the wall, catches the mosaic, and suddenly Jesus shimmers in a dazzling light that fragments into tiny, blinding glints of gold as it plays across the individual stones (page 764).

As I stared up at a Jesus luminous with glory, I could almost share the awe that overcame the Disciples. Then the moment passed. The shaft of light splashed on the marble wall above, and what I stared at was once again just a mosaic.

Outside the church, I watched the long shadows of dusk race across the Plain of Esdraelon. On all sides stretched the arena of Jesus' Galilean ministry. To the west, the first lights flickered on in Nazerat Illit; a line of hills screened the older Nazareth. To the east, a fugitive glimpse of blue marked the Sea of Galilee in the distance. The fields so often crossed by Jesus spread out toward the

As JESUS MINISTERED TO HIS DISCIPLES, so the Patriarch of the Greek Orthodox Church bathes the feet of 12 priests on Maundy Thursday, day of the Last Supper. "Ye are not all clean," said the Master, aware of His coming betrayal by Judas Iscariot (John 13:11). After the Holy Week ritual in the courtyard of Jerusalem's Church of the Holy Sepulcher, worshipers press in to share the sanctified water (below).

PHOTOGRAPHS BY CHARLES HARBUTT, MAGNUM © N.G.S.

mountains of Syria in the east, toward the hills of Samaria in the south.

But Jesus' preaching in Galilee had been merely prelude. The Son of Man had always had a dread rendezvous to keep on a hill called Golgotha.

AND HE WENT through the cities and villages, teaching, and journeying toward Jerusalem. LUKE 13:22

Preaching without surcease, working miracles, healing the sick, Jesus led His Disciples down the Jordan Valley on that final, fateful journey to Jerusalem. Then He and His faithful followers labored up the steep road from Jericho toward the Holy City, a route threading the desolate hills that rise in endless, jumbled profusion west of Jericho (page 758). Jesus knew that wilderness well, for there He had fasted for 40 days after His baptism.

This desert of solitude traversed by Jesus in the first and last days of His ministry has always attracted pious men. From early in the Christian Era, monks have tried to emulate their Saviour by mortifying their flesh in the same wilderness. They still do.

The old Roman road—the one that Jesus and His Disciples had trudged—still winds from Jericho toward Jerusalem. One stiflingly hot morning I followed it as it skirted the gorge of Wadi el Qilt. No words can convey the total desiccation of the landscape. In the dry season, the burned, exhausted, arid soil supports no vegetation. Nothing. All was seared emptiness, with a silence so absolute that it almost pained the ears.

Leaving the road, I picked my way down a rocky path into the deep cleft of the wadi, across the dusty river bed that in the brief rainy season becomes a muddy torrent, to the gate of the Greek Orthodox Monastery of St. George. Huge and earth-colored, the monastery sprawls like a lonely fortress of God against the sedimentary striations of the wadi wall (pages 766-7).

I was welcomed by one of the monks, Father Prokopios, whose long white beard and threadbare cassock harked back to the age of the Patriarchs. As he showed me through the monastery, our footsteps echoed hollowly.

"These buildings are only a century old," he said, "but a monastery has stood on this spot for 1,600 years. More than 6,000 monks once lived here; now we number only seven."

Three of the seven live in caves nearby, he explained. In the manner of the ancient anchorites, they remain in complete isolation for long periods. For the rest, the day begins with the celebration of the liturgy at 2 a.m. and ends with another service just before sunset. In between, the monks meditate, study Scripture, and pray for the salvation of the world. Meat is forbidden, and they subsist on simple fare—vegetables, olives, and water. Once a month they bake bread.

Time collapses in such a setting. Through 16 centuries, the monks of Wadi el Qilt have kept their lonely vigil. Years pass, generations pass, but only the faces change. As I stood in the chapel, before a veiled grotto, I noticed 14 yellowed skulls ranged in a line. Whose were they?

"Monks of this monastery who were martyred by Persian invaders in the spring of 614," Father Prokopios said, patting one of the skulls fondly. In his time scale—the time scale of eternity—it was only yesterday.

And, I wondered, did Father Prokopios

EKTACHROME (ABOVE) BY THOMAS NEBBIA; KODACHROME BY CHARLES HARBUTT, MAGNUM © N.G.S.

EMOTION-WRACKED PILGRIMS, bearing a cross, surge through the Via Dolorosa—Way of Sorrows—singing, chanting, and reading from the Gospels.

Arrested in the Garden of Gethsemane after the Last Supper, deserted by His Disciples, spat upon, tried, and humiliated, Jesus staggered under His great cross toward Calvary. Each year at Easter time, throngs retrace His steps from Pilate's judgment hall to the place of Crucifixion.

miss the secular world? "Forty-five years ago," he said, "I left everything for the love of God. This," he gestured toward the grim and silent desert that seemed to engulf the monastery, "is the world of Jesus. I want to know no other."

AND THEY that went before, and they that followed, cried, saying, Hosanna; Blessed is he that cometh in the name of the Lord . . . Hosanna in the highest. And Jesus entered into Jerusalem, and into the temple. . . .

MARK 11:9-11

It was on a Sunday in the fair springtime of the year that Jesus, mounted upon the colt of an ass, came to fulfill His destiny in the ancient capital of David. Down the Mount of Olives and up to the Golden Gate leading directly into the Temple, a vast throng lined the way, shouting and waving palm fronds. But the Son of Man saw beyond the triumphant procession and, says St. Luke, "when he was come near, he beheld the city, and wept over it . . ." (19:41).

You can stand today, as I did, atop the Mount of Olives and look down across the Valley of Kidron and see a Jerusalem still reminiscent of that which met the eyes of Jesus.* On the site of Herod's splendid temple of white marble now spread the broad esplanades of the Moslem Haram esh Sharif—Noble Sanctuary—capped by the blue-and-gold Arabic perfection of the Dome of the Rock, in Moslem belief the spot from which the prophet Mohammed ascended into heaven. The high city walls—built principally by the Turks, but generally upon Herodian and Roman foundations—still glow in the sunset like burnt gold, and tribesmen still herd their goats and fat-tailed sheep through the gates for sale in the suqs.

As in Christ's time, Jerusalem combines sublimity and squalor, piety and avarice. Even after 2,000 years, moneylenders and hawkers still swarm about the sanctuaries. You can buy a crown of thorns as a macabre souvenir of the Passion, or a garish certificate of pilgrimage,

*See in NATIONAL GEOGRAPHIC: "Jerusalem, My Home," by Bertha Spafford Vester, and "The Other Side of Jordan," by Luis Marden, both December, 1964; "Conquest of the Holy City," by Franc Shor, December, 1963; and "Jerusalem, the Divided City," by John Scofield, April, 1950.

or a bottle of "holy" water from the Jordan. For a few coins you can even ride a donkey along Jesus' Palm Sunday route.

Nevertheless, this city stands as the supreme shrine of Christendom. For in the space of a single week, the crowning drama of Christianity unfolded here. With all the implacability of classic tragedy, Jesus progressed from triumph to betrayal to torture to death on the cross. In the Crucifixion and the Resurrection that followed, Christians find the central mystery and the paramount promise of their faith. St. Paul summed it up in his Epistle to the Romans: "Jesus our Lord . . . was delivered for our offences, and was raised again for our justification" (4:24-25).

Herod's awesome Temple—three generations in the building—died with Jerusalem, when 60,000 legionaries under Titus overran the rebellious city in the year 70. True to the Palm Sunday prophecy of Jesus, not a stone remained upon a stone; in a final, bitter irony, the Tenth Roman Legion erected its standard upon the razed spiritual bastion of Judaism. The standard bore the image of a pig.

I saw a grim relic of that great, doomed edifice in the Old City of Jerusalem. In the Palestine Archaeological Museum, a stone that had once been set into the gate leading to the inner court of the Temple—banned to all but Jews under pain of death—bore a stern injunction in Greek: "No alien may enter within the barrier and wall around the Temple. Whoever is caught is alone responsible for the death which follows."

Monday, Tuesday, and Wednesday of that first Passion Week passed uneventfully, with Jesus dividing His time between teaching in the Temple and the house of His friends, Mary and Martha, who lived in the neighboring village of Bethany.

In the soft dusk of the first Maundy

KODACHROME BY CHARLES HARBUTT, MAGNUM

Thursday, Jesus and His Disciples ascended Mount Zion to celebrate the Passover in an "upper room." Ancient tradition holds that the Coenaculum occupies the site of that same upper room. Climbing to it, I found a big, somber chamber that reveals its history in its architecture. The Crusaders refurbished it with Gothic arches in the 12th century; the Moslems who displaced them left delicate windows and a *mihrab*—or prayer alcove—in the south wall, toward Mecca.

An aura of old tragedy seems to haunt that silent room. The paschal meal was a solemn occasion; Jesus' impending death lay across it like a grieving shadow. The Gospels offer poignant vignettes of St. John resting his head on Jesus' breast, of Peter—fated to deny his Lord—declaring his undying loyalty, and of Jesus' touching farewell: "Little children, yet a little while I am with you. . . . Whither I go,

LOVING HANDS take a figure of Jesus from the cross on Good Friday. At the Church of the Holy Sepulcher, in the room revered as the site of Calvary, Roman Catholic priests wrap the body in linen as did Joseph of Arimathea, who gave his own tomb for the burial.

PROFUSION OF ROSE PETALS, covering a tapestry that symbolizes the body of Christ, adorn the same Calvary altar at this Good Friday observance by Greek Orthodox Christians. On Easter Saturday a priest scatters the petals among the faithful as a sign of the coming Resurrection.

KODACHROME BY CHARLES HARBUTT, MAGNUM, AND NATIONAL GEOGRAPHIC PHOTOGRAPHER JOHN E. FLETCHER © N.G.S.

ye cannot come; so now I say to you. A new commandment I give unto you, That ye love one another; as I have loved you . . ." (John 13:33-34).

AND THEY took Jesus, and led him away. And he bearing his cross went forth into a place called the place of a skull, which is called in the Hebrew Golgotha: Where they crucified him. . . .

JOHN 19:16-18

After the Last Supper, Jesus went to the Garden of Gethsemane, at the foot of the Mount of Olives, where He prayed. But "a great multitude with swords and staves, from the chief priests and the scribes and the elders" burst in among the olive trees and—with the complicity of Judas, one of the Twelve Apostles—arrested Him. To a man, the followers of Jesus fled in panic. Alone, the forsaken Nazarene was dragged from judge to judge to answer charges of blasphemy and treason. In turn the High Priest, the Sanhedrin, and Herod Antipas mocked Him, spat upon Him, slapped Him—and found Him guilty.

The Roman Procurator, Pontius Pilate, could "find no fault in this man," but nevertheless "delivered Jesus, when he had scourged him, to be crucified."

Every year on Good Friday, pilgrims retrace the Way of the Cross in Jerusalem (pages 772-3)—from the site of the condemnation to the gloomy Church of the Holy Sepulcher, which traditionally encompasses both Golgotha and the tomb that later received Jesus' bloody and broken body. Called the Via Dolorosa, or Way of Sorrows, Jesus' route describes a gentle zigzag through the Old City and is marked by 14 stations of the cross, each one commemorating a specific incident.

At midmorning on Good Friday, I gathered with thousands of other pilgrims at the first station, in the courtyard of Al Omarieh College. Jerusalem overflowed with people; in a rare conjunction of Eastern and Western liturgical calendars, Easter fell on the same date last year for all Christians.

Although Al Omarieh College dates only from the time of the Ottoman Empire, it stands on the site of the Antonia Fortress, headquarters of the Romans in Jesus' day.

Just before noon, a contingent of brown-robed Franciscan friars led the assembled pilgrims out onto the Via Dolorosa.

I fell in with a group of Christian Arabs from Aleppo. Some of my companions wore the costumes of Roman legionaries and carried spears; others took turns dragging a life-size wooden cross with sponge, ladder, and hammer affixed. The Syrians from Aleppo had come to Jerusalem this Good Friday to re-enact the death of their God, and they did it with realism and with raw heartbreak.

As we followed the Franciscans out onto the Via Dolorosa, I marveled at the disparity of this slow-moving river of Christians. Just behind me, a lone, white-haired Englishman read in a clipped voice from the Book of Common Prayer. Beside me, a Dominican explained in French to his companions the archeological improbability of most of the stations of the cross. Two Japanese priests were busy with cameras. And the Arabs—those I had joined—sang. A woman with a shrill, ululating voice led a hymn honoring *Sitti Mariam*, the Mother of God. Her voice wailed high and loud, limning the sorrow of the Virgin as she watched her Son stagger beneath the cross.

We wound through El Wad Street—pausing at each station for prayers—on up past the booths of the souvenir sellers and the wood carvers and the dealers in questionable antiquities. The Via Dolorosa is narrow and steep. Sweat blurred the faces of the Syrians carrying the cross; one man kept gasping hollowly, but on and up they dragged that grim burden to the slow rhythm of the hymn. The woman would chant a line, then the entire group would come in with an exultant "*Mariam Habena!*—Beloved Mary!"

The procession snaked through the Khan ez Zeit, the Oil Bazaar. No matter what changes overtake the Middle East, the suqs remain. And Jesus must have faltered past just such stalls, piled high with pots and pans, apples from Jericho and fish from the Mediterranean, flayed lambs and sugar-powdered pastries.

I wondered if the eager sellers and wary buyers had interrupted their haggling for a

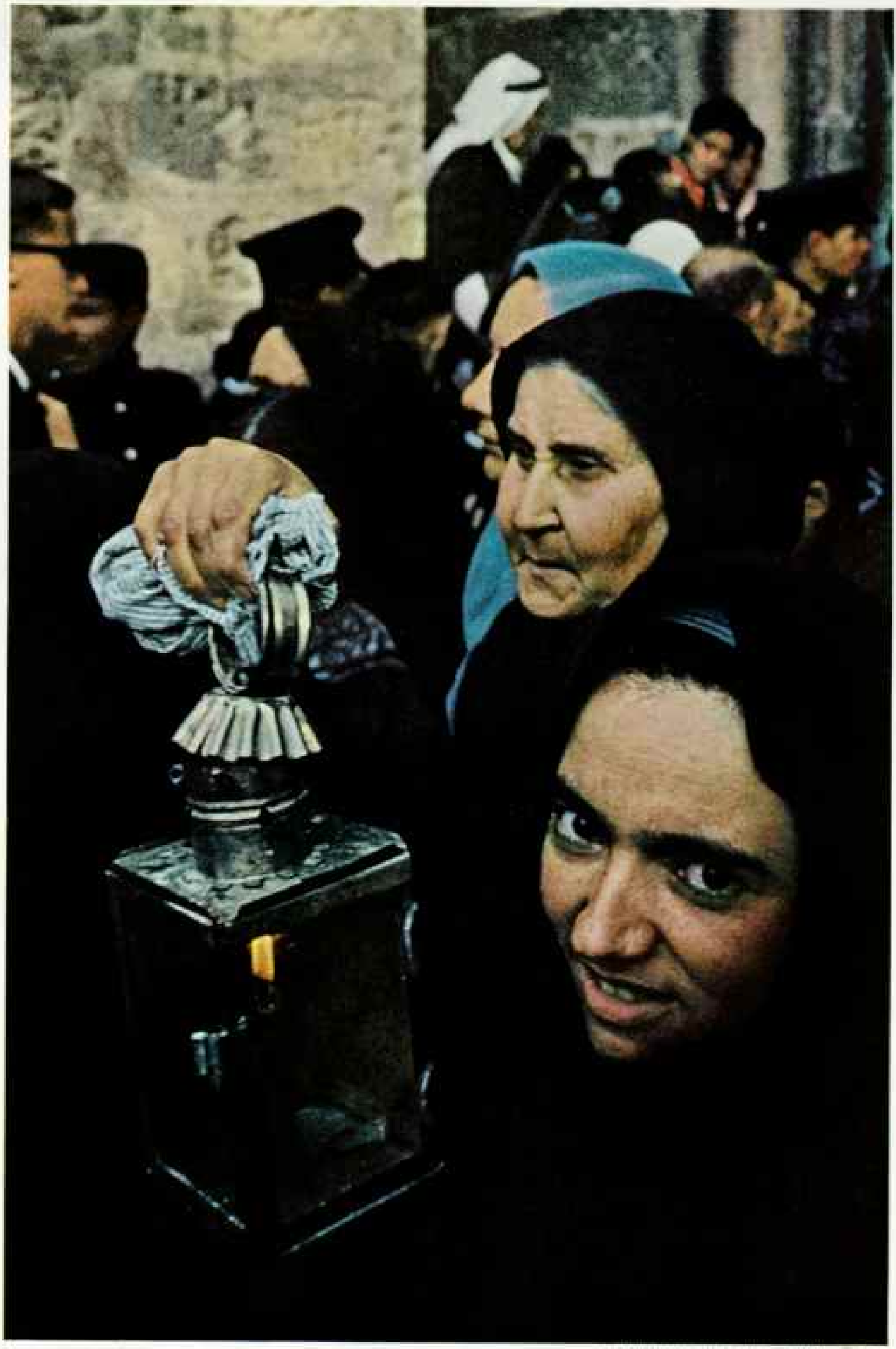
SEEKING SOLACE in the holy places, pilgrims reverently caress the Stone of Unction at the entrance to the Church of the Holy Sepulcher. Here, many Christians believe, Jesus was anointed to prepare Him for the tomb. "And there came also Nicodemus . . . and brought a mixture of myrrh and aloes. . . . Then took they the body of Jesus, and wound it in linen clothes with the spices, as the manner of the Jews is to bury" (John 19:39-40).

PHOTOGRAPH BY CHARLES HARBUTT, MAGNUM © N.G.S.

HE IS RISEN! Jubilant worshipers jam the rotunda surrounding the Holy Sepulcher for the ceremony of the Holy Fire, signifying the Resurrection of Christ to Copts, Armenians, and Greek and Syrian Orthodox Christians. From within the burial chamber, the Greek Patriarch

EXTRAORDINARY BY CHARLES HARBUTT, MAGNUM, AND NATIONAL GEOGRAPHIC PHOTOGRAPHER JOHN E. FLETCHER © N.G.S.

passes the flame, which the faithful believe appears miraculously. The darkened room soon blazes with light as the fire leaps from candle to candle. Copts, clinging to steel beams supporting the crumbling walls, lift the fire to others perched near the ceiling.



REDACHROME BY CHARLES HARRITT, MAXIM © N.G.S.

EXALTED BY FAITH, an Eastern Orthodox woman tenderly carries Holy Fire from the church and, with it, the promise of the Prince of Peace: "I am come a light into the world, that whosoever believeth on me should not abide in darkness" (John 12:46).

curious glance at the condemned Messiah, as the present-day inhabitants paused in their bargaining to eye our strange procession.

As we mounted toward the last five stations, which are inside the Church of the Holy Sepulcher, the Arab hymn reached a crescendo. Tears poured down the faces of the pilgrims from Aleppo; a man beat his breast violently; massed voices keened with unbearable grief for their dying God.

I noticed a woman in an upper window watching us raptly. She kept making the sign of the cross over and over. As we passed beneath her window, her eyes widened and some nameless emotion shook her body. Suddenly, in a kind of blazing ecstasy, she shouted in Arabic: "They believe! They believe!"

WHY SEEK ye the living among the dead? He is not here, but is risen. . . .

LUKE 24:5-6

Good Friday in Jerusalem ends in despair, but Holy Saturday brings jubilation. Promptly at 9:30 a.m., a procession led by the Armenian Orthodox Patriarch arrived at the locked door of the Church of the Holy Sepulcher. Guardians of the church opened the great double doors with huge medieval keys, and in the wake of the Armenian clerics a shouting, singing throng of 30,000 pilgrims swirled toward the ancient church. After some 5,000 had pressed inside—jamming the rotunda—the police formed a cordon to fend off the disappointed 25,000.

In the musty church—more ecumenical than any council because it is shared by five Christian communions: Roman Catholic, Greek Orthodox, Armenian Orthodox, Syrian Orthodox, and Coptic—I waited in the dense crowd for the ceremony of the Holy Fire that, in the Eastern Churches, symbolizes the Resurrection of Christ.

Floor space within the rotunda is rigidly apportioned among the Orthodox: one major sector for the Greeks; another for the Armenians; a smaller area for the Syrians. The Copts, who are allotted no floor space, have to perch in the scaffolding that supports the church walls, shaken by an earthquake in 1927. Roman Catholics schedule their ceremonies to avoid conflict with the Orthodox.

Until recently, the five bickering sects could not agree on how to repair the earthquake damage. In the new ecumenical spirit, however, they recently decided to underwrite a five-year, $2,000,000 program of restoration.

Time passed slowly that Holy Saturday morning inside the Church of the Holy Sepulcher. We were packed tightly in the dim rotunda—so tightly that a man who suffered a heart attack had to be passed toward the door over the heads of the crowd.

Noise—shouts, screams, threats—rends the throng, for Eastern Christians practice their religion with naked emotionalism. Police link arms, forming a solid line around the Tomb of Christ, but the line sways and buckles beneath the enormous pressure of the crowd. Amid the chaos, a Greek nun stands beside the entrance to the Holy Sepulcher, lost in a devotional book. Her almond eyes and pale, sad face belong on a Byzantine icon.

A procession of Armenian, Coptic, and Syrian Orthodox priests threads around the Tomb, and the Copts exiled in the scaffolding clap their hands rhythmically. Then come the Greeks, the Patriarch splendid in a golden cope and a jeweled dome of a crown. The priests wave banners depicting sacred scenes, and a male choir chants themes from the liturgy. The Copts, like great birds, swoop down from their perches in the scaffolding to touch and kiss the Greek banners.

Just before 1 o'clock, a hush descends. The Greek Patriarch has secreted himself within the Tomb of Christ. Suddenly, tiny orifices on either side of the Holy Sepulcher flicker with candlelight—symbol in that dark church of the Resurrection of Jesus.

Then comes pandemonium. Carrying burning tapers lit at the Tomb, Greek and Armenian priests plow through the crowd. The fire flashes from candle to candle, hand to hand (pages 778-9). People—all with a cluster of tapers—strain toward the sacred flame and shout with a kind of holy hysteria. The little bursts of fire leap through the rotunda and on up the scaffolding among the Copts, until the entire interior seems ablaze.

At the same time every bell of the ancient church peals out in a wild paean of joy. Flame and smoke and the smell of wax fill the rotunda. Amid the clamor and exultation of the worshipers, I heard one cry repeated and repeated: *"Christos anesti! Christos anesti!"*—Greek for "Christ is risen!"

There in the flaming church, with the bells pounding their brazen triumph and the faithful screaming in the jubilation of their Saviour's victory over death, my lips too formed the traditional response: *"Alithos anesti.* He is truly risen." * * *

Eyewitness to War in the Holy Land

Article and photographs by
CHARLES HARBUTT, Magnum

THE AUTO RENTAL CLERK at the Tel Aviv airport summed up the delicate state of international affairs with wry Israeli humor when I asked for a car.

"Certainly," he said. "Compact—or armored?"

It was late May, 1967. I had just returned to Israel after working for a month in Jordan, and my NATIONAL GEOGRAPHIC assignment was certainly anything but warlike: the photographic coverage for "Where Jesus Walked," by Howard La Fay (page 739).

On May 19 the United Nations had begun to withdraw its peace-keeping troops from the Gaza Strip at the request of the Egyptian Government, and three days later the Egyptians had blockaded the Strait of Tiran (map, page 785). But one becomes accustomed to such ominous signs in the Middle East. Despite the tension in the air, I had no suspicion that I was about to be swept up in six of the most violent days in the history of the Holy Land.

In Tel Aviv the civilian population was beginning to mobilize in its own way. Go-go girls at a discotheque gave a party to encourage blood donations. Teen-agers too young to serve at the front volunteered for civilian jobs soldiers had vacated. Women baked cakes for the troops. Storekeepers taped their windows against shattering.

I watched one man building an antishrapnel wall in front of his apartment house.

"I put it up; I take it down. I put it up; I take it down,"

Knocked out by Jordanian fire, an Israeli tank lies beside the leafy garden revered as Gethsemane, where Christ was betrayed. Church of All Nations glitters below the Mount of Olives. Beyond rises the modern Hotel Intercontinental. The tank saw action during the battle for Jerusalem. Victorious Israelis placed a wreath on the shattered vehicle as a memorial to comrades who fell during the first hours of last spring's brief but bitter war.

Tel Aviv schoolgirls take over the duties of men alerted for war. Serving as mail carriers, these students ask directions of a shopkeeper.

War begins with the scream of sirens on the morning of June 5, and Tel Aviv office workers run to an air-raid shelter. But the city suffered no casualties; in lightning strikes, Israeli fighter planes virtually wiped out Arab air power.

he laughed, pointing out the remains of walls built for earlier wars.

After a few days in Tel Aviv, I felt the tension begin to subside. On the first weekend in June many troops were sent home after two weeks in the desert. The beaches were crowded, and coffee shops on the Dizengoff, Tel Aviv's "Fifth Avenue," buzzed with gaiety.

On Sunday, June 4, I went to Jerusalem to photograph Israel's new Defense Minister, Maj. Gen. Moshe Dayan. Gunfire erupted that morning along the Jordan border near Bethlehem, but by 1 p.m. calm had returned. I arranged to travel with the general to the front the next morning.

It was an appointment I was never able to keep: War broke out. At 8 o'clock Monday morning, Tel Aviv's air-raid sirens screeched an alarm (below).

"I don't know whether it's the real thing or not," said a puzzled bellman in my hotel lobby.

At 8:15 a radio bulletin erased all doubt by announcing that Israeli and Egyptian troops were locked in combat. In my rented car I sped to the press center, where reporters had gathered for a briefing.

The Israeli Air Force, we were told, was attacking airfields in the Arab countries. A convoy would try to reach the southern front, and correspondents would be permitted to go along in a bus assigned to them for the day.

Newsmen Commute to the Front

It was to be this curious kind of war for the next six days: Newsmen could cover the fighting, file their stories, and return that night to sleep in a Tel Aviv hotel.

"A civilian bus just like this has been shelled near Gaza," warned a press officer, but no one offered to disembark. The air-raid alert sounded again as we left Tel Aviv.

On that first day of the war, we stood in a farmyard at the kibbutz of Nahal Oz watching the first Israeli artillery barrage open up on the town of Gaza, its minarets visible across the grainfields (map, opposite).

A helmeted girl showed me a barn that had been shelled only two hours before. No one had been hurt.

"We're used to shelling," she told me, laughing. "We were in the shelters almost before the first explosion. But, unfortunately, they did get 12 of our cows."

Our bus got us back to Tel Aviv at dusk. Another alert sounded, and I heard explosions. Crouched on the balcony of my room, I watched Jordanian shells bursting near Lod Airport, and Israeli batteries replying.

THE SIX-DAY WAR

• June 5: As war begins, Israeli planes virtually wipe out Egyptian, Syrian, and Jordanian air power. Israeli columns cut across Gaza while others move into Sinai. Combat erupts in divided Jerusalem as Jordan opens a second front.

• June 6: Heavy fighting in Sinai. Israelis, moving swiftly and with unchallenged air support, continue westward toward Suez Canal. U.N. Security Council approves cease-fire resolution. Israeli columns encircle Jordanian Jerusalem while others penetrate west bank area of Jordan.

• June 7: Last major Egyptian stand at Mitla Pass. Israelis converge on Suez Canal. Blockade of Gulf of Aqaba ends as Israelis occupy Sharm el Sheikh. Old Jerusalem falls to Israel. Jordan accepts U.N. cease-fire.

• June 8: Israeli troops reach east bank of Suez Canal. Egypt accepts U.N. cease-fire. Occupation of Jordan's west bank area completed. Israeli planes accidentally attack USS *Liberty* off Sinai coast.

• June 9: Israel turns its attention to Syria, moving columns toward hills overlooking the Sea of Galilee.

• June 10: War continues on Syrian front. Israeli troops scale the heights and capture Quneitra. War ends as Syria and Israel agree to a cease-fire.

On June 9, Israeli armor and infantry began moving up the heights north and east of the Sea of Galilee, toward the nests of Syrian artillery that had intermittently shelled Israeli border settlements for nearly twenty years. By the afternoon of June 10, the Syrian guns were silent. Israelis spilled over the escarpment and pushed their line to Quneitra, only 40 miles from Damascus.

Fighting began in Jerusalem at 11 a.m., June 5, when Jordanians began an all-day shower of artillery fire on the Israeli sector. After nightfall, while Israeli fighter-bombers lit the sky with counter-attacks on Arab positions, two armored columns started an eastward pincer maneuver. It completely encircled the Old City on June 6, despite fierce opposition by the crack Arab Legion. Early next morning, Israeli commandos fought into the walled city itself. In late June, Israel annexed Old Jerusalem.

On June 6, Israeli troops moved into Jordan's breadbasket, the area west of the River Jordan. From the north and west they converged on Jordan's main defenses south of Jenin. Next day, as Nablus fell, Israeli columns radiated from Jerusalem north to Ramallah and east to the Jordan, and south to Bethlehem and Hebron. On the same day, Jordan accepted the U.N. cease-fire.

In the first ground action of the war, Israeli columns fought northward to Rafah, cutting the Gaza Strip and pushing Egyptian regulars and the 9,000-man Palestine Liberation Army

In their raids of June 5, Israeli fighter-bombers spared the runway here for later use at their own base.

All Egyptian hope died at Mitla Pass in the bloodiest engagement of the war. For 24 hours, squadrons of tanks battled as the Egyptians stood fast along the pass — a last attempt to halt the Israeli drive to the Suez Canal.

Closed by Egypt on June 5, the waterway marks the western most advance of Israeli troops.

Israelis breached key Egyptian defenses six miles long, three deep, on June 7, opening up the whole north-central Sinai area.

Here, Israelis opposite the main Egyptian line turned back an offensive on the first day of battle, then continued south and west toward Suez.

On the eve of war, some 80,000 Egyptian troops and 900 tanks were in position along the dotted boundary separating the frontiers of Israel and Egypt. On June 5, while air attacks obliterated Egypt's air power, Israeli troops — some 40,000, with a tank force equal to Egypt's — began the move westward across Sinai. One column made a coastal thrust that isolated Gaza; others moved in parallel paths to the south. In four days, Israeli troops had occupied the east bank of the Suez Canal.

Fortress commanding the narrow Strait of Tiran, focal point of the prewar blockade of the Gulf of Aqaba. Egyptian troops abandoned the garrison shortly before Israeli torpedo boats and paratroops arrived on June 7.

On June 5, morning raids on Egypt, plus later ones on Syria and Jordan, completely neutralized Arab air power and erased any chance of Arab military victory. In all, Israeli bombs and aircraft cannon destroyed some 450 planes, mostly on the ground, at 25 bases. Thus the Israeli Air Force, which lost only 26 planes in the entire war, was able to give its ground forces unchallenged support.

Israel's "window to the south" and port of entry for 90 percent of the country's oil supplies. Fanning movements by Israeli tank-landing craft here before the war drew a third of Egypt's navy into the Red Sea.

Israel's sole access route for trade with Asia and East Africa. A multination accord of 1958 re-affirmed the Gulf of Aqaba an international waterway. Egypt's announcement, on May 22, 1967, of its blockade was considered an "act of war" by Israel. Subsequent Arab defense pacts and troop buildup set the stage for the six-day war.

Beirut
LEBANON
Damascus
Tyre
Dan
MEDITERRANEAN SEA
Quneitra
SYRIA
Tiberias
Sea of Galilee
Haifa
Irbid
Janin
Al Mafraq
Nablus
ISRAEL
Tel Aviv–Yafo
As Salt
Lod
Ramallah
Amman
Ashdod
Latrun
Jerusalem
Ashqelon
Bethlehem
Gaza
Hebron
Dibon
GAZA STRIP
Rafah
Nahal Oz
El Qarara
Beersheba
Al Karak
El Arish
Baltim
Damietta
Port Said
Lake Manzala
Port Fuad
El Tina Bay
Shirbin
El Mansura
Rumani
Misfaq
Bir Lahfan
El Qantara
Abu Aweigila
Nitzana (El Auja)
Hazeva
JORDAN
Zifta
Ismailia
Zagazig
Gebel Libni
El Quseima
Bilbeis
Abu Suweir
Deversoir
Bir Gifgafa
NEGEV
Shibin el Qanatir
Fayid
Lake Timsah
Bitter L.
El Kabrit
Mitla Pass
Bir el Thamada
Maan
Cairo
Suez
Port Taufiq
El Shatt
SINAI
Nakhl
El Kuntilla
Helwan
Al Quwayrah
El Saff
Elat
Aqaba
Al Muwawwarah
GULF OF SUEZ
UNITED ARAB REPUBLIC (EGYPT)
Zafarana
GULF OF AQABA
Mt. Sinai
Abu Durba
SAUDI ARABIA
Al Magnah
El Tur
Sharm el Sheikh
Ras Nasrani
Jezirat Tiran
Sanafir
Ghubbet el Kebir
Jezirat Qubal
RED SEA

CARTOGRAPHIC DIVISION
© NATIONAL GEOGRAPHIC SOCIETY

0 10 20 30 40 50 75 100
STATUTE MILES

Roads — Airfields ✈ Airfields Bombed ✈
Sand Oil Fields Elevations in Feet Lava

Israel (8,000 sq. mi.)
Arab Territory Occupied by Israel (26,000 sq. mi.)

West to the Suez

In the "Miracle War," as military experts have called it, vastly outnumbered Israeli forces crushed Arab legions in six days. But more than weapons powered the victory. "I am the only member of my family who survived Buchenwald," said one Israeli soldier. "This time I have a gun to fight with, a country and a cause to serve!"

Through the Gaza Strip and the Sinai desert raced the Israeli Army toward the Suez Canal. Before entering the town of Gaza at sunset on June 6, a soldier in camouflage uniform washes down the day's first meal with coffee brewed inside his Centurion tank.

Heavy fire meets Israeli troops in Gaza (below). Up and out of the personnel carrier sails a grenade, aimed at unseen Arab attackers.

In the Gaza cleanup, a young soldier cocks his Uzzi submachine gun. Made in Israel, the weapon has few moving parts and can be quickly field-stripped and cleaned, vital in desert fighting.

Flagman waving Israeli colors in the lead half-track directs the dusty dash through the Negev.

Next morning a military liaison officer climbed into my car, and we set out for the battlefront.

After passing the Sinai border, we ran into a long military convoy that had halted by the roadside. Advance was impossible until the engineers could repair the bombed-out road. One tank racing cross-country had run into a barbed-wire barricade; its crew fumed at the delay as they worked furiously to clear the tangled treads.

Booby Trap Kills Israeli Cameraman

We heard over our transistor radios that Israeli troops had entered Gaza, and we decided to take a side road to that battle. On our way we passed buses converted into ambulances and loaded with wounded.

I drove across no man's land toward Gaza, keeping carefully to the center of the tarmac. Red flags along the roadside warned of mines. At the entrance to town we passed a shattered car with Israeli license plates. Later we were told it belonged to an Israeli cameraman, Ben Oyserman, who was killed when he moved a few stones from a roadblock, triggering a booby trap.

I stopped at an intersection to photograph a tank crew sipping coffee. I asked its red-eyed, exhausted commander to radio ahead for an escort to take me into the Israeli command post inside the town. Then I walked cautiously down the street past a smoldering Israeli tank toward the meeting point.

Suddenly I froze in my tracks. From a doorway came a horrible sound—half groan, half scream. I remembered warnings about snipers and traps, but no one could ignore such suffering. I was moving toward the doorway when the source of the sound burst from the house

EXTRACTED BY CHARLES HARBUTT, MAGNUM © N.G.S.

—an unharmed but obviously hungry goat.

I met the escorting jeep and clambered into the back. Suddenly I felt very lonely. The empty streets of Gaza stretched out before us. Here and there a building was still burning. Corpses lay crumpled by the walls. The only sound was distant firing.

In the jeep a stubble-chinned, battle-grimed corporal shifted his machine gun and smiled.

"Hang on," he said, and pointed. "We'll get a little fire from over there."

We started with a lurch that sent me sprawling—then suddenly stopped. The corporal emptied his clip at a rooftop, where he had seen an Arab soldier with a grenade. He reloaded and we traveled on into the town, past the debris of war: downed telephone wires, burned-out cars, blackened tanks, and everywhere the golden piles of cartridge cases.

At one corner we passed a still-flaming jeep with its grim cargo of five dead Egyptians. It had been riddled with machine gun bullets.

Soon after, we came upon a long line of prisoners who had been caught hiding in a schoolyard. Many were dressed in hastily donned civilian clothes.

At the command post weary Israeli soldiers huddled around their first meal of the day. Most had not slept since the war began, and eagerly awaited supply trucks with their bedrolls. The cooking smells reminded me that all I had eaten for the day was five scallions and a crust of bread, gleaned from a kibbutz dining hall.

I had to return to Tel Aviv to ship out my film, but got back to Gaza before dawn. The troops were still bedded down in long rows by their tanks and half-tracks. A picket offered me a cup of coffee, and the men began to stir. At the command post a soldier donned prayer shawl and phylacteries for the traditional Jewish morning worship.

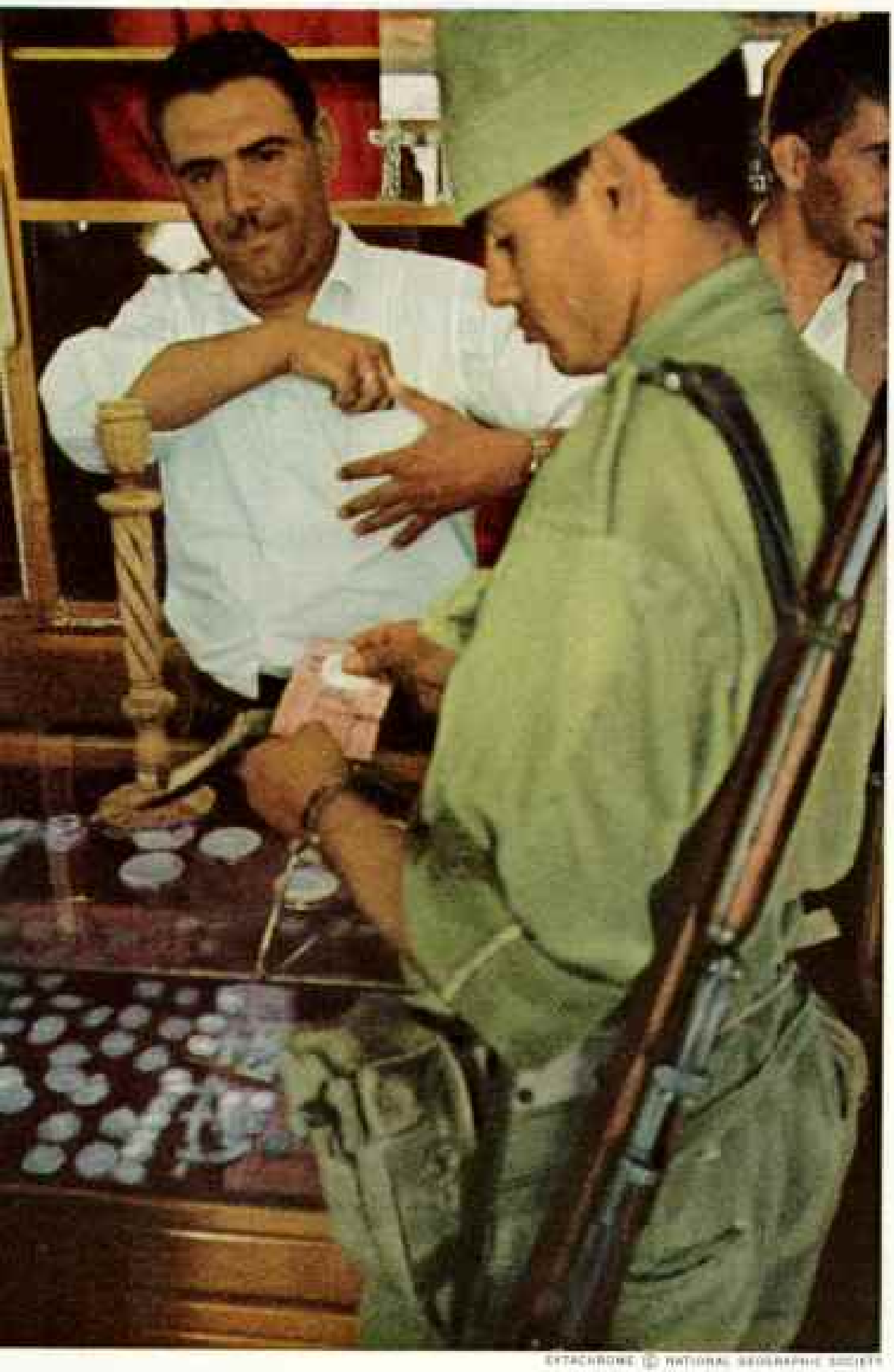
An officer invited me to breakfast. There one of his men spotted a crate of Jaffa oranges.

"You can have the oranges, but not the crate," the mess sergeant said.

The soldier dumped the fruit into a box half full of grenades in the half-track we were to board.

Midway through town we came upon two jeeps pinned down by Arab fire. An officer assigned our two half-tracks to engage the enemy post.

We churned around the corner and the commander passed me a helmet. Even the proudest sabras—native-born Israelis—who had been refusing to speak English to me, offered at least



EKTACHROME © NATIONAL GEOGRAPHIC SOCIETY

Scant 24 hours after war's end, Bethlehem shopkeepers unshutter their doors for business as usual. But for the first time in 19 years, the customers are Israelis. At a crowded souvenir store abutting the Church of the Nativity, a soldier buys silver Arab jewelry. To the author's surprise, the Jordanian merchant made change in Israeli currency.

two words: "Keep down!" Then they turned to their guns and began firing at the post and at the rooftops to discourage any would-be grenade throwers.

As we neared the position, it opened up with heavy machine guns, grenades, and mortars or bazookas. Deafened by the Israeli submachine guns on each side, I barely heard the shell that hit a wall behind me, covering my cameras with plaster dust.

The order was passed to use grenades. A sergeant tore off the lid of the grenade box, then gasped. The top of the case bulged with oranges. He dumped them on the floor of the half-track, and the battle continued. Finally we passed under the blistering fire, the soldiers heaving grenades as we went, and sped out of range around a bend in the road (page 786). When I stood up after half an hour, I found my boot tops filled with spent cartridges from my neighbor's gun.

For the rest of the morning the battle raged around Gaza. Snipers' bullets whined down every street. Tanks and half-tracks moved through the city, attacking and silencing the remaining Arab positions.

Shortly after noon an armored car with a surrendering Egyptian general pulled into the command post. He signed the surrender documents nervously.

"The people in Gaza were totally unprepared for the war," he told us. "No one believed it would actually start."

Back in Tel Aviv that evening, I learned that all of Jerusalem had fallen to the Israelis. I would now be permitted to return to the Holy City. I fell into the deep sleep of total exhaustion.

The drive from Tel Aviv to Jerusalem always moves me. The broad fields of vegetables and grain—larger and lusher than any I have seen in the Middle East—and the reforested Judaean hills, pay impressive tribute to the determination of the Israeli settlers.

On the outskirts of Jerusalem I drove past new apartment developments, then down through Mea Shearim, the orthodox Jewish quarter. People milled everywhere, newly emerged from the shelters they had lived in for days.

Finally I reached the Mandelbaum Gate, a road junction heavily guarded by both Jordan and Israel since the truce of 1949. Traffic now flows freely through this link between New and Old Jerusalem—for the first time in 19 years. And Jews are in possession of the Old City for the first time in 19 centuries.

Assessing war damage, Israeli officers inspect Bethlehem's Church of the Nativity, revered as the site of Christ's birth. They find the shrine only slightly damaged by shelling and fire bombs. Soldier at left wears a *yarmulke*, or skullcap, as a mark of respect for the Christian sanctuary. From the circle on the floor a stairway leads down to the sacred grotto.

On the Jordanian side of the Mandelbaum Gate I met an Israeli officer who was already helping to build a memorial to his fallen comrades—a stone cairn with smashed weapons, topped by a bullet-pierced helmet.

"Hussein's army fought the best and hardest of all the Arab forces," he told me. "The fighting here wasn't house-to-house, but room-to-room. If I had my way, I'd build a memorial to them as well."

Over the next few days I wandered through Jerusalem—as Israeli authorities and sporadic sniper fire allowed—revisiting the holy places I had so recently photographed, to see how they fared in the brief war.

Once I parked beside a battered Israeli tank near the Mount of Olives (pages 782-3), stepped past some grenades and piles of cartridges, and walked up the steep hill in front of St. Stephen's Gate, the main point of entry for the Israelis into the walled Old City.

I walked on across the mosque compound of the Haram esh Sharif, past the jewel-like Dome of the Rock with its sparkling tiles and golden roof (opposite, lower). Only one pane of glass had been broken, to admit Israeli troops searching for snipers. The Aksa Mosque nearby had been garrisoned by Jordanians, yet stood undamaged except for a shattered wooden door.

A Soldier Weeps by the Wailing Wall

Following the route of the victorious troops, I walked through a narrow gate, down a flight of steps, and there it was—the Wailing Wall. A soldier handed me a *yarmulke*, the skullcap worn by Jews as a sign of reverence, and I walked in amid worshiping soldiers, many still carrying guns.

This wall contains several rows of huge stone blocks—part of a wall that surrounded Herod's Temple, built just before the time of Christ on the site of Solomon's Temple. Nebuchadnezzar razed the earlier structure in 586 B.C. Herod's Temple was leveled by the Romans in A.D. 70. From then until now, this hallowed place had not been in Jewish hands.

As I stood there, a stubby, bearded soldier reached out, touched the Wall, and was shaken by deep sobs (page 792). He wept tears not only of triumph but of the traditional sorrow of all Jews over the destruction of the Temple. The emotion was so palpable that I, who shared neither their triumph nor their sorrow, could feel my own eyes filling with tears.

I visited the shell-damaged Church of St. Anne near the Pools of Bethesda, where Christ performed one of his healing miracles. A live shell rested in front of the main altar.

As I stepped out of the compound onto the Via Dolorosa, a bullet cracked down the street, chipping into the stone a few feet away. Abruptly I realized I was out after the 3 p.m. curfew on a street filled with snipers; an Israeli patrol had fired at me. I took off my campaign hat and edged to the door. Waving the hat, I yelled, "I'm press; I'm coming out. O.K.?"

"You're a fool, but come ahead," was the response.

Artillery shells shred the sky and rain down on Jerusalem's eastern outskirts. Explosions silhouette the tower of the Augusta-Victoria Hospital at left and the bell tower of the Russian Orthodox convent, right.

Treading hallowed ground, Israeli fighters—and a girl volunteer out of uniform—turn sightseers at the golden Dome of the Rock. By the third day of war their forces had won all of Old Jerusalem. Dome of the Rock, a seventh-century mosque, stands on the site of Solomon's Temple and of Herod's Temple, where Jesus taught. From here, Moslems believe, Mohammed sprang to heaven on his horse.

Sobs of thankfulness rack an Israeli soldier as he prays at the Wailing Wall. On this holy site of their Temple, Jews mourn its destruction nearly 2,000 years ago. Drapery at right covers a scroll containing the Torah, the first five Books of the Bible.

For the first time since 1948, when Jordanians occupied Jerusalem's walled city and closed it to citizens of Israel, Jews flock to their most sacred shrine. Bearing prayer books, they push toward the mammoth blocks of the Wailing Wall at right, in a plaza created immediately following capture of the city. Rubble from houses razed by bulldozers edges the square. On this day, June 14, 200,000 rejoicing Jews streamed through to celebrate Shabuoth—the spring harvest festival.

Chastened, I left the city, resolved to make any future explorations before curfew.

Next day I drove to Bethlehem, where a guard had already been posted outside the low entrance to the Church of the Nativity. The church had sustained several shell hits because it stands directly behind the police station. But a few days of work by a stonemason would restore it.

I met two Israeli officers on an inspection tour, standing outside the crypt which tradition calls the birthplace of Christ (page 789). They looked somewhat ill at ease.

"Is it really proper to go in there?" they asked, fingering the caps they had donned, as Jews do in their synagogues.

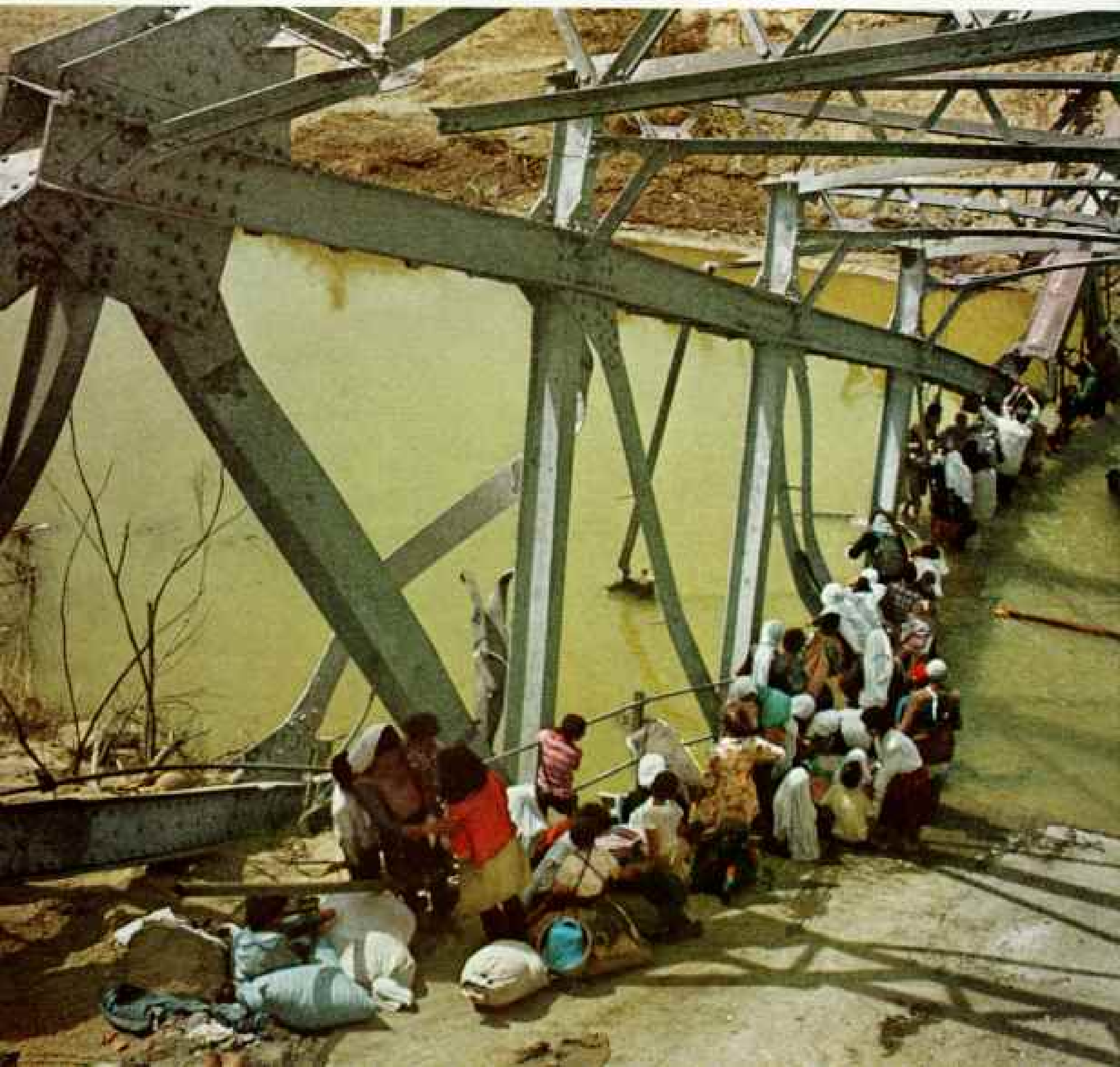
"Of course," I said, and led them inside.

All the lamps and candles were extinguished, but one officer produced a flashlight, and in a few minutes I could assure them that all was as I had last seen it. They jotted this information on a clipboard, exclaiming at the wealth of gilt in the church.

Bulldozers Level Arab Homes

On the way back to Jerusalem I passed a group of Israelis distributing water to Arab refugees. Inside the city, on the Via Dolorosa, I watched Arab children line up for free milk and bread. From this point I could hear the roar of straining bulldozers at work.

Curious, I followed the sound through the little gate near the Wailing Wall—and stopped dumfounded. The narrow alley I had walked along a few days before had given way to a wide plaza. Bulldozers were piling the rubble



of houses to one side, and the Jews worshiping at the Wall choked in the dust.

The driver of one bulldozer told me the plaza was being prepared for the thousands of Israeli civilians who would come to the Wall on Shabuoth, the festival celebrating the year's first harvest (pages 792-3). And so they did; 200,000 strong, walking up Mount Zion, through the Dung Gate, past the blue-gold-and-white banner of Israeli Jerusalem and the blue-and-white flag of Israel itself.

On my last day in Jerusalem, Israeli authorities gave Arabs living in the former Jewish Quarter until 3 p.m. to leave their homes. As I stood on the wall at the Damascus Gate, watching the frantic crowds boarding buses and exchanging farewells, an Arab friend touched my arm. An educated, quiet-spoken man, he had helped me with the picture coverage for "Where Jesus Walked."

This city has seen so many wars, I said, did he think it would ever find the long-sought legacy promised by the Prince of Peace?

My friend gently reminded me that his people had seen all those wars; that Arabs were the descendants of the Biblical people of Phoenicia, Babylon, Assyria, and Egypt.

"And we never left," he said, his voice rising with emotion. "With all this talk of homeland, who is it that you see, their belongings on their backs? This is the modern Exodus!"

Embarrassed at his own outburst, the Arab shook my hand and left.

I wondered then if the six-day war was really over. Or if, indeed, peace would ever come.

THE END

Fleeing from Israeli-occupied Jordan, Arabs cross the demolished Allenby Bridge over the shallow Jordan River. Fear of the conquerors goads the refugees.

Blindness feeding her panic, an invalid rides a man's back through knee-deep water swirling across the broken bridge. A mother carries a child and a hastily assembled bag of belongings. In late August Israel permitted thousands of Jordanians who fled during the war to return to their homes.

EKTACHROME (LEFT) BY CHARLES HARBUTT, MAGNUM;
KODAKCHROME BY LEONARD FREED, MAGNUM © N.G.S.

Lands of the Bible Today

New wall map presents the pivotal Middle East, with a wealth of historical notes

IN BIBLICAL LANDS long torn by conflict, more than custom prompts the beginning and ending of conversations with that freighted word "peace." The Arab says *salaam*, the Jew *shalom*. And their words tell of an age-old hope in the often embattled land of Abraham, David, and Solomon, of Jesus and St. Paul, of the prophet Mohammed.

This year it has been a hope denied, and the brief but deadly Arab-Israeli war has had world-wide repercussions, including the closing of the Suez Canal for many months.

Now the National Geographic Society brings this pivotal Middle East region to its more than 5,500,000 members in a special supplement map that shows not only the present but the past—**Lands of the Bible Today,*** with thousands of words of historical notes against a background of up-to-date geography.

On the main map and on a larger-scale inset, Holy Land Today, a shaded red line indicates territory occupied by Israeli troops at the end of last June's fighting: all Sinai, the Gaza Strip, western Jordan, and part of Syria. Conventional coloring, however, still shows prewar national borders.

A second inset shows the heart of Old Jerusalem. Now entirely in Israeli hands, the Holy City appears without the strip of no man's land that long divided it into Israeli and Jordanian sectors. Other insets trace the traditional route of the Exodus, the travels of St. Paul, and the Crusades.

Arabs Rebuild Historic Railway

An extensive revision of the Society's 1963 Bible Lands map, this supplement shows such up-to-date developments as the newest railroads and oil pipelines.

Striking south through desert from Maan in Jordan, a black line traces reconstruction of the Hejaz Railway, now completed to the Saudi Arabian border. World War I guerrillas, aided by the storied Lawrence of Arabia, shattered segments of the track, and for decades the rails were left to rust in the sun.

Previously landlocked oil deposits in Turkey's southeastern fields now flow freely to the Mediterranean through a recently completed 300-mile pipeline from Garzan to the port of İskenderun.

Jordan's southernmost frontier with Saudi Arabia cuts across blistering sand in a zigzag line established by a 1965 agreement. The pact transferred to Jordan 2,300 square miles of virtually uninhabited territory in exchange for 2,700 square miles of equally desolate land ceded to Saudi Arabia. But Jordan acquired 11 new miles of shoreline along the Gulf of Aqaba—a vital factor for future development of the nation's only port, Aqaba.

Excavations just north of the port have revealed the smelters of Ezion-geber, where Solomon once refined copper and built his

OLD TESTAMENT ISRAEL stretched from the Euphrates to Egypt after David's remarkable conquests of the first millennium B.C. With increased foreign trade in goods and ideas, the succeeding reign of Solomon witnessed the full economic development of the kingdom and the beautification of Jerusalem, the capital city.

"navy of ships" (I Kings 9:26). Nearby Elat, in Israel, flared into the news when the United Arab Republic blockaded it by sea, a spark in last June's Israeli-Arab war.

On the generous scale of 45 miles to the inch, this 41-by-29-inch wall map covers a vast expanse of geography and history, from the Egyptian tomb of King Tutankhamun to the Soviet Caspian Sea oil port of Baku, and from deep in the Balkans to Kuwait and Bahrain, tiny sources of vast amounts of petroleum.

Nearly 350 descriptive notes—more than 7,500 words—enhance the geographic information on the map. They cover a wide range of human occupation, from the June, 1967, cease-fire lines to Shanidar Cave, in northern Iraq, which has yielded the bones of a Stone Age baby that lived at least 60,000 years ago.

Another map note pinpoints new excavations—being done with the aid of a National Geographic Society research grant—at the marble city of Aphrodisias in Turkey. From this Anatolian center the work of skilled sculptors spread across Rome's empire during the first centuries after Christ.

What is the oldest map known? How old is installment-plan buying? What and where is the Fertile Crescent? These are only a few of the questions answered on this map, eight square feet of concentrated knowledge.

To the student of the Bible, to the merchant waiting for his Suez-stranded ship to come in, to every follower of world events, this portrayal of one of earth's great crossroads will serve as a valuable reference source. It forms a guide not only to lands of the Bible but to the sometimes proud and often troubled past of mankind itself, for from these lands have sprung profound ideas shaping our religions and civilization.

*Additional copies of the map and a booklet-form index to its thousands of place names may be obtained by writing Dept. 461, National Geographic Society, Washington, D. C. 20036. Maps, $1 each on paper plus 10 cents for postage and handling, $2 each on fabric (unfolded) plus 30 cents for postage and handling; index, 55 cents including postage and handling.

A SERIES OF TREATIES between 1920 and 1923 subdivided the Holy Land, for 400 years part of the Ottoman Empire, creating the British mandates of Palestine and Transjordan, and the French mandate of the Levant States.

NEVER IN EFFECT, the U.N. plan of 1947 proposed that, upon termination of the British mandate on May 15, 1948, Palestine be partitioned into separate Jewish and Arab states, with the city of Jerusalem under U.N. trusteeship.

ISRAEL'S NATIONHOOD, proclaimed the day before British rule ended, triggered war with her Arab neighbors. Though armistice lines were agreed upon in 1949, short wars broke out in 1956 and 1967.

The Sailing Oystermen of

By LUIS MARDEN
Chief, Foreign Editorial Staff

DAWN-ETCHED PHANTOMS *from a bygone age, skipjacks dredge for oysters. Until last year, Maryland law decreed that only sailing vessels might take the shellfish from deepwater beds. But the coming of power may toll a knell for these proud survivors of working sail—and for a way of life.*

798 EXTACHROME BY LUIS MARDEN © N.G.S.

Chesapeake Bay

Vessels of a vanishing fleet—the Nation's last to work under sail—brave winter's blasts to dredge Maryland oyster beds

"THE WAY I FIGURE IT," said the captain, "most men live in hope and die in despair." He eased the wheel off two spokes. "The trouble with drudgin' with sail, you either got it flat ca'm or it's too much wind. You go to bed at night wonderin' where the wind's gonna be, and you don't know where you gonna make your day's work.

"Days loike this, when it's pretty, we can't work—ain't neither breath in the world. When it's blowin' not fit for a dog to be on the water, you have to go. Yep, there's hardship in the oyster [he pronounced it 'auster"] business.

"But," said Capt. Eldon Willing, squinting at the red disk of the setting sun, "me, I'm loike everyone else. I live in hope. I don't think it's ever been so bad as I couldn't make it."

"Tree of Water" Yields Rich Harvest

On the map of the eastern flank of the United States there grows a mighty tree of water. Resting its broad buttress roots athwart the Virginia Capes, it extends northward for 195 miles, bending to the east as if to resist the winter gales of the Atlantic, and thrusting its gnarled and twisting arms deep into the fertile tidelands of Maryland and Virginia. This is the Bay of the Chesapeake, one of the most fecund bodies of water in the world (maps, page 806).

When that tough and capable Englishman, Capt. John Smith, came to Virginia in 1607, he sailed past Capes Charles and Henry and into "Chesapeack" Bay. He recorded:

"There is but one entrance by Sea into this Country, and that is at the mouth of a very goodly Bay, 18. or 20. myles broad. . . . Within is a country that may haue the prerogatiue over the most pleasant places knowne. . . heaven and earth never agreed better to frame a place for mans habitation. . . ."

Like others who followed him, John Smith noted particularly the prodigal richness of sea life in the waters of the Bay. Of the exuberance of sea food, the most noteworthy and valuable was the oyster.

On the second day the landing party came to a place where "the Sauages . . . had made a great fire, and had beene newly a rosting Oysters. . . . We eat some of the Oysters, which were very large and delicate in taste."

The early settlers found the Indians raking oysters from the bottom, and for more than two centuries tonging was the method used by all who sought the Bay's famed shellfish. Even now tongers outnumber dredgers ten to one. But my friend the captain dredged—he said "drudged"—oysters with iron-and-net dredges pulled by his single-masted sailing craft, a skipjack.

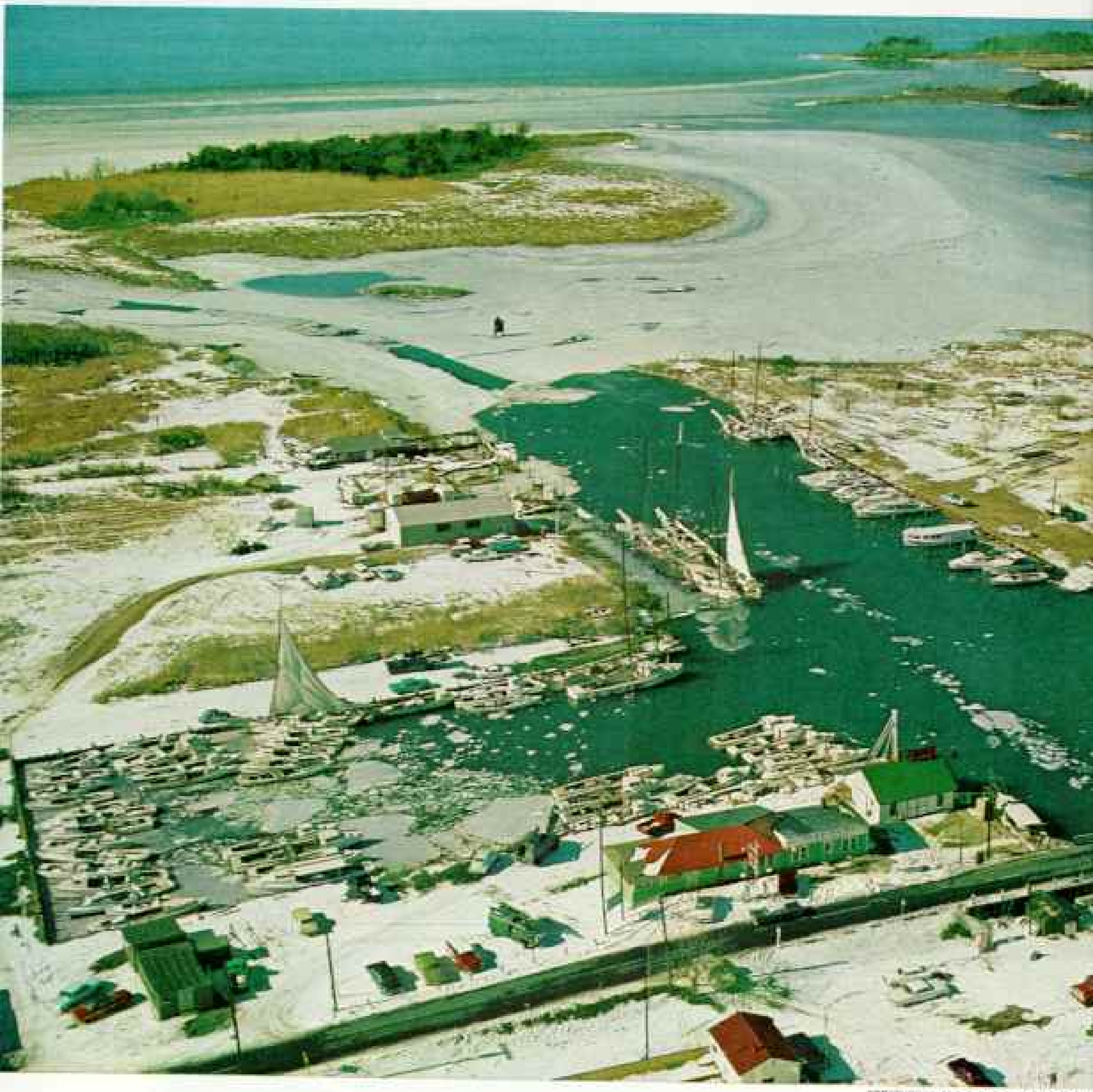
"Fifty years ago, when I started in," he said, "sailboats was thick as pine trees out there. I've seen 75 to 100 boats drudgin' the same ground above Sandy Point. They was 500 boats in Tangier Sound alone. Ain't many boats on the Bay now. What boats it is, most of 'em is in the Choptank and at Deal Island.

"Oh my blessèd, there used to be all the austers you want into the Bay then. You could catch thousands of bushels. Now you got to grind down to catch any. They killed the Bay. Caught the bottom and didn't put it back."

When working sail was at its apogee on the Bay, before World War I, perhaps 2,000 licensed vessels, great and small, sailed the waters of the Chesapeake. Of all that fleet of sail, no more than a handful brave the blasts of winter now. Last year only 47 sailing vessels took out licenses to dredge. All were skipjacks; the last round-bottomed sloop and last bugeye are gone. The gallant boats that remain form the only commercial fleet still working under sail in the United States.

Even this vestigial fleet of sailing dredgeboats exists today only because of a Maryland law that prohibits dredging under power on all but two days of the week. From November 1 to March 15, Baymen sail their dredgeboats to and from the oyster "rocks"—bars—or, "if it's no wind," push them with small powerboats rigged astern (page 804). But they must hoist the yawlboats inboard when on the rock, and dredge by wind power alone, except on Mondays and Tuesdays.

"Sail—it's somethin' that gets into you," says Capt. Orville Parks, who like his forebears lives by time-honed seaman's skills. Coaxing *Rosie Parks* to victory in a blustery skipjack race, he tenses for every shift of wind and wave as son Hubert stands by. Of his 72 years, Captain Parks has spent 60 harvesting the Chesapeake's oysters.



SKIPJACKS AND DREDGEBOAT (RIGHT) D

And they continue to dwindle. "Ever' year there's one or two of 'em taken up the creek to die," said the captain (page 819). "Ain't no more workin' skipjacks bein' built. Last one was built in 1956. Won't never be no more."

Beds Restocked From Protected Nurseries

Captain Willing's vessel, the *Robert L. Webster*, is nearly 80 feet long from tip of bowsprit to stern—the largest skipjack now afloat. It was spring, and we were dredging for seed oysters. The dredge brought up the young shellfish from protected seed beds for transfer to public water to mature.

Each dredgeboat works two dredges, port and starboard, attached by steel cables to a winder engine amidships. The captain pulled a cord leading to the winder-engine throttle, a crewman stepped on the clutch, and the dredges wound slowly in. When they reached the rollers at the rails, two men with one practiced easy motion swung each inboard and emptied it. Other crewmen shoveled the oysters into piles fore and aft.

Round and round and back and forth the skipjacks plied, and the hills of oysters rose until the rails were within a few inches of the water. Then the heavily laden boats, clustering like ducklings round a mother, drew alongside a bluff-bowed buy-boat (pages 808-9) to

NATIONAL GEOGRAPHIC PHOTOGRAPHER EMORY KRISTOF © N.G.S.

Hard as ice, cold as fear, white winter crusts Knapps Narrows, a thin blade of water that splits Tilghman Island, left, from Maryland's Eastern Shore. Skipjacks shelter here during the oyster-dredging season, November 1 to March 15. Alongside lie the small powerboats of tongers, who work the bottom by hand with scissorlike rakes in depths of 30 feet or less.

"**It's the hardest, coldest work** in the world," says shipwright Curtis Appelgarth of the oystermen's lot. Capt. Ralph Ruark shovels snow from the skipjack *Wilma Lee* before she sets out for the oyster beds, or "rocks." Oysters grow fat and succulent in winter, after the summer spawning months.

transfer the oysters for planting on the growing grounds, where they would lie undisturbed until at least three inches in size.

When we had discharged our last load, our crew sluiced the decks clean and we turned downbay. We forged steadily down the Eastern Shore, pushed through the windless evening by a snub-nosed yawlboat nudging our stern. To starboard the sun plunged below the horizon in a welter of gold and mauve. The silken surface of the Bay was like a dove's breast, shot with purple lights and flecked with green where cat's-paws flawed the water. Against the saffron afterglow a ragged W of Canada geese flew northward. Through the drumming of the engine their honking *ow! ow! ow!* came faintly down to us.

The skipjack came into being some time after the Civil War, and her origin, like the meaning of her name, is obscure. But soon after her appearance, the V-bottomed vessel's handiness and speed were so apparent that she began to supersede the round-bottomed sloops, bugeyes (two-masted, round-bilge vessels), pungies (broad-beamed keel schooners),

and centerboard schooners that had dredged for oysters since the early 1800's.

Long before the American War for Independence, the Bay shores were known for the excellence of the boats and larger vessels built there. In this primeval forest of giant oak, walnut, cedar, and pine the early Baymen found first-rate shipbuilding timber ready to hand, close to the banks of the Bay's innumerable tributary streams.

The first colonists saw the Bay Indians fishing from "Cannows," each made of a single huge log. Smith wrote: "These they make of one tree by burning and scratching away the coales with stones and shels, till they haue made it in forme of a Trough. Some of them are . . . fortie or fiftie foote in length. . . ."[7]

Bay Builders Adapted Indian Method

Skilled shipwrights were rare among the early settlers, and the newcomers made their first watercraft partly after the Indians' example, using whole logs to form the hull.

When the Baymen attempted something more ambitious than a "cannow," they chained three logs together, dubbed out the convex

"It's quiet. Listen to the water going by . . ." muses Capt. William Todd. Chill waves slap the stout sides of *Nellie L. Byrd*, outward bound from Cambridge, Maryland. Across her stern

bottom curves with an adz, then turned the logs over to hog out the inside. The "log-built" boats then were fastened with pegs.

As the builders grew more skillful and the watermen demanded larger vessels, they built five-log, seven-log, and even nine-log hulls. The smallest were the famed Chesapeake Bay log canoes, small clipper-bowed, sharp-sterned boats with little freeboard. They carried a sharply raked mast stepped right forward, and sometimes another nearly amidships.

As the light faded from the sky, the captain's voice brought me back to the present. "We should soight Hooper Strait Loight just at the edge of dark," he said.

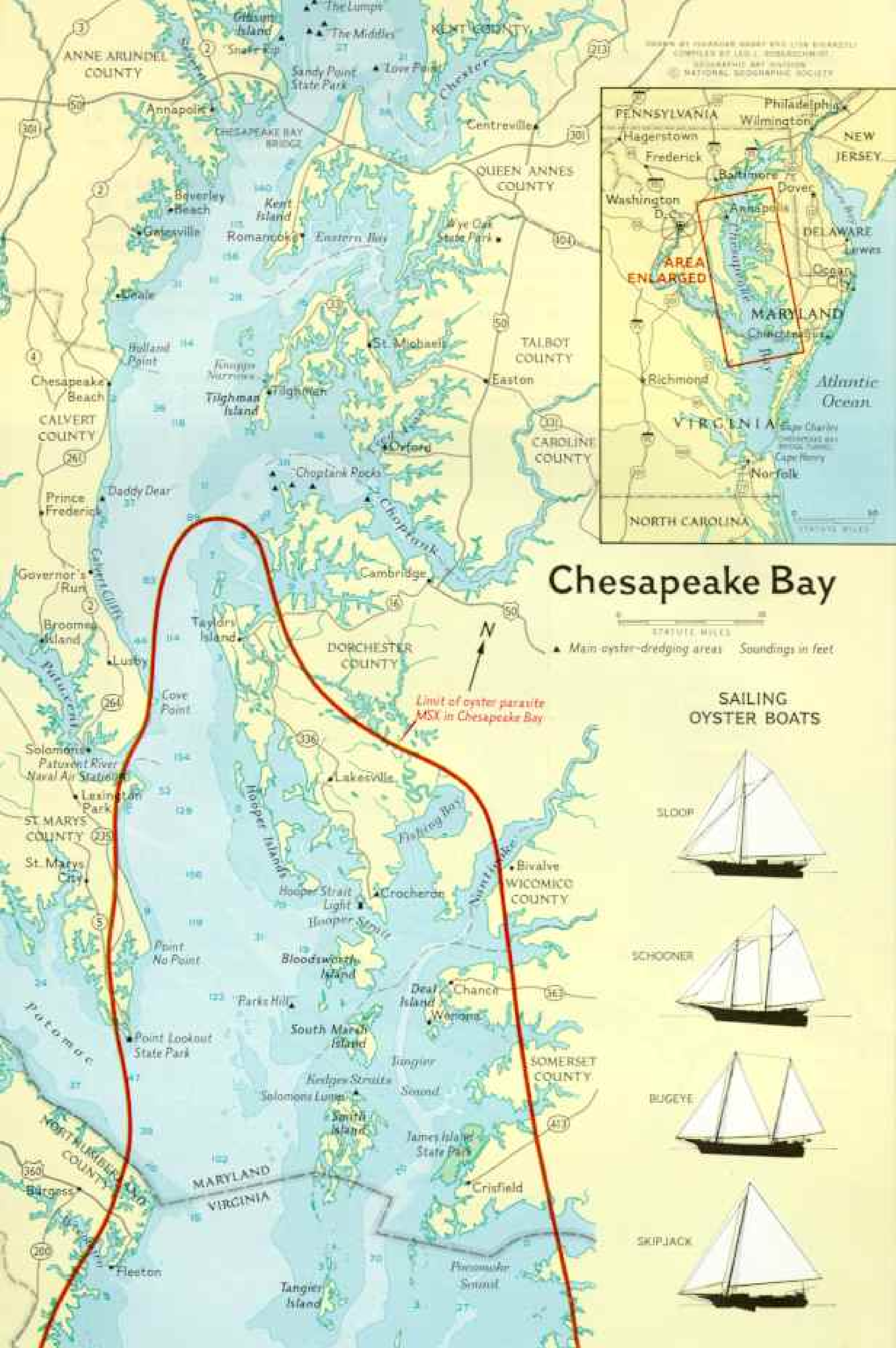
In a short while we made out the pale loom of the light against the gathering darkness. As night fell the wind rose, and a short sea slapped against the bow.

"Set the jib, boys," the captain called to the shadowy figures forward, "then h'ist the fores'l." For some reason many Chesapeake skipjack men call their mainsail the foresail. "It ain't no wind, but it's a fa'r wind."

To a rhythmic creak of blocks, first the jib, then the main rose in jerks, blotting out the

hangs a yawlboat; such motorized small craft are now permitted to nudge workboats across the oyster beds on Mondays and Tuesdays. Other days, oystermen still must laboriously dredge by sail.

Chesapeake Bay



SAILING OYSTER BOATS

stars from the horizon upward. The skipjack heeled slightly as the breeze filled the heavy canvas, and the slap under our forefoot became a steady chuckle.

The vessel was homeward bound after more than a month of dredging seed oysters. The extra work had eked out a lean season, and the men were content. One of the crewmen stumbled over a shovel and the captain cried, "Watch it, Jimmy! If you fall overboard we can't stop to pick you up. Get you next year on the way back."

Except for the big rivers, the western side of mid-Chesapeake Bay has few good harbors. The low-lying Eastern Shore, on the other hand, is fretted with water. From the time of the earliest English settlers, this land of water has always been set apart because of its isolation and the sturdy individuality of its inhabitants.* On their long peninsula between the Atlantic and the Chesapeake, the watermen grew independent yet closely knit.

"Well, that's one more season," said the captain. "What do austermen do in the summertime? Some goes crabbin', some grows strawberries, some goes rockin' [catching rockfish], some does nothin' at all—them that's made it."

The breeze was freshening as we neared Deal Island,

*See "Chesapeake Country," by Nathaniel T. Kenney, NATIONAL GEOGRAPHIC, September, 1964.

KODACHROMES BY LUIS MARDEN (RIGHT), BATES LITTLEHALES (CENTER) AND JAMES L. AMOS © N.G.S.

Hardy captains of a vanishing breed: Eldon Willing (above) captains the biggest skipjack still dredging, the *Robert L. Webster*, nearly 80 feet from bowsprit to stern. Smoke from the cigar of his brother Bunk tells which way the wind blows. Bill Jones (right center) knows the Bay so well he often navigates without a compass. Rugged face of Loudy Horner (top) belies his other calling—Methodist Church lay leader.

"Mighty tree of water," the author calls the Chesapeake Bay and, like a tree, it supports multitudinous life—including MSX, or *Minchinia nelsoni*, a microscopic parasite that thrives on oysters. Once 2,000 sloops, schooners, bugeyes, and skipjacks sailed the Bay; in 1966-67 only 47 skipjacks remained to dredge in Maryland waters. Virginia, which shares the Chesapeake, does not require dredging by sail.

Piled high with oysters, skipjacks raft up to a buy-boat that will seed the immature shellfish in protected beds. The state pays dredgers and carrier for off-season transplanting. In three to four years the oysters grow to harvesting size (above). Last winter they brought $3 to $6 a bushel.

Strong third hand of the oysterman, the culling hammer provides a three-inch scale to determine oysters of "keeper" size. It also knocks off rocks or separates oysters that stick together.

Heaven on the half shell for oyster fanciers lies ready for the tasting after a shucking knife has pried open the plump Chesapeake bivalves.

our destination. A quick red flasher pulsed on our starboard hand; we turned hard left, and ghosted slowly into a berth outboard of three other skipjacks. After tying up, we stepped from vessel to vessel to the sandy foreshore.

In the morning I looked round the little basin. Skipjacks were all around the *Webster*, rafted three and four deep, side by side and held apart by auto-tire fenders. Some had hoisted their sails to dry, and they hung in white and buff folds against the deep-blue sky.

Within an oyster's throw stood the white wooden houses of Wenona. Gray weatherboard crab-packing houses and wooden holding boxes floating in rows lined the waterfront. Like all oyster communities on the Bay, Wenona is a crab town in summer.

On the screen door of the little general store and post office I read a sign: "Please leave your whiskey and beer outside." The deeply pious Methodists of Deal Island are, almost to a man, teetotalers.

Inside, the captains sat on long benches and talked shop. Above the men's heads a hand-lettered sign read: "We don't care to hear your nasty vulgar jokes thank you."

Quiet Talk of Oyster Beds and Boats

"These austers on Daddy Dear was right heavy; they'd shuck seven points [pints] to the bushel."

"Fish is nothin' plentiful; we been havin' right smart o' trout, but no hardheads."

"Oh my blessèd but she was tender. A little green flaw comin', she'd jump. When we jibed her, her deck'd come level with the water."

"Course she won't sail as fast. Them old boats is sobby. New wood's lighter."

SCRATCHBOARD BY JAMES L. AMOS © N.G.S.

In the 1966-67 season, beginning on November 1, 1966, Maryland first permitted oyster dredgers to "push"—dredge with power—on two days of each week, but limited each boat to 100 bushels a day. I asked the captains what they thought of the new law.

"I was sorry to see it come," said one. "I figure a man can only handle so many austers, no matter how you bring 'em up. But it's saved our life. You can work to weather, not depend on the wind. You get those two good days, and they'll overbalance the other three if they're bad."

"That's roight. We lose two, three days a week because it's no breeze, not countin' the times when the Bay's froze up. It's no way in the world you can make a livin' thataway."

"Well, I loike drudgin' under sail. I'd rather do it than eat, and that's the truth."

Said Capt. Clifton Webster of the *Maggie Lee* (page 813), a man whom his colleagues describe as "one of the finest captains it is":

"Five hundred sail in this sound 45 years ago. The captains has died, the owners has died, the boats has died. Young people don't want to go into it, and I don't blame 'em. I raise my hand to the Master, last year I paid my crew as little as $13 a week; in a good week, they might make $150.

"In the old days austers was 25 cents a bushel, they was so plentiful. Even as late as 1948 to 1950 the boat'd make $1,200 a week. She was loaded from the bowsplit on back. Thirty cents on each dollar went for the boat—upkeep and all; the rest we divided six ways. Some boats and captains takes half, the crew gets the other half.

"Then the cull law, that tells you how big a auster's got to be, was changed from two-and-a-half to three inches. Prices went up right

Chain-bag dredge, showered by sparks from an arc welder, undergoes repairs at Cambridge, Maryland. Unseen rocks and snags often bend or break the frame and its bag, as watermen call the metal net. Fully laden, it holds five bushels of oysters.

Old-time gear still finds use aboard sailing oystermen. Red running light, fueled with kerosene, identifies the boat's port, or left, side to other vessels after dark. Steam-bent hoops of hickory, like curtain rings, hold the mainsail to its loblolly pine mast.

Stitch by stitch, sails take shape in Henry Brown's loft at Wenona on Deal Island. His family has made workboat sails since 1870. Today, still using tools nearly as old as sail itself, Mr. Brown tailors jibs and mainsails from heavy cotton canvas that grows scarcer each year, since modern yachts use Dacron. Here he sews reinforcing rope along a mainsail's three edges—the luff, foot, and leech. For a new suit of sails that should last four or five winters, the owner pays $550 to $1,000.

good, we got as high as $7.50 a bushel. But we only caught 40 bushels a day, when we got through throwin' back the mud, rocks, and small austers. Then MSX came along. We had a right prosperous little island, but we gettin' close to a ghost town now. Let me tell you, honey, MSX has finished us down here, just as sure as go-to-be-hung." Watermen use terms of endearment for emphasis.

Oyster Blight Invades the Bay

The captain referred to an oyster blight that in 1957 appeared in Delaware Bay, worked along the coast, and since 1959 has been creeping insidiously northward in Chesapeake Bay.

At first the biologists could not identify the micro-organism, so they tagged it MSX—Multinucleate Sphere X. Now they know it as *Minchinia nelsoni*. The protozoan parasite that kills the oysters requires a salinity of 15 parts per thousand, and thus rivers like the Choptank and the Potomac, and the upper part of the Bay, are so far free of MSX (map, page 806). But several years of unusual drought have allowed the salinity to increase in northern waters, and slowly the micro-organism has seeped up the Bay. Tangier Sound is almost devoid of catchable oysters, and the Deal Island and Smith Island men must go out into the more boisterous waters of the Bay itself to make a living.

I said I had heard that in the old days some captains at the end of the season would take a crewman and "pay him off with the boom."

"I've heerd tell about it," said one. "Some captains would go ashore in Balt'm'r and go into a saloon where they was foreigners. The captain would get the foreigners drunk, and take 'em down to his boat and throw the lines

off and sail away. It was shanghaiin', pure and simple.

"Some captains would pay 'em off decent, but I heerd tell some would tell the green man, 'Here, get on top of that cabin and sweep 'er off,' and when the man was up there, the captain, he'd jibe her [throw the helm over in a following wind], and the boom would swing hard over and knock the man into the water.

"Most of 'em couldn't swim, and anyway it was too freezin' cold to swim. They was mostly tramps, didn't have no relatives or nothin', and no one missed 'em.

"The cap'n would write it down in his log, 'Blackie lost overboard, got drowned.' But one Blackie fooled 'em. He swam ashore. Somehow he got to Balt'm'r, and reported to the police. They took the captain and tried him; the story is that they hanged him. Then there was no more shanghaiin'. But that was all before my time."

One of the captains knocked out his pipe, and said, "Guess I'll go home. Strawberries gettin' ripe and nobody to take care of 'em." That broke up the session.

Skipjacks Sail On as Yachts

Off and on through one summer I sailed my Alberg 30 sloop *Bounty* along the Eastern Shore and talked to oystermen and boatbuilders. At Oxford, on the Tred Avon River near where it flows into the broad mouth of the Choptank, I visited Curtis Applegarth, a third-generation waterman who builds yachts on the skipjack pattern.

"They started building skipjacks in the 1880's," said Mr. Applegarth. "They were plank boats and flat-bottomed. To make them sail closer to the wind and come about more easily, the Baymen built in dead rise—gave them a V-bottom. They had a centerboard that could be raised or lowered through a slot, so they could work in shallow water."

Mr. Applegarth put down his plane. "Skipjacks have no outside ballast; they put a couple o' tons of fieldstone inside. Some of the old-timers would go to an old graveyard and get some marble slabs that would fit nice, y' know, and stuff them underneath of the bunks. I'll bet if you pulled up the bunks of old skipjacks, you'd still find tombstones."

Howard Chapelle, the noted naval architect and Smithsonian Institution authority on marine history, once told me that he is nearly certain that the first skipjack launched in Cambridge, on the Eastern Shore, was built about 1886 with timber left over from a schooner. Named *Eva*, she was originally bugeye-rigged, with three sails.

The last round-bottomed sloop of the oyster fleet, the *J. T. Leonard*, worked out of Cambridge until 1966, when she was retired to the Maritime Museum in St. Michaels. Built in 1882, she was the oldest vessel of the oystering fleet.

Captain "Went on the Water" at 12

On the deck of one of the newest, the skipjack *Rosie Parks*, I talked with her captain, Orville Parks, who sails the *Rosie* to victory in nearly every race he enters (page 801).

Said the captain, "I never had much schoolin'. My father had a big family, and my mother died when I was six. There was four boys left, and he married again and there was five girls more. Made nine head." He smiled. "Most watermen always managed to keep one on deck and one in the hold.

"When I was 12 years old I wanted to leave school, because I only got to go when I wasn't out with my father. I'd know parts of the book, but other parts I wouldn't know nothin' in it, so I told my father, 'Let me go on the water.' I've been out here ever since.

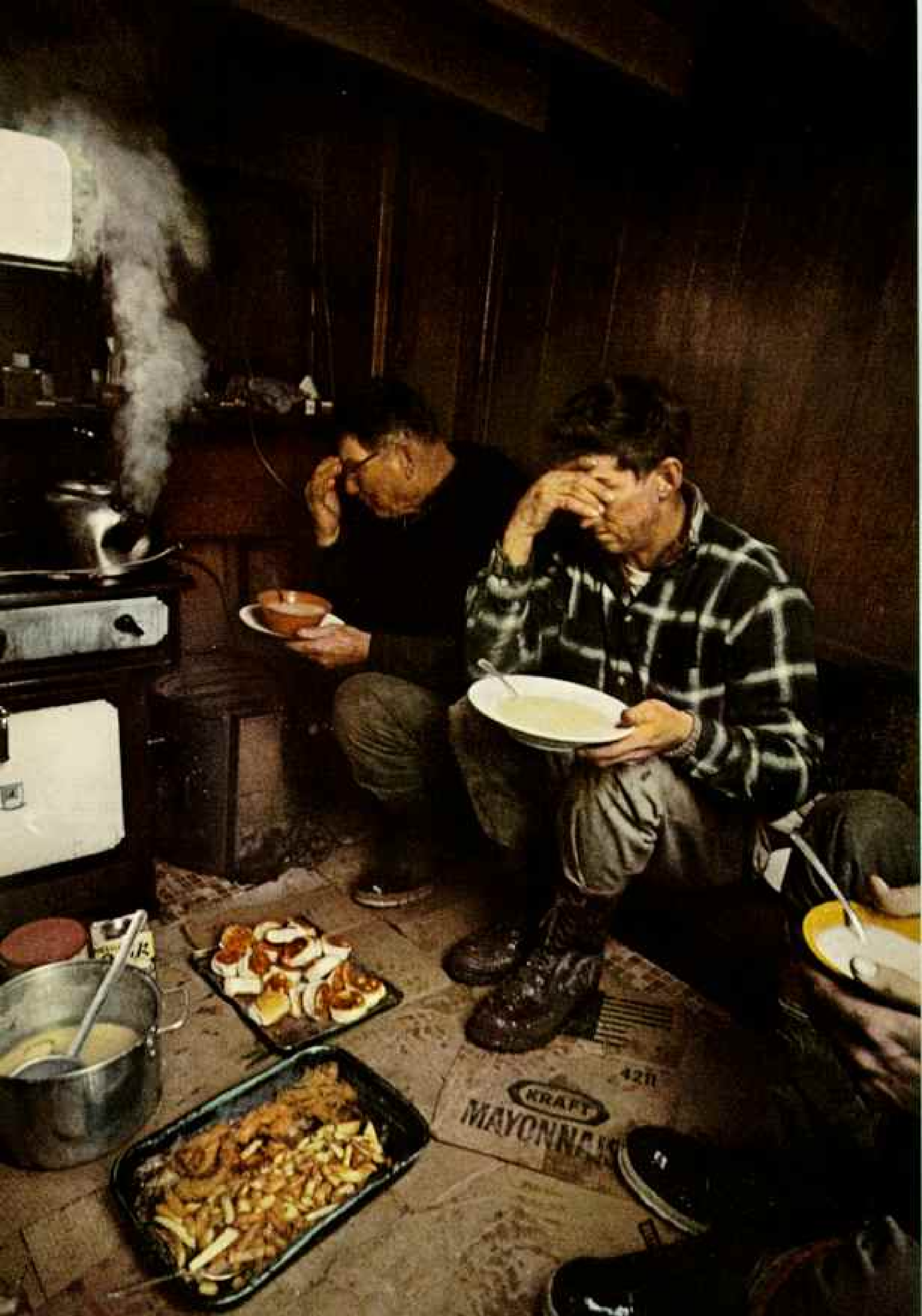
"The old-timers sure knew how to sail a boat. We don't sail boats like they did. When I was a boy, if I'd git up and run for'ard to draw away the jib when my father was racin', he'd throw anythin' handy at me. I had to crawl for'ard, so's not to hold back the wind. He was just a sailor, that was all."

Captain Parks may have the fastest skipjack on the Bay. I asked him her top speed.

"Oh, I suppose she'll do 12 or 13 knots in a stiff breeze. Mostly, if a drudgeboat goes 10 knots, she'll be all out, though.

"This power business? Here in Dorchester County we voted against it. In the Choptank River, thank the good Lord, we don't have the MSX disease, and we've got right good o' austers. So we don't want no drudgin' with power to scrape the bottom down to nothin'."

"We thank Thee, O Lord, for Thy bounty," recites Capt. Clifton Webster, left, and the *Maggie Lee*'s crew as they bow their heads in grace. To satisfy appetites sharpened by icy air and hard work, the cook feeds them lunch of bean soup, fried chicken, French fried potatoes, and baked biscuits fresh from the oven. Sometimes he serves oysters.


KRAFT
MAYONNAISE

On the Tred Avon River in Oxford, at a laboratory of the U. S. Fish and Wildlife Service, I heard the other side of the question.

"Our archaic oyster fishery is dying out because we're still largely working on a virgin crop and depleting the natural stock," said a marine biologist. "We ought to farm the oyster. The question is: How much are the taxpayers willing to pay to support today's oystermen, among them a few who like to sail?

"Maryland has to use tax revenue to transplant small seed oysters from protected areas to public water, where the oystermen can take them when they've reached legal size. I say let the fishermen work the self-maintaining areas, those that produce abundantly. But those places that can't replenish themselves, let's lease to oyster farmers.

"The Maryland oyster catch declined from a high of nearly 15,000,000 bushels in 1885 to only a tenth that amount in certain years since 1930. Today we have one-third the oyster-producing areas we had at the turn of the century—though last year the seeding showed its effect, and the take was the biggest since 1940-41, some 3,000,000 bushels." Of that amount, the dredgeboats took only 10 percent, the tongers the remainder.

"What about the R months?" I asked.

"Technically that does not apply to the American oyster, *Crassostrea virginica*. The custom of not eating oysters in months without an R originated in England, where they have the round oyster, *Ostrea edulis*. The English oyster keeps the young within the mantle cavity for some time; the shells form early, so the oyster tastes gritty during the summer months. Our oysters discharge their eggs directly into the water. Then the larvae attach themselves to bottom debris; that is what we mean when we say there is a 'strike' of spat. But it's just as well to observe the R tradition, because it protects the oysters during the spawning months.

"Every year, the State of Maryland makes conditions favorable for the spat—the newborn oysters—by dumping 5,000,000 bushels of clean shell near the brood oysters. Then at the end of the season the state employs the oystermen to dredge up the shells, which are now covered with little seed oysters, and move them to a place in open water where they can grow to maturity. It takes three to four years to produce a three-inch oyster."

The hot summer days flowed one into the other; the blue crabs shed their armor, mated, and were taken up by the traps of the Baymen. As the days drew into autumn, the winds hauled to the nor'west. In a thin, dark lattice against the yellow dawn, the great geese came

"A good lick, captain," drawls a crewman as a winch winds home oysters by the dredgeful. Watermen must show great skill in scouring the bottom. If their skipjack sails too fast, the dredge refuses to bite; too slow, and it snags on the bottom. Reefed sails control the speed. For easy identification by water police, each vessel bears a number visible for a mile or more.

High eye of the law, helicopter-borne Inspector C. J. Robey of the Maryland Marine Police sees that dredgers do not use power except on Mondays and Tuesdays, work off-limit beds, or keep undersize oysters. Ninety police boats also patrol the Bay.

Five hundred years of combined experience makes for nostalgic reminiscing by veteran captains of sail. Here on a pier at the village of Chance, they recall bristling storms, bitter cold, and oyster rocks with names like Love Point, Tea Table, Snake Rip, and Daddy Dear. Off season, many skippers raise strawberries or trap Maryland's famous blue crabs.

Scene from the past: White wings lifted, a bevy of oyster boats crowds a rock in the 1930's. Half a century earlier, close to 15,000,000 bushels were taken from the Maryland waters in one season; the 1966-67 catch, best in 26 years, totaled only 3,000,000 bushels.

down from the north and settled on the sheltered bays with a noise like distant applause. The first frosts rimed the wheat stubble, and in the rising winds the nodding masts of the skipjacks beckoned at their moorings. It was once again the time of the oyster.

The winds of winter are heavy winds. Cold air is denser than warm, and a 15-mile breeze in January has a lot more weight than the same breeze in summer.

The sky was leaden and the water like pewter as the skipjack *Rosie Parks* sailed out of Cambridge. Even the waves slapping against our bows had a wintry sound. The great mainsail bellied to the quartering breeze, and soon we were pitching in a short, steep sea.

Shallow waters enclosed by land have only one way to go in a blow—up. Unlike the open ocean, shoal water can get rough very quickly. And the sudden Bay squalls have caught many an unwary yachtsman and some watermen.

"I remember a time I was drudgin' with an uncle, years ago," said Captain Parks. "We had the deck piled so high we was top-heavy. It blew us a gale nor'west, a real blusterous wind. My uncle started for his oilskins, but before he could get 'em on, she rolled over. One man had gone for'ard to take in the jib, and when she went over, he kept walkin' as she turned around and when she was bottom up, there he was straddlin' the bow, holdin' a cigarette in his hand. 'Say,' he says, 'does anyone got a dry match?'

"One February before the war," the captain continued, "a lot of us was drudgin' in the Choptank in a fog. We couldn't see nothin', but all of a sudden we heard somethin' a-roarin'. We thought it was some kind of engine, but it was the wind. It came out of nowhere and it hit us. I had a good crew and we got our sails off before she struck. But two boats capsized and ever' man on 'em was lost. Nine head in all. The wind only lasted ten minutes, that's all it lasted.

"I'll never forget it—72 miles an hour, an' we never saw it comin'! The men that follows the water today, if they didn't have good judgment and study the weather, plenty of times it would be bad. Once in a while you get caught and y' have to go with it."

Reefing Sails Controls Dredging Speed

We were over the oyster bar and the captain called out, "All right, boys, reef 'er down." The crew let jib and main down part way and tied rows of dangling rope ends round the tucks (page 814), reducing the sail area.

"That's the onliest speed control we got," said the captain. "That's why we got four reef bands on each sail, gives us four speeds.

"If you sail too fast over a rock, you float your drudges, and they don't hit bottom. If you go too slow, they get hung up."

The captain thrust a long sounding pole over the side and poked the bottom with it.

"You can tell by the way the pole feels if you're over austers," he said. "A captain's got to see the rock in his mind just like you look down on your table to see what's there to eat. I can take a place of austers not much bigger than the top of a barrel and I can sail up and drop my drudge right on it."

The captain signaled and the crew dropped both dredges, port and starboard, into the Bay. The skipjack slowed a bit as tension came on the vibrating cables dragging the dredges. The captain reached out and hooked a boathook round one of the taut cables.

"You can feel the bottom thisaway," he said. "If it's real smooth, you over mud. If she's bumpin', you on hard bog or austers. We try to find the edge: that's where the big austers is. I guess they get more to eat on the edge, because they always fatter there than the ones up on the hill in the middle of the rock."

"Lickin' About" Brings a "Fair Jag"

When the dredges came up and the crew had culled out the legal three-inch oysters, the portside man called out, "That was a good lick, captain, we got thirty-two."

"Thirty-two! When I think of the bushels o' big austers we used t' drudge up. Looked like a mountain o' shells on the deck.

"We just broadcastin' now. That means we keep sailin' and drop the drudge down almost anywhere. When we find the edge of the rock, we do what we call lickin' about. Drop the drudges down for a lick, come about with the boat, and drop 'em agin, like plowin' a field."

The sky darkened and the cold grew sharper, and the pile of legal oysters grew.

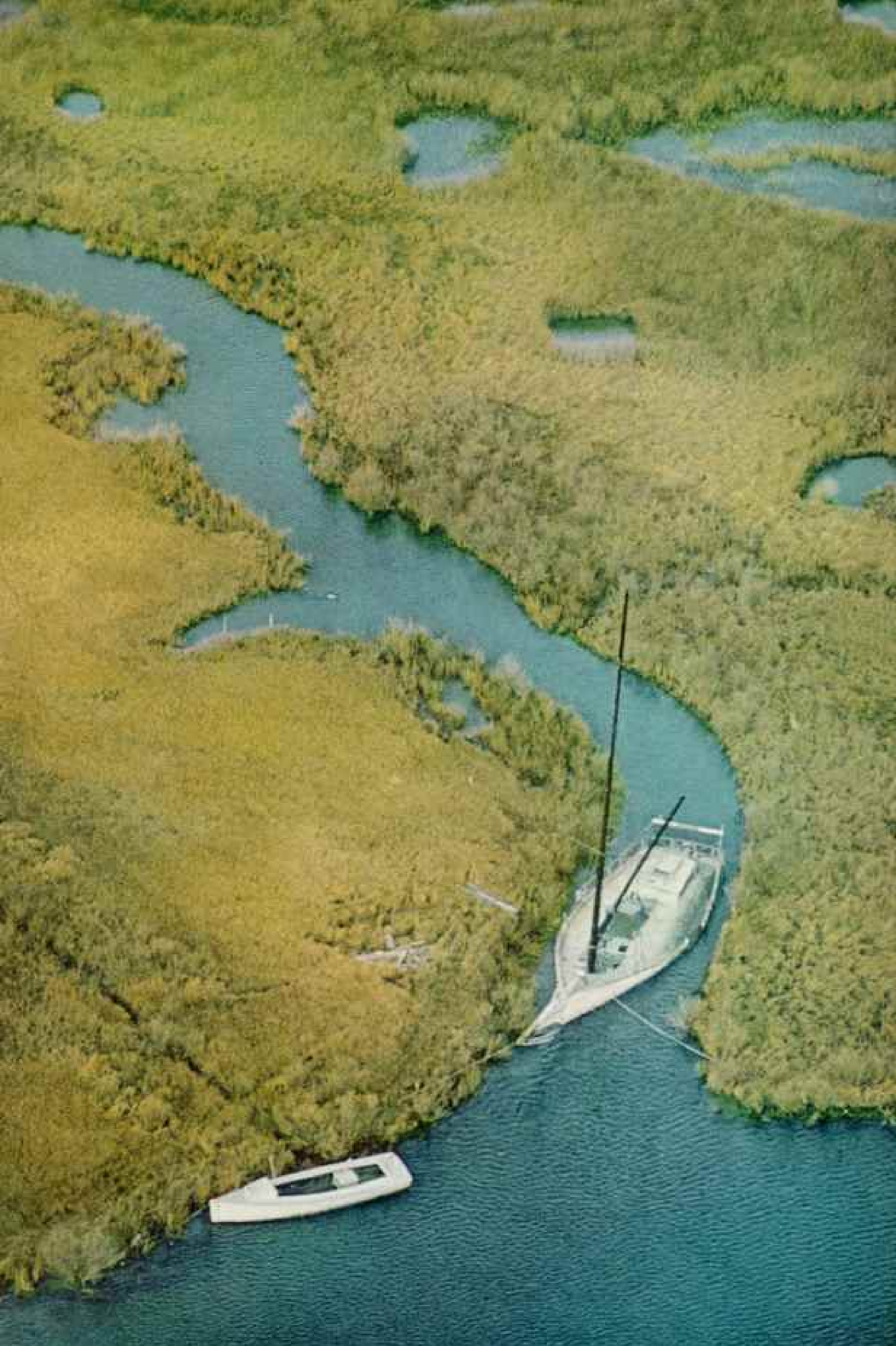
"Well," said the captain, "looks like we'll make a fair jag. Austers look thicker than either year yet." The wind freshened and the captain took a deep breath.

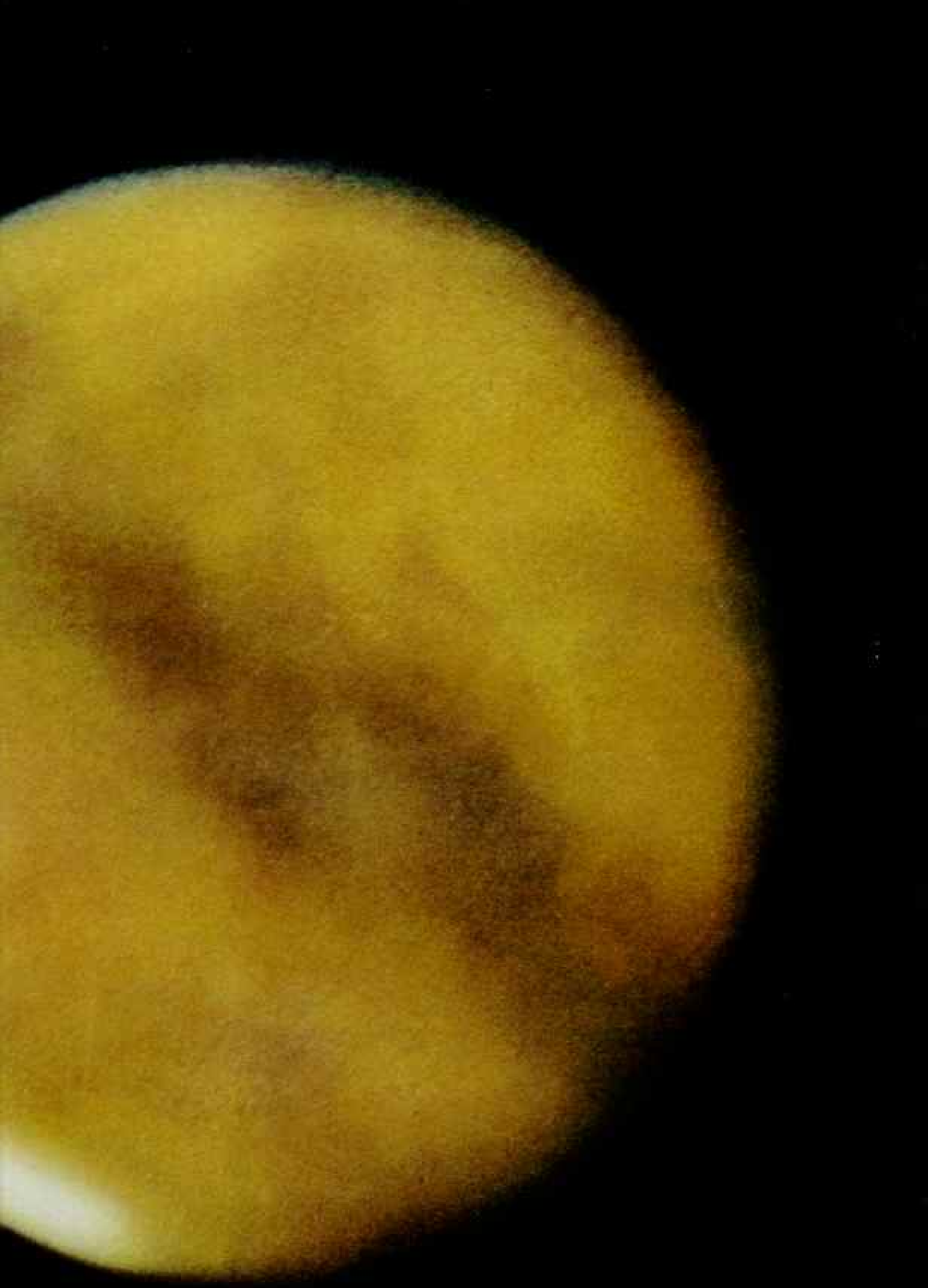
"There's no comparison between sail and power," he said. "Take this boat, put an engine in her, sit on a box sniffin' that old grease and push into the Bay; turn one way, let go, heave and wind in. The same thing, day after day, whether it's blowin' or ca'm. I wouldn't like it. This way, standin' at the wheel with a breeze on your face and the sails flappin'.... It's somethin' that gets into you, you can't get it out of your bones overnight.

"No, sir, if it comes to drudgin' with power, I'll go home and get on relief. For sixty years now I've been drove hard and put away wet, and if it comes to that I'll just set there and do neither thing in the world with the rest of 'em."

I doubt that he would. THE END

"Ever' year there's one or two taken up the creek to die," lament watermen of proud old craft such as this skipjack abandoned in Man Gut, a Deal Island backwater. Before mooring her for the last time, the owner salvaged all gear; tides and winds finish the hulk off. She epitomizes the fate awaiting others in the Nation's last commercial sailing fleet.





MARS
A New World to Explore

By CARL SAGAN

FOR THOUSANDS OF YEARS the red planet Mars has filled man with awe and stirred his imagination. Its unwinking, baleful gleam, at times one of the most brilliant sights in the night sky, spelled death and disaster to the ancients. They gave it the name of their god of war, and sacrificed human lives to propitiate its wrath. A joined spear and shield became its symbol. And its two tiny moons came to bear the names of the war god's attendants, Phobos and Deimos—Fear and Terror.

In more modern—and more scientific—times, man lost some of his dread and began to speculate on the possibility that Mars is inhabited. Astronomers, peering through

DEAD OR ALIVE? *Earth's atmosphere tauntingly blurs the ruddy face of Mars, seen 35,000,000 miles away through a telescope atop Mount Wilson, California. Scientists have long pondered the riddle of the planet's polar caps and ocher landscape that change with the seasons. Now space technology promises to reveal in the next decade whether earth's neighbor harbors life or spins through eternity as a sterile desert.*

KODACHROME BY DR. ROBERT B. LEIGHTON
CALIFORNIA INSTITUTE OF TECHNOLOGY © N.G.S.

telescopes at the fuzzy orange ball, sought on Mars an answer to the ancient haunting question: Is there life out there?

But at best the images seen through a ground-based telescope vary from moment to moment, and even from observer to observer. If simple visual observation were the only method at our disposal, Mars would remain an enigma, populated by the products of our wishes and our fears, unconstrained by much contact with the facts.

We may soon solve the riddle, however, for recent years have seen revolutionary improvements in astronomy. With radar we probe the topography of Mars; with spectroscope and polarimeter, with infrared and radio techniques, we analyze its radiations. Rockets and spacecraft now carry some of our instruments above earth's interfering blanket of atmosphere. Through the tools of modern physics we can now learn much about the Martian atmosphere and surface, its temperatures, even its winds.

And with the spacecraft Mariner IV we have secured the first close-up photographs of Mars, from less than 10,000 miles away

(next page). Today a portrait of our neighboring planet is taking shape that differs in many ways from the ideas held by astronomers only a few years ago.

Mars—Most Earthlike Planet

We know that the first men who land on Mars (we could be ready for interplanetary travel by the 1980's) will be able to move with comparative ease: Mars has only about half the diameter and a tenth the mass of earth; its gravitational pull is therefore lower, and a man on Mars will weigh only about 40 percent of his weight on earth.

Those first explorers, we also know, will need protection against the lack of oxygen, ultraviolet radiation from the sun, low atmospheric pressure, and extremes of cold. At the same time they may find Mars the most hospitable and earthlike of all our neighbors in the solar system. There they will find wind and water; carbon dioxide and sunlight; clouds, rolling hills, and deserts; winter frosts and balmy summer afternoons.

By contrast, other bodies in our solar system seem forbidding indeed. Our moon is airless

Puffs of "Mars dust"—actually samples of earth's own iron oxides on a sheet of glass—frame author Carl Sagan, who believes that Voyager (left) will find the Martian surface powdered with such rustlike substances. Today, knowledge of Mars remains a matter of scientific inference; in this article Dr. Sagan presents his views. His credentials: Assistant Professor of Astronomy at Harvard, staff member of the Smithsonian Astrophysical Observatory, and consultant to the National Aeronautics and Space Administration, the Air Force, and the National Academy of Sciences.

Space-age *Santa Maria*, braking its descent with rockets, eases onto the new world of Mars. Completing an eight-month voyage, the unmanned ship finds a surface pocked by meteorites and scoured by dust storms.

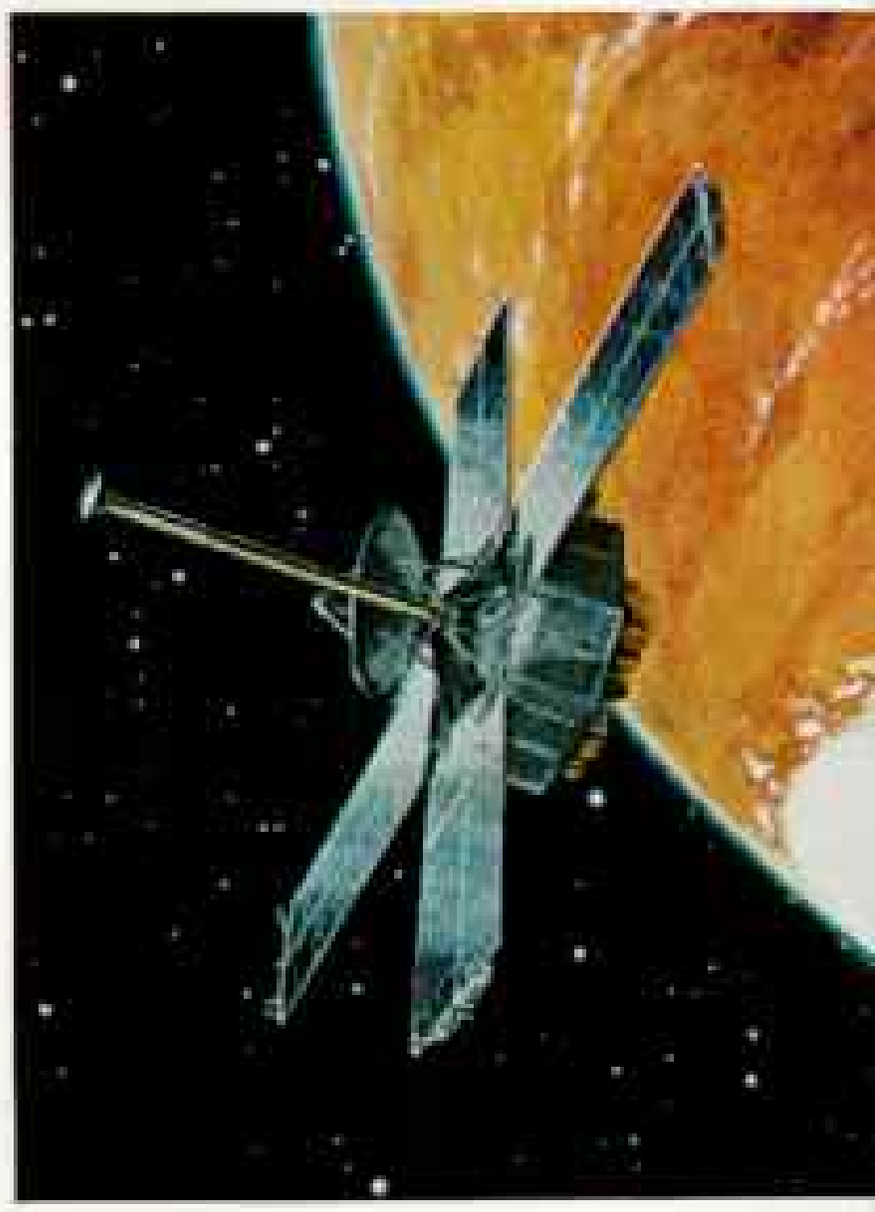
The time: possibly 1974, if things go well for the first of the yet-unborn generation of U. S. spacecraft named Voyager. Its complex scientific systems will "taste" the soil for mineral content and evidence of living matter; television cameras and other instruments will beam back to earth data that will, scientists hope, resolve questions vexing man since the time of the Babylonians, who associated the planet with war.

DOUGLAS CHAPTER; KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER BRUCE DALE © N. G. S.

NASA (ABOVE); PAINTING BY DOUGLAS CHAFFEE © N.A.S.A.

Cratered surface, photographed by Mariner IV in its historic flyby of Mars in 1965, surprised some scientists. From 7,800 miles away, this picture of the Mare Sirenum area (lower map, page 831) revealed eroded, meteorite-blasted craters as small as 3 miles across. Other Mariner IV photographs showed even smaller features.

Second flyby of a Mariner, set for 1969, will pass within 2,000 miles of Mars. It will make wide-angle and high-resolution photographs of the planet, including close-ups with ten times the clarity of those from Mariner IV.



and waterless, alternately oven-hot and freezing-cold. Cloud-wrapped Venus, between us and the sun, suffers temperatures hot enough to melt lead. Daytime surface temperatures on airless Mercury, even closer to the sun, are also unbearably high. Jupiter and the other outlying planets are much too distant for exploration in our time.

And so, in the search for life outside our own planet, we look to Mars, only 34,600,000 miles away at its closest approach to earth. Its 56,000,000 square miles—comparable to the total land area of earth—represent an entire world awaiting its first explorer.

Does All Life Share a Common Origin?

Exploration of Mars holds immense significance. Such sciences as geology, meteorology, and biology base many of their laws on the single example of our own planet. By studying Mars, we can test these laws in other contexts, and perhaps derive more universal scientific principles.

As a case in point, an extraordinary fact has emerged in the past 20 years from developments in biochemistry and molecular biology. We have discovered that the basic similarities among organisms on earth are vastly more significant than the superficial differences. For example, all organisms—men and molds, shrikes and shrews, paramecia and poodles—use the same genetic molecules to store hereditary information, and break food down into usable form in virtually identical ways.

The source of these and many other astonishing regularities appears to be a common ancestry. All organisms on earth seem to arise from a single instance of the origin of life, dating back some four billion years to the remote recesses of our planet's past. Apparently we are all variations on the same biological theme.

But is there a repertoire of themes, or is there one tune only in the universe? Is our kind of biochemistry the only kind possible? No one yet knows, but we may find the answer on the planet Mars.

PHOTOCHROMES BY JONATHAN L. BLAIR (ABOVE) AND NATIONAL GEOGRAPHIC

Duplicating harsh demands of the Martian environment, scientists test the hardiness of earthly life. Here biologist Paul H. Deal removes a rack of bacterial cultures from a freezer at NASA's Ames Research Center, Mountain View, California. Many of the bacteria thrived in a daily freeze-thaw cycle of minus 150° to plus 70° Fahrenheit.

And if we do discover life there, no matter how seemingly simple in form, everyone will recognize the immense philosophical as well as scientific significance of the discovery.

We are almost certain that many other stars have dark companions similar in mass to the planets of our solar system. Since we estimate that there are more than a billion galaxies, each with a hundred billion stars, we conclude that hundreds of billions of billions of planets may exist in the universe.

Can it be, then, in this vast array of possible habitats, that ours is the only inhabited planet? One way to answer such a question is to seek life on the nearby planets.

Let us consider, from what we have recently learned about Mars, how favorable an environment it may offer to living things.

For many years we have known that Mars has an atmosphere. In series of photographs taken at intervals, we can observe white clouds forming and dissipating. We can see dust storms raised by fierce Martian winds.

In the last few seconds before Mariner IV passed behind Mars, on July 14, 1965, radio-telescopes on earth measured the changes in the spacecraft's radio signals before they were finally blocked by the solid planet. Scientists were then able to deduce the density of the atmosphere that caused the signals to vary. They found that, at the surface, the Martian atmosphere is only about 1 percent as dense

In a plastic-domed "Mars jar," turtles easily endure one-tenth sea-level pressure. Research assistant Olive Daly uses a mechanical manipulator to handle one of thirty red-eared turtles that spent up to four months in this chamber at Union Carbide Research Institute, Tarrytown, New York. In another study, larvae of the common mealworm survived 70 days without oxygen.

Environment experimenter, Dr. Sanford M. Siegel prepares crayfish for a "Mars sojourn" at Union Carbide. In the cabinet, dwarf Swiss mountain pine and Peruvian apple cactus pass a test of no oxygen and a daily temperature range of 65° to minus 4° F.; rye and corn seeds sprouted under like conditions. Dr. Siegel feels his work supports the plausibility of life on Mars.

PHOTOGRAPHER ALBERT MOLDVAY © N.G.S.

as that on earth—or about as tenuous as earth's atmosphere 20 miles up.

And what does this thin atmosphere contain? Unlike earth's air, which consists almost entirely of nitrogen and oxygen, the atmosphere of Mars appears to be largely carbon dioxide. It holds a tiny amount of water vapor, perhaps a few tenths of a percent of the water vapor in our air. If all this vapor were condensed, it would cover Mars with a film of water no more than a few thousandths of an inch thick.

Martian "Air" Lacks Oxygen

No other gases have been detected in the Martian atmosphere, though we think there may be some nitrogen and carbon monoxide.

The absence of oxygen anywhere near the surface does not, of course, exclude life. Scientists have good reason to believe, in fact, that oxygen was absent during the origin and early history of life on earth. Even today, certain familiar organisms live very well without oxygen; some, like the bacteria that cause tetanus, are actually poisoned by it.

Rocket observations show Mars to lack ozone, a variety of oxygen with three atoms instead of the usual two to each molecule. Ozone exists in small quantities high up in our atmosphere, and does earthly life a great service by absorbing most of the flood of deadly ultraviolet radiation from the sun. Otherwise, most familiar life would cease to exist; hospitals, in fact, commonly use ultraviolet light as a germicide.

Thus if no other absorber of ultraviolet light exists in the Martian atmosphere, most organisms from earth would be killed there in a matter of minutes, unless they found some kind of protective shielding. Curiously enough,

however, the desertlike surface of Mars seems to contain large amounts of a mineral known as limonite, made up of iron oxides that absorb ultraviolet light. So if a Martian organism used a limonite shield, or if a small terrestrial organism hid under a grain of limonite, it might readily survive the searing solar ultraviolet radiation (page 833).

Mild Days and Bitter Nights

The climate on Mars, just as on earth, is affected by the length of the day, the length of the year, and the amount the planet's axis of rotation is tilted from the plane in which it moves about the sun.

By some quirk of nature, both the length of the Martian day (24 hours and 37 minutes) and the tilt of the axis (about 24 degrees) strikingly resemble those of earth. The similarity to earth's tilt of 23½ degrees gives Mars seasons of the same relative duration as ours. However, since Mars lies farther from the sun and travels about it more slowly, its year runs longer than our own—687 days.

We can determine temperatures on Mars by placing heat-detecting devices such as thermocouples or bolometers at the focus of a large telescope. They measure the infrared, or heat, radiation that Mars emits into space.

In this way astronomers find that a typical ground temperature at the Martian equator on an early afternoon in summer might be a comfortable 70° Fahrenheit. But a few yards up, primarily because of the thinness of the atmosphere, it might be below freezing. And that night the temperature would drop to almost 150° below zero. So low, in fact, does the temperature fall that every morning a frost can be observed—the so-called dawn haze.

No one should be surprised that Mars is colder than earth. It is roughly half again as far from the heat-giving sun, and its thinner atmosphere and drier surface do not retain heat nearly so well as earth's.

Although earth's air usually distorts the telescopic image of Mars, in the same way that hot air rising from a toaster distorts your breakfast partner's face, sometimes the atmosphere temporarily steadies. Then come breathtaking moments of crystal-clear seeing.

Some observers spend long hours at their eyepieces waiting for such moments. When surface details of Mars suddenly pop into sharp focus, the astronomers quickly record their impressions in notes and sketches. (Photographs always seem to miss the finest details.) Many years of visual and photographic observations have clearly defined three kinds of areas on the Martian surface:

(1) Bright areas, buff or orange-ocher

(2) Dark areas, predominately orange-gray, although some scientists still see them as greenish or bluish-gray

(3) Brilliantly white polar caps

The first of these, the bright areas, seem to be regions of wind-blown sand and dust. Analysis of both ordinary and infrared light from Mars has led to the suggestion that these bright areas are composed in part of limonite—a kind of rust with water chemically bound to it. The manner in which light is reflected and energy emitted from Mars—as well as the existence of dust clouds—shows that the Martian surface is finely pulverized.

Limonite readily absorbs the blue and ultraviolet light from the sun, but reflects much of the red light, thus giving Mars its characteristic coloration. The ancients, as far back as the Babylonians of the second millennium B.C., identified the planet with the god of war—perhaps because of its blood-red appearance—and there is a certain logic in this connection. Mars is reddish because of limonite (if our conclusion is correct). Blood is red because of hemoglobin. Both limonite and hemoglobin contain iron. Thus iron links the god of war with the sun's fourth closest planet.

Mystery still surrounds the dark areas of Mars. They are often described as maria, or dry seas. However, I conclude that they are largely elevated and covered chiefly with pulverized material like that of the bright areas, except that the particles are larger. Such larger particles would reflect light more poorly and give a duskier hue.

Meteorite Craters Pock the Surface

Both dark and bright areas were named before the turn of the century by the Italian astronomer Giovanni Schiaparelli, who knew more Greek and Latin than most of us know today. So we find such place names on Mars as Mare Sirenum, Hellas, Xanthe, Mare Erythraeum, and even Utopia (maps, page 831). One day men will walk these places, and the names will be everyday words.

And when men do arrive, after an eight-month voyage through space, they will wander over a gently sloping landscape marked by sand dunes and by enormous numbers of eroded, flat-bottomed craters. When the spacecraft Mariner IV sent back to earth 22

DETACHCHROME BY JACK FIELDS © N.G.S.

Blushing with a clue to its identity, a solution fluoresces in ultraviolet light. The reaction of a fluorometer tells Dr. Joon H. Rho that the tube contains chlorophyll. At the California Institute of Technology's Jet Propulsion Laboratory, the biologist hopes to design a compact device that could analyze Mars for compounds such as proteins, sugars, or chlorophyll, by measuring stimulation of soil samples under irradiation.

photographs of Mars, some scientists were startled to see the surface heavily pocked by craters (pages 824-5). Almost certainly, these were produced by huge meteorites—fragments from the asteroid belt, the ring of rocky and metallic debris that whirls around the sun between the orbits of Mars and Jupiter (diagram, page 831).

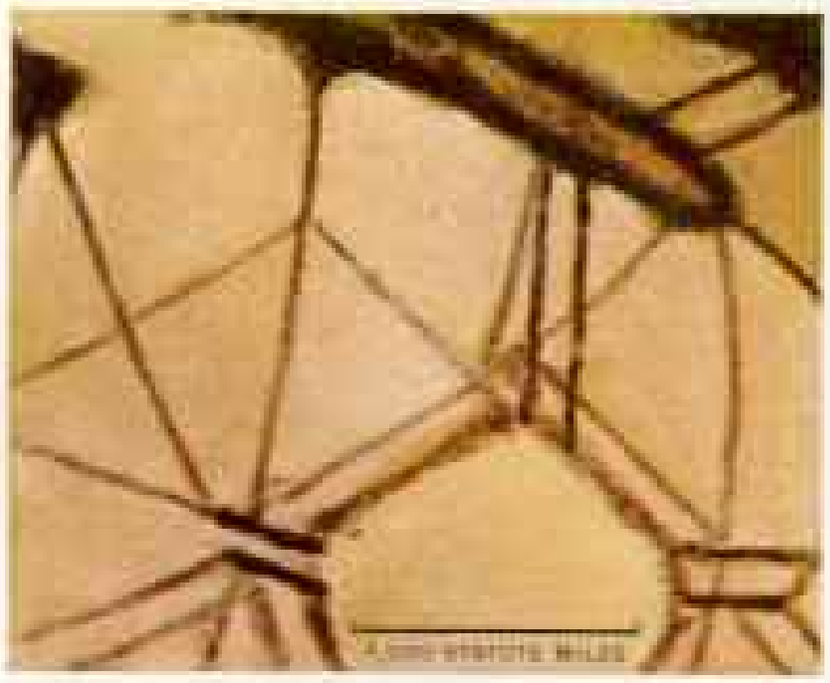
The white polar caps are the third of the familiar Martian areas. Each grows during winter, recedes in spring.

As a cap recedes, water vapor in the atmosphere above the pole appears to increase, suggesting that the caps consist of a very thin layer of frozen water—somewhat like earthly frost on a cold winter morning.

Actually they may contain more dry ice than ordinary ice. It is calculated that the poles reach temperatures as low as minus 200° F., at which point carbon dioxide would also freeze out of the Martian atmosphere.

We may learn for sure in 1969, when the National Aeronautics and Space Administration expects to send two Mariner spacecraft

Bleak stretch of Sahara near Sinkat, Sudan, may be one answer to a Martian puzzle. Dark straight streaks in this aerial photograph resemble the network of "canals" that some astronomers have seen cobwebbing the surface of Mars (below). Here black dolerite resists wind erosion better than surrounding rock, and forms ridges that drifting sand alternately covers and uncovers.



Opposing views of "canals": Italian astronomer Giovanni Schiaparelli drew the top one in the 1880's after observing what seemed a lacing of continuous lines about Elysium. Years later E-M. Antoniadi, a Greek observer using a more powerful telescope in France, pictured the same area as marked by strings of disconnected detail.

Schiaparelli called the features he observed *canali*, or channels. But others translated the Italian word as canals. Percival Lowell, an American astronomer, concluded that a race of intelligent beings dug the canals to irrigate Mars with melt from its polar caps. His convictions stimulated scientific interest in Mars, and inspired English novelist H. G. Wells to write *The War of the Worlds*. In 1938 a radio adaptation of that science-fiction classic panicked listeners who accepted the drama of a Martian invasion as a news report.

Pieced together from centuries of meticulous observations, these maps locate the three basic Martian features: dark areas, bright areas, and the frostlike cap that covers each of the polar regions in winter.

Like earth, Mars experiences seasons. Spring causes polar caps to recede, and a wave of darkening sweeps from them toward the equator. Once scientists considered dark regions bodies of water, describing them in Latin as *mare*—sea, *lacus*—lake, and *sinus*—gulf. But the author believes dark areas generally correspond to highlands; bright ones, he thinks, are dusty basins analogous to earth's ocean basins.

Mars measures some 4,200 miles in diameter. It has only a tenth of earth's mass, but exerts a gravitational pull about 40 percent that of earth. Infrared readings indicate surface temperatures at the Martian equator vary daily from 70° to minus 150° F. A Martian day lasts 24 hours, 37 minutes, 22.7 seconds.

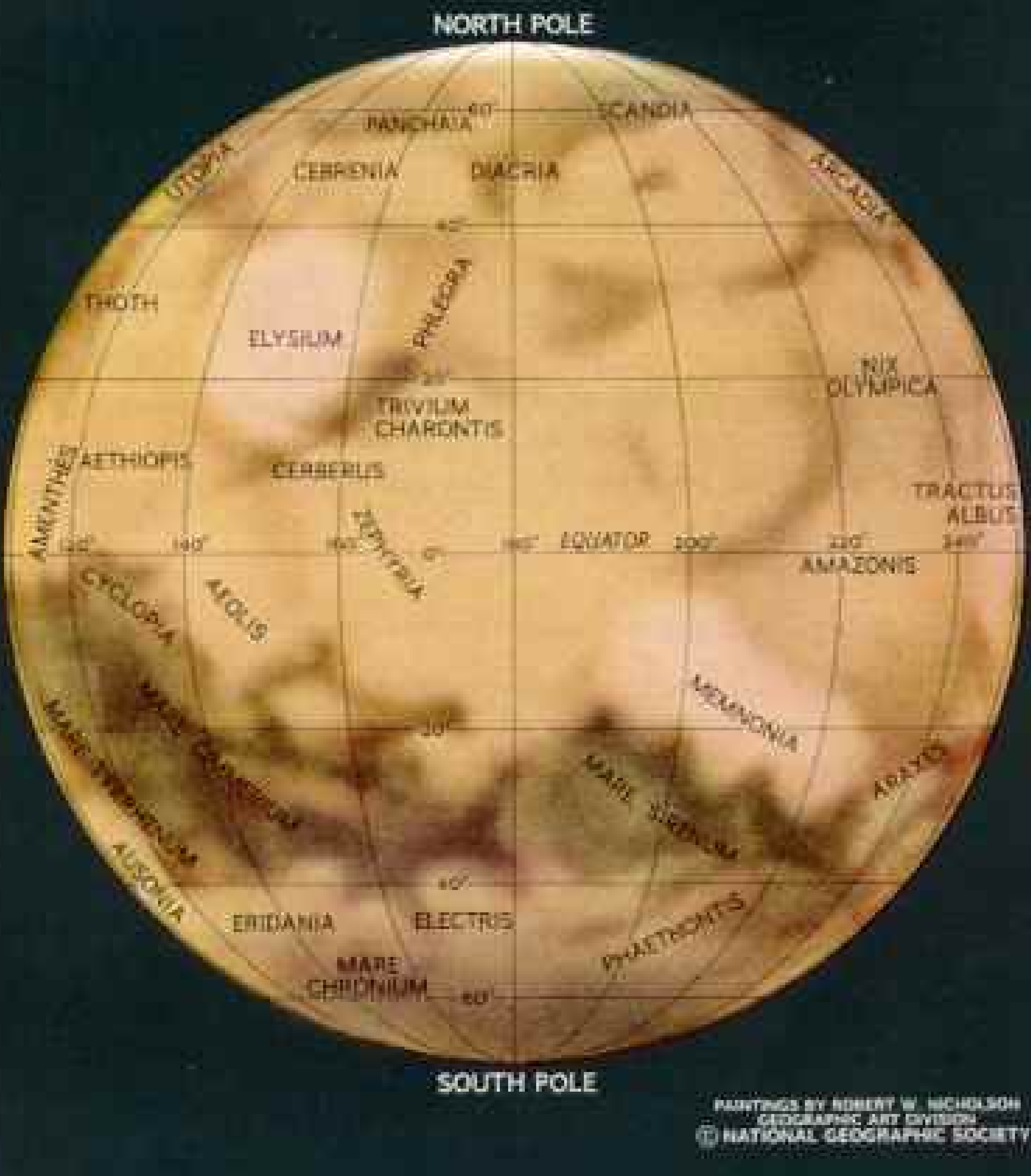
Mariner IV—beeping signals through Mars' atmosphere—helped scientists calculate the surface air density to be about 1 percent of earth's. They think this tenuous atmosphere is composed largely of carbon dioxide, with only a trace of water vapor.

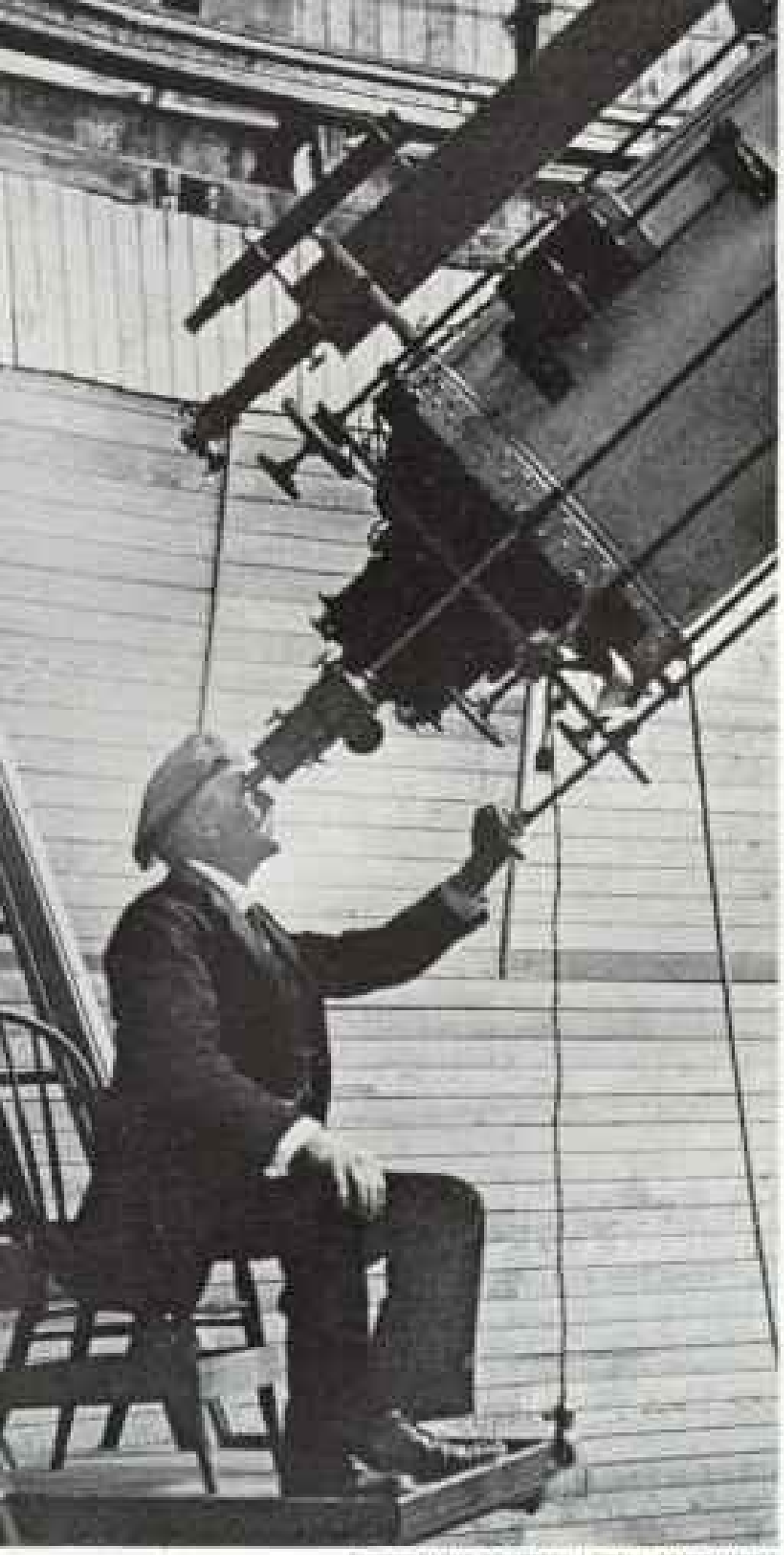
In stately orbits, planets revolve about the sun. Farther out and slower than earth, Mars takes 687 days to make one circuit.

Unlike maps, photographs are usually reproduced with Mars' south pole at the top, because telescopes invert images. Hazy bluish cloud over the north pole on pages 820-21, called the polar hood, appears in late fall.


NORTH POLE
BALTIA
ORTYGIA
CECROPIA
MARE ACIDALIUM
CYDONIA
NILOSYRTIS
NILIACUS LACUS
DEUTERONILUS
OXUS
MOAB
ARABIA
LUNAE PALUS
XANTHE
CHRYSE
THYMIAMATA
AERIA
SYRTIS MAJOR
EQUATOR
SINUS MERIDIANI
EDOM
SINUS SABAEUS
DELTOTON SINUS
DEUCALIONIS REGIO
PANDORAE FRETUM
IAPIGIA
MARE ERYTHRAEUM
SOLIS LACUS
VULCANI PELAGUS
MARE SERPENTIS
NOACHIS
HELLAS
HELLESPONTUS
ARGYRE
MARE AUSTRALE
SOUTH POLE

MARS


NORTH POLE
PANCHAIA
SCANDIA
UTOPIA
CEBRENIA
DIACRIA
ARCADIA
THOTH
ELYSIUM
PHLEGRA
NIX OLYMPICA
TRIVIUM CHARONTIS
AETHIOPIS
CERBERUS
AMENTHES
TRACTUS ALBUS
ZEPHYRIA
EQUATOR
AMAZONIS
CYCLOPIA
AEOLIS
MEMNONIA
MARE SIRENUM
ARAXES
AUSONIA
ERIDANIA
ELECTRIS
PHAETHONTIS
MARE CHRONIUM
SOUTH POLE



PHOTOGRAPHS COURTESY LOWELL OBSERVATORY

Evidence of seasons: As the polar cap recedes, between the Martian months of May (left) and July (right), a wave of darkening sweeps toward the equator, increasing the contrast between bright and dark areas.

Seeking signs of intelligent life on Mars, Percival Lowell peers into a 24-inch telescope at Flagstaff, Arizona, in this old photograph. The observatory he founded there in 1894 has long been a leading center of Mars study.

Mysterious areas of darkness show up in nonseasonal changes. From the dark center patch of Syrtis Major in March, 1954 (left), a curving band extends toward the lower left. The feature was barely discernible in April, 1907 (right).

on flybys that will approach within 2,000 miles of Mars (page 825). One important experiment will measure the polar temperature.

What happens when the icecaps disappear? The Mariner IV photographs—which cover less than 1 percent of the Martian surface—show no clear and prominent sign of water-erosion features, such as river valleys. We expected this. Mars has no open bodies of liquid water today, and the thin polar caps simply vaporize rather than melt.

Mars No Longer Shows Original Face

However, even the largest craters on Mars have been significantly eroded and filled, probably by wind-blown dust, by expansion and contraction under huge daily temperature changes, and by new craters. Because of the erosion, we can no longer see the original surface of Mars. Perhaps in earlier eons oceans of a sort lapped Martian shores.

In any case, large bodies of liquid water are not required for the origin of life; in many respects, shallow pools or underground lakes provide better environments. We cannot exclude the possibility that even today, below the arid Martian surface, lies a layer of permafrost, with liquid water still deeper.

Could life exist on Mars, in the apparently hostile environment we have described?

People have thought so for several hundred years. One of the arguments, advanced about the beginning of the century, hinged on the fact that people looking through telescopes thought they detected green areas. This is now known to be partially an optical illusion. Also, green does not prove vegetation—nor does lack of it prove there is none. Plants, if any, on Mars may be a different hue.

Another argument centers about the famous "canals." In the 1870's and 1880's Schiaparelli discovered through his telescope a network of delicate dark lines that occasionally stood out "like the lines on a fine steel etching," as a later observer described them. The lines seemed straight and proceeded for hundreds of miles across bright areas, connecting distant dark regions with one another.

Schiaparelli called them *canali*—by which he meant simply "channels." But the lines were interpreted, especially by the American astronomer Percival Lowell, as waterways of a race of intelligent beings.

Lowell and his followers believed that the Martians constructed the canals to bring water from melting polar icecaps to parched cities near the Martian equator. Some even described Martian hydraulic engineering and placed the political capital of the planet in Solis Lacus—Lake of the Sun.

Canals: A Trick of the Eye?

Scientists today differ on whether the lines exist. Those who do recognize them have found that, when earth's atmosphere becomes exceptionally clear and steady, the lines break down into fine but disconnected detail, rather like dotted lines. Psychologists explain that when the eye sees such disconnected markings at a distance, the brain characteristically ties them together and remembers them as unified lines (page 830).

So, although we do not now believe in canals created by intelligent Martians, we still must explain why the disconnected fine details are arranged in such long, straight lines —something quite remarkable in itself.

Mariner IV photographs did record narrower lines, invisible from earth. Some appear as ridges, others as depressions. Their relation to the classical "canals" is in dispute.

Another set of enigmatic observations which seems to argue for life on Mars concerns the seasonal changes in the dark areas. As the polar caps retreat each year, releasing water vapor into the atmosphere, we observe a wave of darkening, increasing the contrast between bright and dark areas and progressing steadily toward the equator (opposite).

What would be more reasonable than to conclude, as did the French astronomer E. L. Trouvelot in 1884: "Judging from the changes that I have seen to occur from year to year in these spots, one could believe that these changing grayish areas are due to Martian vegetation undergoing seasonal changes"?

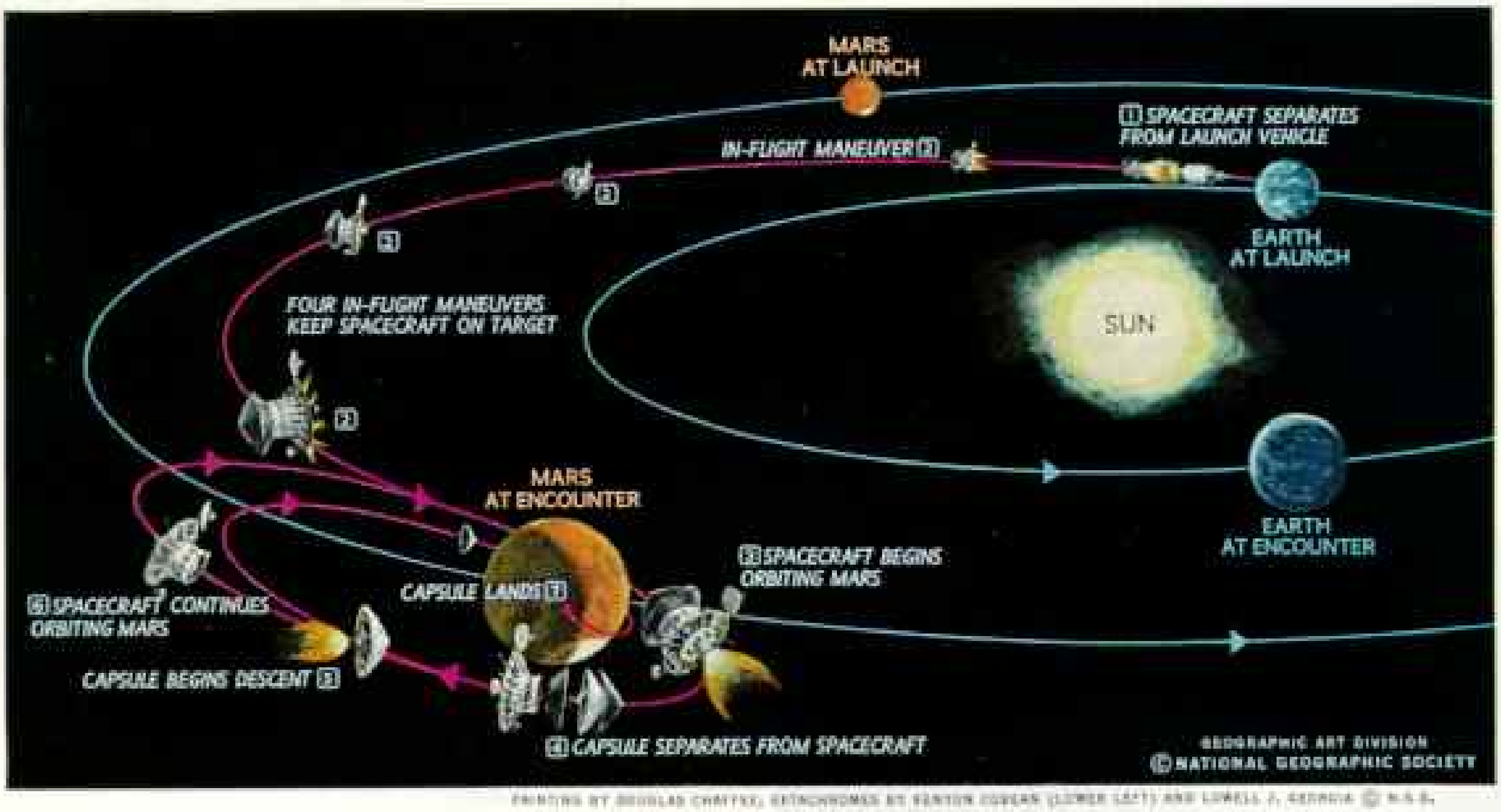
Many other scientists have accepted this hypothesis. Among them was the late Dr. E. C. Slipher of Lowell Observatory at Flagstaff, Arizona, who from 1905 to 1964 devoted

If Martian life exists, its higher forms might look somewhat like these, the author conjectures. Shielded from ultraviolet radiation by a glassy shell, an animal gorges on mossy ground cover among plants with cabbagelike tops. Outer leaves close at night to protect buds from cold. Like the ground cover, these plants have developed an ultraviolet tolerance. Others, lacking such immunity, wear transparent bubbles.

PAINTING BY DOUGLAS CHAFFEE IN CONSULTATION WITH THE AUTHOR © N.G.S.

Real flying saucer: A conical metal aeroshell such as this may shield an instrumented package entering Mars' thin atmosphere. A Martin Marietta Corporation technician at Denver inspects riveting on the aluminum cone.

Inhaling helium through two ducts, the world's largest balloon lifts its head at Walker Air Force Base, New Mexico. As the plastic balloon rises in the rarefying air, the gas expands to fill the main body—here a bright streak on the ground—to a 410-foot bubble. It carries an aeroshell 25 miles into an atmosphere as thin as that 7½ miles above the Martian surface. There the aeroshell, fired by rockets, will test a parachute's ability to slow descent in a Mars landing.



PAINTING BY DOUGLAS CHAFFEE; ASTRONOMER BY KENTON CORAM (LOWER LEFT) AND LOWELL J. ARRIGHI © N.G.S.

Voyager races Mars to an encounter on the other side of the sun, following a Cape Kennedy launch in the 1970's. After the spacecraft enters an orbit about its target, a cone-shaped capsule called the "lander" detaches from the "orbiter." Braking by aerodynamic drag, possibly with a parachute, and by retrorockets, the lander touches down on Mars (page 822). It radios findings to earth either directly or by relay through the orbiter, itself making observations from above.

a lifetime to observing and photographing the planets. Much of his work was aided by the National Geographic Society.

In 1955 Dr. Slipher wrote of the waxing and waning dark areas, "To me, the best hypothesis still seems to be . . . vegetation able to grow through the yellow dust deposited upon it from time to time." *

Another astronomer, the Frenchman Audouin Dollfus, observing the polarization of sunlight reflected from Mars, has concluded that the wave of darkening is accompanied by a change in the sizes of the particles which make up the dark areas. In other words, we see bigger grains in spring than in winter.

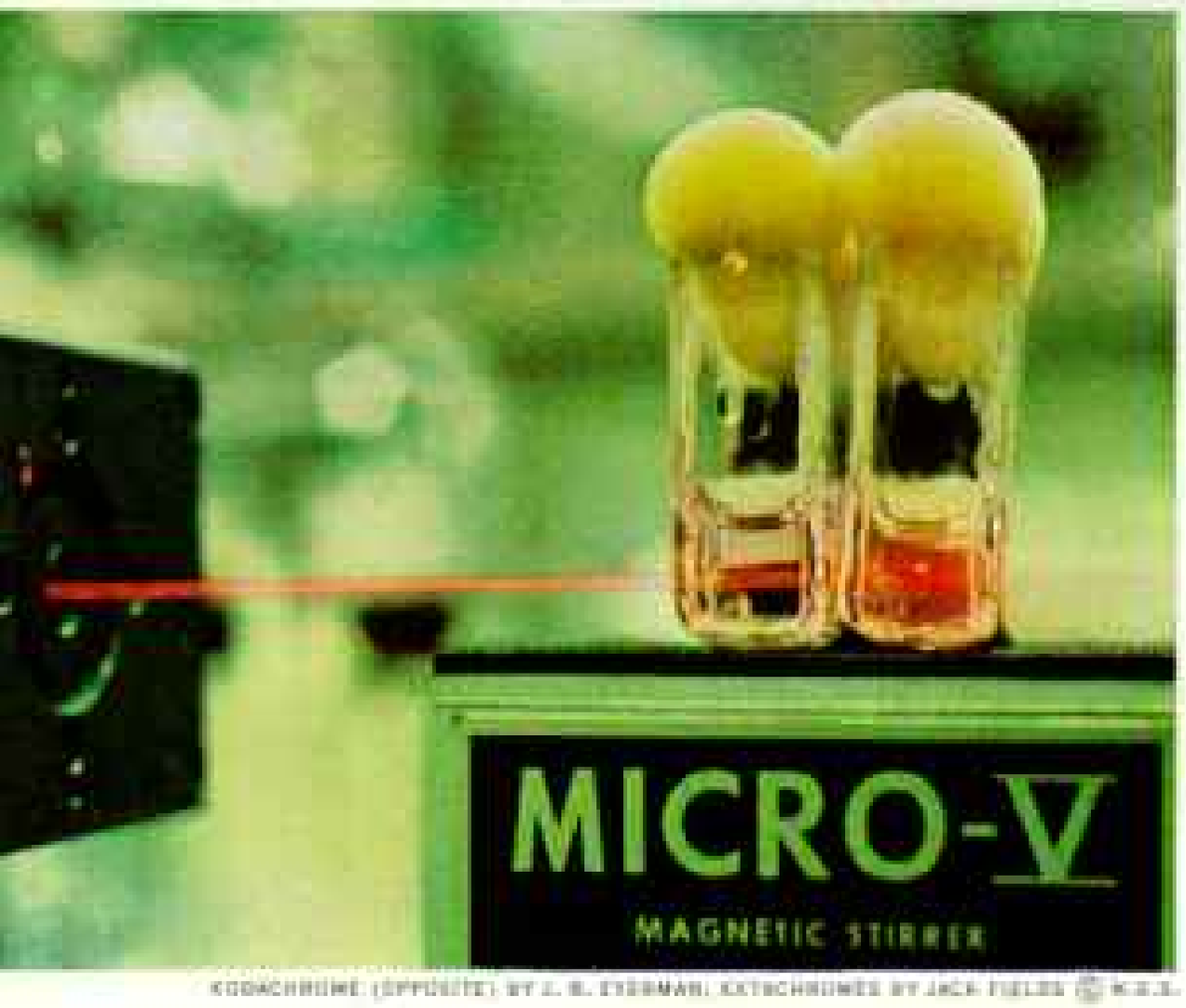
If the wave of darkening *is* biological, we may actually be seeing the growth and reproduction of Martian organisms only about the size of the period at the end of this sentence. These, perhaps, would be comparable to the algae and lichens we know on earth.

My colleague James B. Pollack and I, at Harvard University and the Smithsonian Astrophysical Observatory, have been working on nonbiological explanations of several of these Martian enigmas. Formerly scientists thought the dark areas were lowland basins, but we have analyzed radar signals bounced off Mars, as well as other evidence, and have found indications that many dark areas are gentle slopes reaching heights of as much as ten miles. We think the bright areas tend to be lowlands, similar to our ocean basins, but filled with dust rather than water. And the canals that cross these dusty seas, and at least some of the finer lines found by Mariner IV—as we interpret the evidence—turn out to be ridges comparable to the oceanic ridges and seamounts that lace ocean bottoms on earth.†

*See "New Light on the Changing Face of Mars," by E. C. Slipher, NATIONAL GEOGRAPHIC, September, 1955.

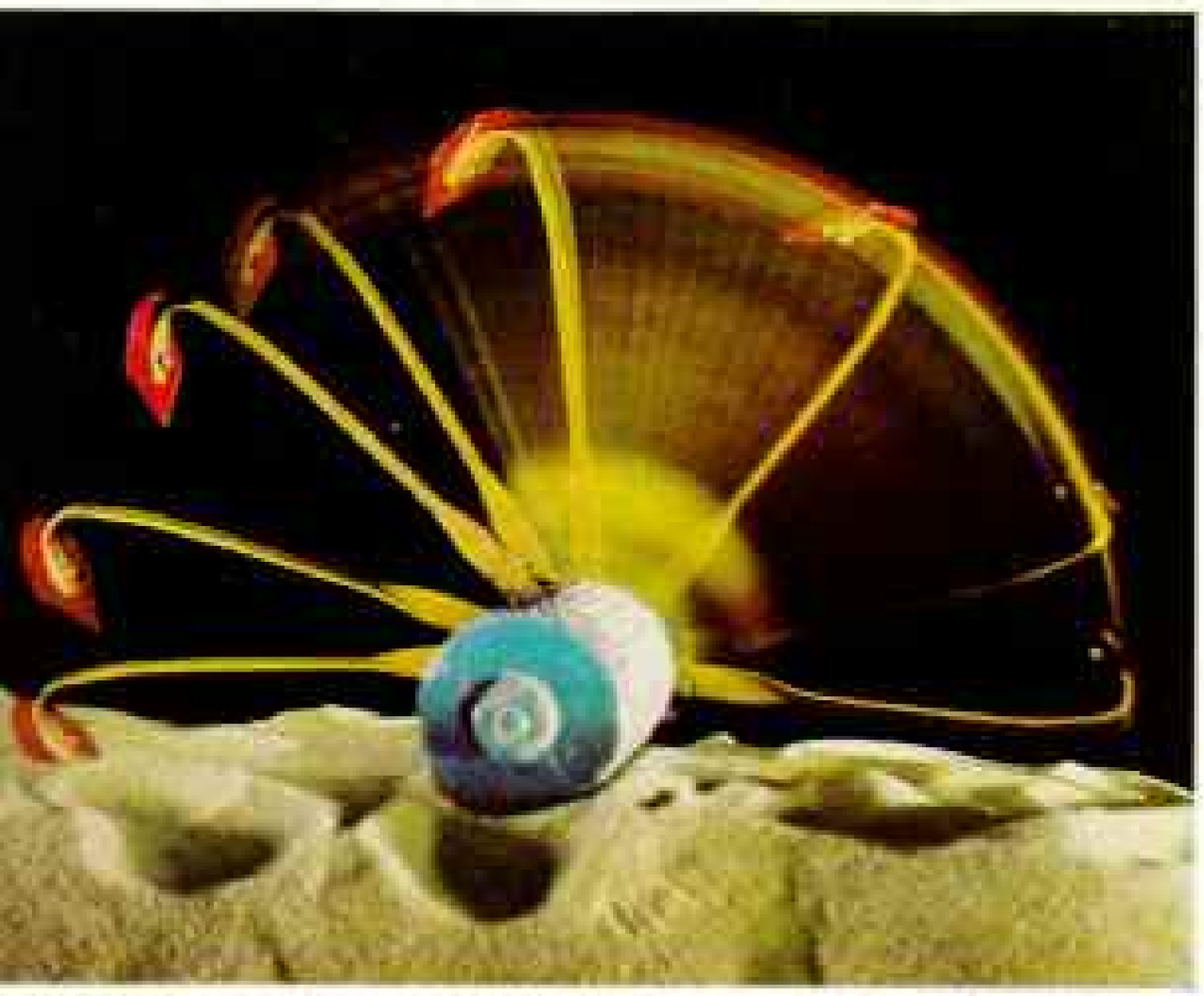
†Such topography marks the special map supplement, **Indian Ocean Floor,** distributed with the October, 1967, GEOGRAPHIC.

Piercing laser beam finds life. It passes intact through a glass container of sterile solution, but micro-organisms in a second container diffuse the crimson shaft. The NASA experiment at Ames Research Center shows how a light source might be used to test similar solutions mixed in a Voyager biological laboratory. Since microscopic life exists universally and abundantly on earth, researchers feel such minute game offers the best hunting for traces of Martian life.



KODACHROME (OPPOSITE) BY J. B. EYERMAN; KATACHROMES BY JACK FIELDS © N.G.S.

Dropping anchor, a sampler digs into simulated Martian soil with a hoe-tipped arm, swinging in this multiple exposure. Spinning independently of the arm, the perforated cylinder sucks in grit for later analysis. To roll elsewhere, the sampler flips back the arm and lets it drag behind.



The idea that the bright areas are lowlands makes sense in several ways. For one thing, as the polar caps retreat, they leave islands of frost behind, more often in the bright than in the dark areas. If the bright areas are lowlands, we expect that the winds would not be quite so violent there and that the vaporizing frost would not be blown away so readily.

Also, on a planet where the winds blow fine dust about, we would expect the finer and brighter particles to tend to settle in the lowlands. Aerial photographs in the Sahara, where the wind blows fine dust off the highlands, show such reddish dust-filled lowlands and darker highlands (page 830).

We often observe erratic changes in the shapes of the dark areas. I think we can explain them as drifting sand and blowing dust that cover and uncover the lower slopes.

The seasonal changes, the wave of darkening, may be caused by springtime winds that scour the finer, brighter particles off the hills. The more furious winter winds, blowing well over a hundred miles an hour, then drive small particles uphill again, making the highlands somewhat less dark.

Thus wind-blown dust, and not living plants, may explain these intriguing changes on Mars (page 832).

But even if we discard the "evidence" of the green coloration, of the canals, and of the

Ingenious snares for signs of life lie on a 12,000-foot granite-strewn height of California's White Mountains. Such experimental paraphernalia help shape concepts for the scientific package that Voyager will deliver to Mars.

The picture-taking mast of an automated laboratory—here a quarter-scale model—periscopes to 16 feet. As a microphone listens for sounds, samplers collect soil for chemical analysis. Gas chromatographs examine the material for molecular content, while another device attempts to grow cultures of any micro-organisms captured. Thirty-five separate experiments measure environment as well as seek characteristics of life.

Bullet-shaped Gulliver detects metabolism, the conversion of food to energy and new cell structure by living organisms. It obtains testing matter by reeling in sticky lines shot out by projectiles.

Multivator, right foreground, breathes dust-bearing air into 15 cartridges that check for enzymes involved in metabolism.

Beside it sits a small model of a three-legged vehicle that might land Voyager's 860-pound laboratory (pages 822-3).

springtime darkening, we may still believe that life can exist on Mars.

For one thing, we do not expect that signs of life would be visible over interplanetary distances. The Mariner IV photographs of Mars do not detect features much less than two miles across. Weather-satellite photographs of earth, at about the same resolution, show virtually no signs of life on our planet.

For another thing, experiments in a number of laboratories suggest that the Martian environment does not rule out life. In our own laboratories, for example, we have designed special chambers where we can simulate the Martian environment. They are, of course, called "Mars jars." With earthly organisms, mainly bacteria, in the jars, we have reproduced the daily temperature variations, the low atmospheric pressure, the composition of the Martian air, and the ultraviolet radiation.

Earth Life Survives Martian Conditions

Most of the organisms quickly die. But in every sample of terrestrial soil we have found varieties of micro-organisms that survive the Martian conditions, some indefinitely.

They find the lack of oxygen and the temperature extremes to their liking. They find perfect safety, under small particles of soil, from the deadly ultraviolet light.

When the subsurface water content increases slightly, they thrive in the seemingly hostile environment, just as do such strange earthly creatures as iceworms that live on glaciers, algae that survive in scalding hot springs, or brine shrimp that easily take to the intense salinity of salt lakes.*

So it takes no great stretch of the imagination to believe that some earthly organisms would grow on Mars. And if terrestrial organisms can at least survive, native creatures should get along very nicely, for what seems to us to be a rigorous environment may not be rigorous at all for Martian life.

If there are Martian organisms—and scientists do not agree on this matter—we must expect adaptations there that do not occur here, because the histories of life on the two planets must have been widely divergent.

It may be that the oxygen bound in limonite is used for respiration. Perhaps some Martian enzyme is able to use the water chemically bound in the iron-rich soil. In fact, so much water is tied to the limonite that if the chemical bonds binding the water to the limonite can be tapped by Martian organisms, the bright areas on Mars may for them be oceans rather than deserts!

Sealed off from his work, a technician solders by using gloves built into an airtight plastic tent. At Denver, the Martin Marietta Corporation develops methods of repairing space parts under sterile conditions, since microbes, riding Voyager to Mars, could mislead life detectors and possibly set off a plague among any Martian life.

Aside from showing that life on Mars is within the realm of possibility, the Mars-jars experiments underline the problem of biological contamination of the planet.

Suppose an unsterilized spacecraft from earth crash-lands on Mars. Micro-organisms such as bacteria easily survive the crash. They escape and adhere to grains of surface material; winds spread them over the planet.

Some may find themselves in favorable environments, with neither competitors nor predators; they reproduce rapidly. In this way, descendants of just one micro-organism could, in theory, give Mars in a few years as many microbes as exist on earth.

*See "Life in a 'Dead' Sea—Great Salt Lake," by Paul A. Zahl, NATIONAL GEOGRAPHIC, August, 1967.

Many arms make germ-free work. Clad in sterile garb, William Butters uses rubber gauntlets to assemble electronic equipment inside a sealed chamber at McDonnell Douglas Corporation, St. Louis, Missouri. Air pressure keeps unused gloves extended and out of the way. To avoid polluting Mars, many companies study ways to keep Voyager uncontaminated while it is built and launched.

Revealing invasion of a sterile area, white gobbets show near the edge of a culture plate in a McDonnell Douglas test. Microbes burgeon into visible colonies in a nutrient coating on the plate.

Now suppose we send an instrumented laboratory to Mars to search for native organisms (such laboratories are being developed in the United States and the Soviet Union). How can we possibly tell whether the bacteria we find are truly Martian, or alien contamination from earth?

Worse yet, suppose the invading bacteria produce a kind of plague, killing much of the native life. And even if there is no life on Mars now, there may be repositories of organic matter, created in the early history of that planet, still present because no organisms have appeared to eat them up. Contamination from the earth could destroy significant information about the early history of the solar system and the origin of life.

To avoid this danger, both the Soviet Union and the United States have established standards for sterilization of space vehicles. Costly but effective techniques include assembly of spacecraft in dust-proof clean rooms, dousing with germicidal gases, and heating at temperatures above the boiling point of water. The sterile spacecraft can then be enclosed in a shroud preventing contact with earth and its atmosphere.

Because of the contamination problem, we must learn much more about the environment and possible life on Mars before we land human beings, with their teeming populations of intestinal and skin micro-organisms.

And we can learn a great deal more from future probes orbiting Mars. Our instruments

can make temperature maps, seeking local hot spots; look for places of water abundance; detect organic chemicals that may be related to the presence of life.

For example, on earth the gas methane is produced by methane bacteria, such as live in the stomachs of cows. A spectrometer in orbit around earth would detect the gas, and would probably record an increased abundance over India, where live nearly a quarter of earth's cows. Now we would not be able to deduce from such an observation that there are cows on earth, but we would certainly suspect life in India.

Such experiments are in fact being planned for the Mariner space vehicles which will fly by Mars in 1969, and for the larger and more advanced Martian vehicles known as Voyagers, with which NASA hopes to orbit Mars and land an automatic biological laboratory in the 1970's (pages 835 and 837).

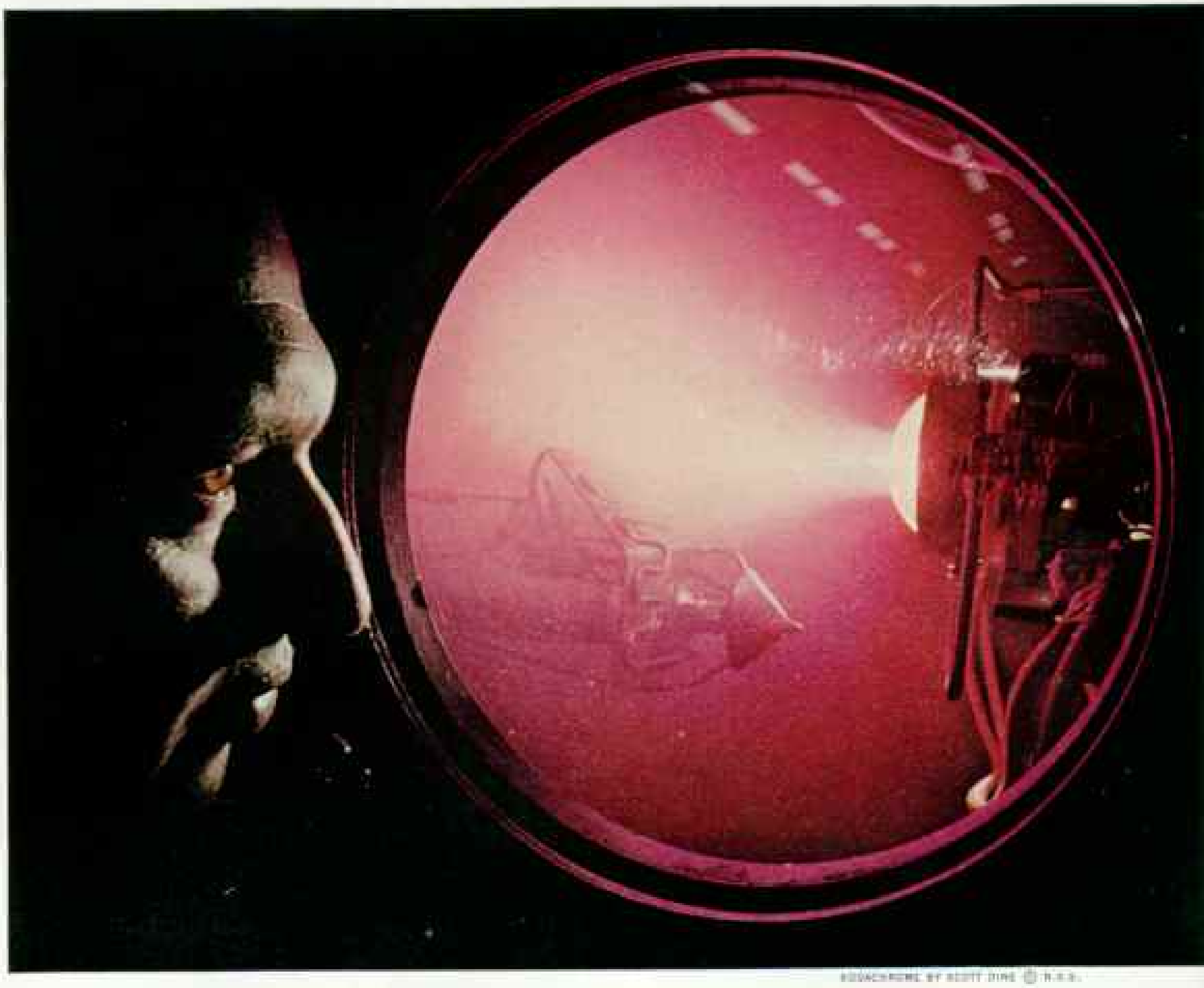
Only after such a graduated series of experiments, it seems to me, should we land men. But we can expect that one day human explorers and colonists will live and work on the sands of Mars.

Red Planet Challenges Man

We cannot measure the potential scientific return, both theoretical and practical, from the exploration of Mars. But beyond this reward stands a compelling reason that has to do with matters of the spirit. Man, on foot, on horseback, and carried through the air by contrivances of his own design, has penetrated the remotest corners of his small planet in the past million years. He has established outposts at the top of the Andes Mountains, at the bottom of the Red Sea, on ice islands in the Arctic, and in orbit around the earth. In less than a thousandth of the lifetime of earth, he has virtually mastered his planet—if not himself.

In all that time, man's vitality and exuberance have found outlet in an expansion to new territories. His philosophy and outlook have been broadened by the knowledge that elsewhere there existed strange lands and peoples of other tongues and customs.

The moon and beyond to Mars—man's goals at the threshold of space travel. This classic photograph, made at Lowell Observatory in 1911, emphasizes the limits of exploring space by telescope. Almost as close to earth as it ever comes, the red planet appears no larger than a medium-size lunar crater. PHOTOGRAPH FROM LOWELL OBSERVATORY



RESEARCHERS BY SCOTT DINE © N.G.S.

Spouting glowing ammonia into a vacuum chamber, this experimental thrustor, right, may someday help speed a man toward Mars. Apparatus to the left measures the engine's exhaust for a McDonnell Douglas researcher. A magnetic field draws the ammonia, charged by an electric arc, through a nozzle to produce long-sustained power. The collar of the thrustor is silhouetted against a second porthole.

But today the exploration of the earth's land surface is almost ended. Technology has made transportation and communication between the remotest parts of the world possible, even convenient. And we have now turned to the exploration of the ocean bottoms and of our neighboring worlds in space.

Space exploration is in the finest human tradition; many feel that it is a prerequisite for our continued survival as a species. The same technology that has conquered earth's surface now also permits the destruction of mankind. Our planet is in danger of becoming a vast closed society, with its tensions and enormous energies turned inward upon itself.

As the British author Arthur C. Clarke has written: "There is no way back into the past: the choice, as Wells once said, is the Universe —or nothing. Though men and civilizations may yearn for rest, for the Elysian dream of the Lotus Eaters, that is a desire that merges imperceptibly into death. The challenge of the great spaces between the worlds is a stupendous one, but if we fail to meet it, the story of our race will be drawing to its close. Humanity will have turned its back upon the still untrodden heights and will be descending again the long slope that stretches, across a thousand million years of time, down to the shores of the primeval sea."

It is our remarkably good fortune to live in the first moment in man's million-year history when we are capable of leaving our planet and exploring another world. Mars moves through our skies in its stately dance, distant and enigmatic, a world awaiting exploration. If we but choose, it waits for us.

THE END

JAMAICA Goes It Alone

By JAMES CERRUTI
Assistant Editor

Photographs by THOMAS NEBBIA

I FELT I WOULD LIKE JAMAICA the moment I set foot in Kingston's Palisadoes Airport. Rushing for my luggage in the forceful American style, I caught out of the corner of my eye a sign that read "Waving Gallery." Not, you will note, as in most airports throughout the United States: Observation Platform (Admission 10¢). In this vivid little phrase Jamaica said to me: "Yes, an airport is a technological wonder and a money-maker, but remember, please, it is also a place of deep emotion."

Sensing the change of national mood that my 600-mile flight from Miami had brought, I slowed my pace. Here, I thought, are people of heart, people sensitive to human values, even in an age of jets and lucrative tourism.

Seven weeks and more than 2,000 miles of journeying on the balmy, green, and mountainous isle ("the most lovely that eyes have seen," Andrés Bernáldez, Columbus's chronicler, fairly called it) confirmed my first chance insight.

I came to Jamaica on Christmas Eve, and my wife Hannah and our three young children, Diana, Jimmy, and Vera, were along to spend their two holiday weeks with me. In the dusk the airport thermometer read an un-Christmaslike 79° F., and the clock said 7 p.m. We were hurrying to our hotel at Port Antonio on the North Coast, 78 miles away by the shore road (map, pages 848-9). We thought our excellent driver would get us there for dinner, and he did—at 10 o'clock. Distances over Jamaica's tortuous roads cannot be reckoned by superhighway speeds.

But what matter? Jamaicans have an expression that epitomizes the national mood: "Soon come." And along the road to "soon come" lie many pleasures.

Rendezvous of wood and water, Dunn's River tumbles down stone stairs in a frothy rush to the sea. In nearby St. Ann's Bay, Columbus dropped anchor in 1494, first of countless travelers captivated by sun-dappled Jamaica, whose Indian name means "island of springs." Last August the verdant Caribbean isle, a onetime British colony, celebrated its fifth birthday as an independent nation.

Towns on our way jumped with the spirit of Christmas Eve. The population strolled along the roads, dressed in the blazing reds, greens, and yellows so dear to the warm Jamaican heart. Some girls wore conical Christmas hats, but others bore their shoes on their heads instead, saving them for the evening's dance.

In Morant Bay and Manchioneal, carnival grounds glittered with strung lights; loudspeakers roared rock-and-roll; and men gathered at tables, gambling at dice and pitch-and-toss.

"We call dem coney islands," our driver told us tourists. "Don' know how dem got dat name."

Of all the resorts on Jamaica's famous North Coast, I think I like Port Antonio best. Better-known Montego Bay and Ocho Rios have their charms—in the Miami Beach pattern. But I love Port Antonio because to me it is the island's most thoroughly Jamaican resort (pages 846-7).*

One of the island's smaller cities (population 7,830), it is still a working town. It is a principal banana port, as well as the chief shopping center for northeast Jamaica, with its buzzing Musgrave Market and its "Chinee stores" (as all grocery and general stores are called, because Chinese merchants run many of them).

"Out of many, one people": Though Jamaicans descend in the main from Africans brought as slaves to work on plantations, a rich seasoning of other strains justifies the nation's motto. Mrs. Michael Manley, wife of a Member of Parliament, mirrors such a medley—French, Welsh, East Indian, and African. She sips a punch made of golden Jamaica rum.

Strolling through the town on Christmas Day, we felt its grass-roots flavor strongly. Here, in microcosm, was the real Jamaica.

In the yard of the Seventh-day Adventist Church, a crowd gathered round a strange figure of a man wearing a Joseph's coat of many colors and patches. He carried a shepherd's crook, a pink bouquet, and a straw basket full of religious tracts; he wore his hair in long, tightly plaited ringlets.

He was preaching in the full patois—a blend of African and colonial English usage with totally unexpected intonations. What hope of understanding when I was baffled by just a little phrase like "Wa' fe do?—What's for to do? What's to be done?" A snatch came across: "Evuhbody think uh money. Gi' I no money. Peace and love!"

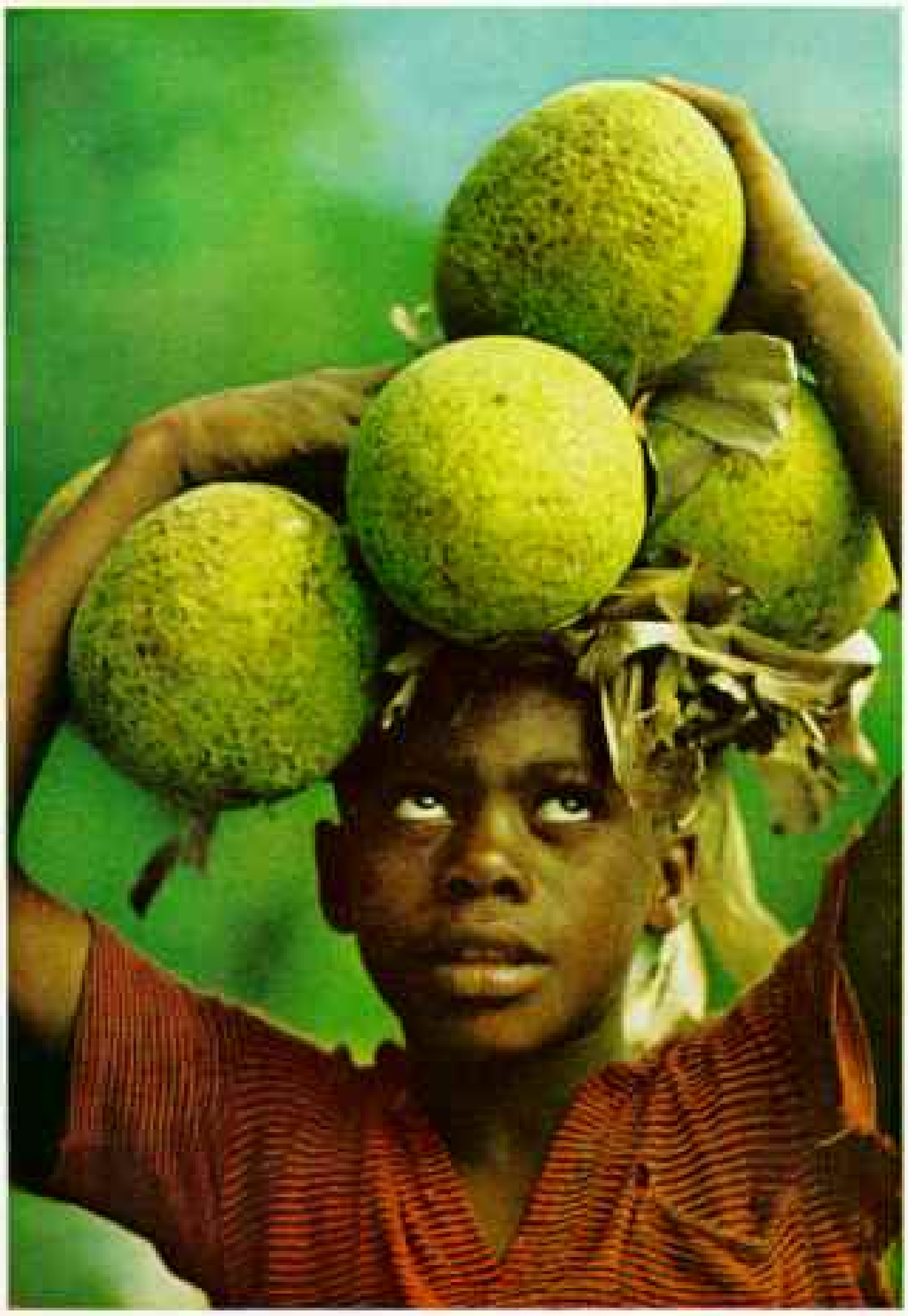
The plaited locks, "peace and love," the use of "I" in the objective case are all marks of the controversial Rastafarian sect. The Rastas appeared about 30 years ago, demanding "repatriation" to Ethiopia; calling Haile Selassie by his precoronation name of Ras Tafari, they proclaimed him God. Like this preacher, they are generally mild men whose poverty is religious, but some Jamaicans view them warily.

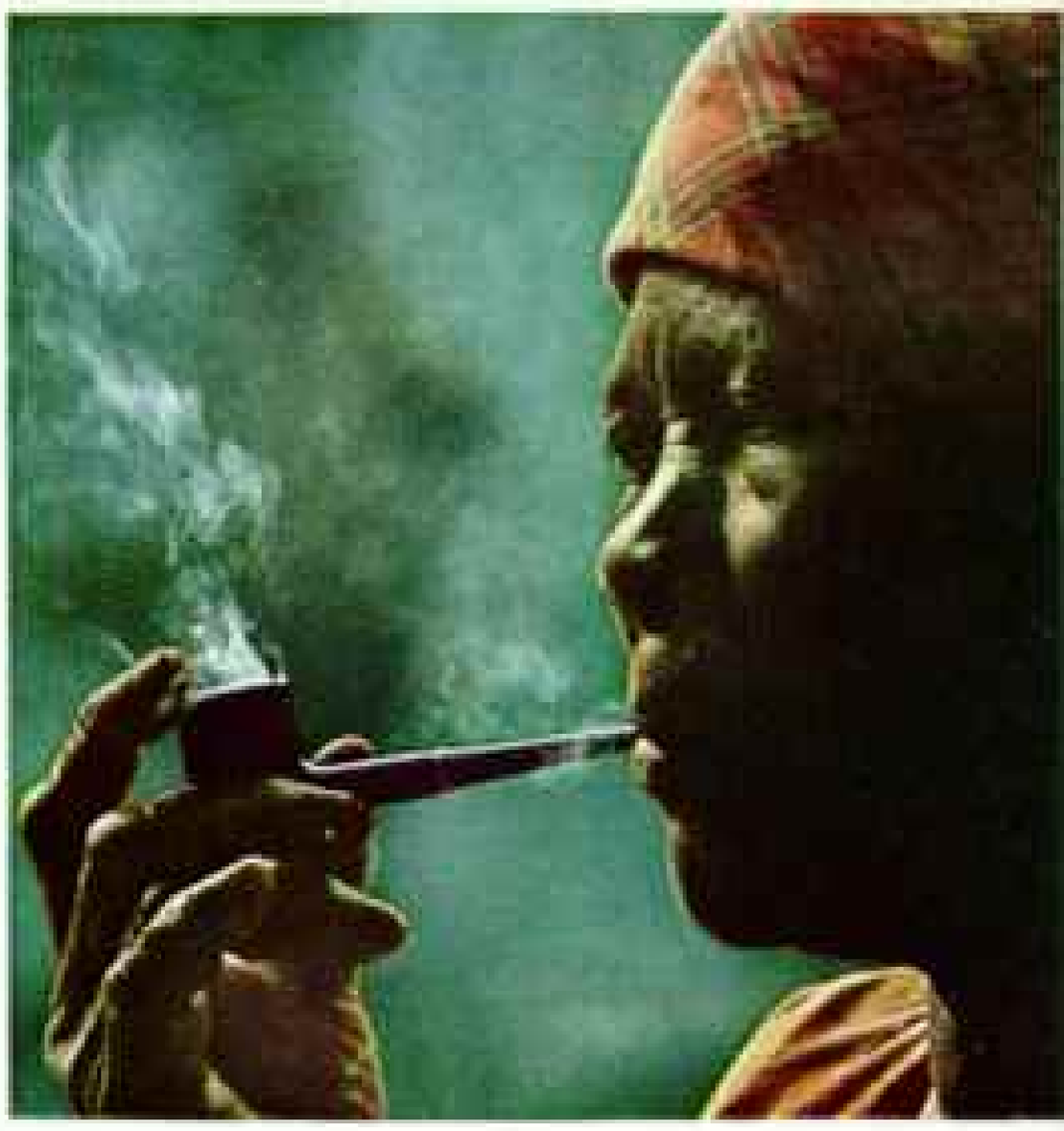
Prime Minister Hugh Shearer told me later, "There's an element who infiltrate and seek to use the movement as a disguise for misconduct. But the genuine Rastafarian is not a drug addict or a danger. I've had no problem with the movement."

*See "Jamaica—Hub of the Caribbean," by W. Robert Moore, NATIONAL GEOGRAPHIC, March, 1954.

EXTACHROME © N.G.S.

Proud nonconformist, a man of the Rastafarian cult twists his hair into spiky strands to imitate an Ethiopian warrior. His sect believes Emperor Haile Selassie of Ethiopia, whose precoronation title was Ras Tafari, reigns as God incarnate. Members seek salvation in repatriation to Africa, an idea inspired by Jamaica-born Marcus Garvey. Despite their wild appearance, most live by the motto "Peace and Love."





Contentment comes with a smoke for a countrywoman on a banana estate.

Transplant from Tahiti, breadfruit first reached Jamaica in 1793, when Capt. William Bligh of the British Navy sailed in with 347 trees. Four years earlier, the mutiny of his crew aboard the *Bounty* ended the first attempt to transport breadfruit, sought as food for slaves. Islanders bake, roast, or fry the starchy fruit.

I asked the patched preacher, "Are you a Rastafarian?"

"Peace and love," he replied, and, with a gap-toothed smile, went on preaching.

In a side street just past the church, we came on the John Canoe dancers—probably so called from *dzong kùnu*, meaning "terrible sorcerer" in the African Ewe language. In the country towns, all week between Christmas and New Year, local groups get themselves up in colorful rags, feathered headdresses, and black masks with features outlined in ghastly white. They dance and shout to an African rhythm of drums and flutes, brandishing wooden spears and axes. A dozen of them capered before a little house graced by a huge red poinsettia bush, begging shillings from the occupants.

We joined the watching crowd, and the dancers scampered up to us, shouting "Hi, Whites!" One handed my 12-year-old Jimmy a spear and hatchet and danced at him. Jimmy danced back. The crowd cheered, "Come on, White!" And somehow learning his name, they clapped him on with laughing cries of "Jemmy! Jemmy! Jemmy John Canoe!"

I also began to call, "Come on, Jemmy! Come on, White!" An elderly man turned to me with gentle if illogical reproachfulness: "We don' make nothin' of color here. All skin de same." Though "White" was being used in a friendly, prejudice-free way, what was all right for Jamaicans to say was not all right for a white tourist.

Such human contradictions are prevalent in Jamaica. "Ever see any country more beautiful than this?" a Jamaican will ask you proudly, and in the next breath will beg you

EKTACHROME (LOWER RIGHT) BY RICHARD STEDMAN, JAMAICA TOURIST BOARD; KODACHROMES BY THOMAS NEBBIA © N.G.S.

Afloat in an azure world, Port Antonio lazes beneath the Blue Mountains. Here in 1905 the United Fruit Company built the first North Coast resort hotel to house its banana-boat passengers. A white-roofed annex, luxuriously remodeled, remains on the spit between the Port's twin harbors.

Jogging across powdery sand, a donkey and his master introduce a young rider to an Ocho Rios pastime. Other diversions of the windward coast include swimming, fishing, water-skiing, shell collecting, and dancing to the rhythms of barefoot calypso bands.

On a silver-spangled sea, sailors slide their Sunfish past the blur of an umbrella at Montego Bay, four air hours from wintry New York.

to help him emigrate to the United States. In this earthly paradise, a disconcerting number of Adams and Eves dream only of escape. As a popular Jamaican ballad puts it:

If I hadda wings of a dove
I would fly,
Fly away,
Flyaaay awaaay,
And beeee at rest.

But in typical Jamaican style, even discontent is expressed in laughing song.

Since August 6, 1962, Jamaicans, for the most part descendants of African slaves, have been their own masters. On that day, after 468 years of foreign rule, and a short membership in the ill-starred British West Indies federation, Jamaica became a self-governing dominion of the British Commonwealth.

Though progress has been made (particularly in tourism—now, after aluminum, the nation's second largest producer of income from abroad), independent Jamaica is still beset by inherited problems, chiefly overpopulation and high unemployment. Many of its humble folk "just haven't adjusted to reality," Theodore Sealy, editor of the Kingston *Daily Gleaner*, told me. "They believe independence should bring immediate prosperity."

Color sensitivity intermingles with Jamaica's economic discontent. Fred Wilmot of the Jamaica Tourist Board said, "Of our nearly two million population, 90 percent is Negro and 'colored,' less than 1 percent white, and the rest chiefly Chinese and East Indian. To oversimplify a bit, the minority 9 or 10 percent generally has been, and still is, more prosperous than the Negro and colored majority.

"Our current worries stem from long before independence. Overpopulation, for example, is partly traceable to an attitude of slave days —the encouragement of promiscuous 'breeding' to maintain the supply of workers."

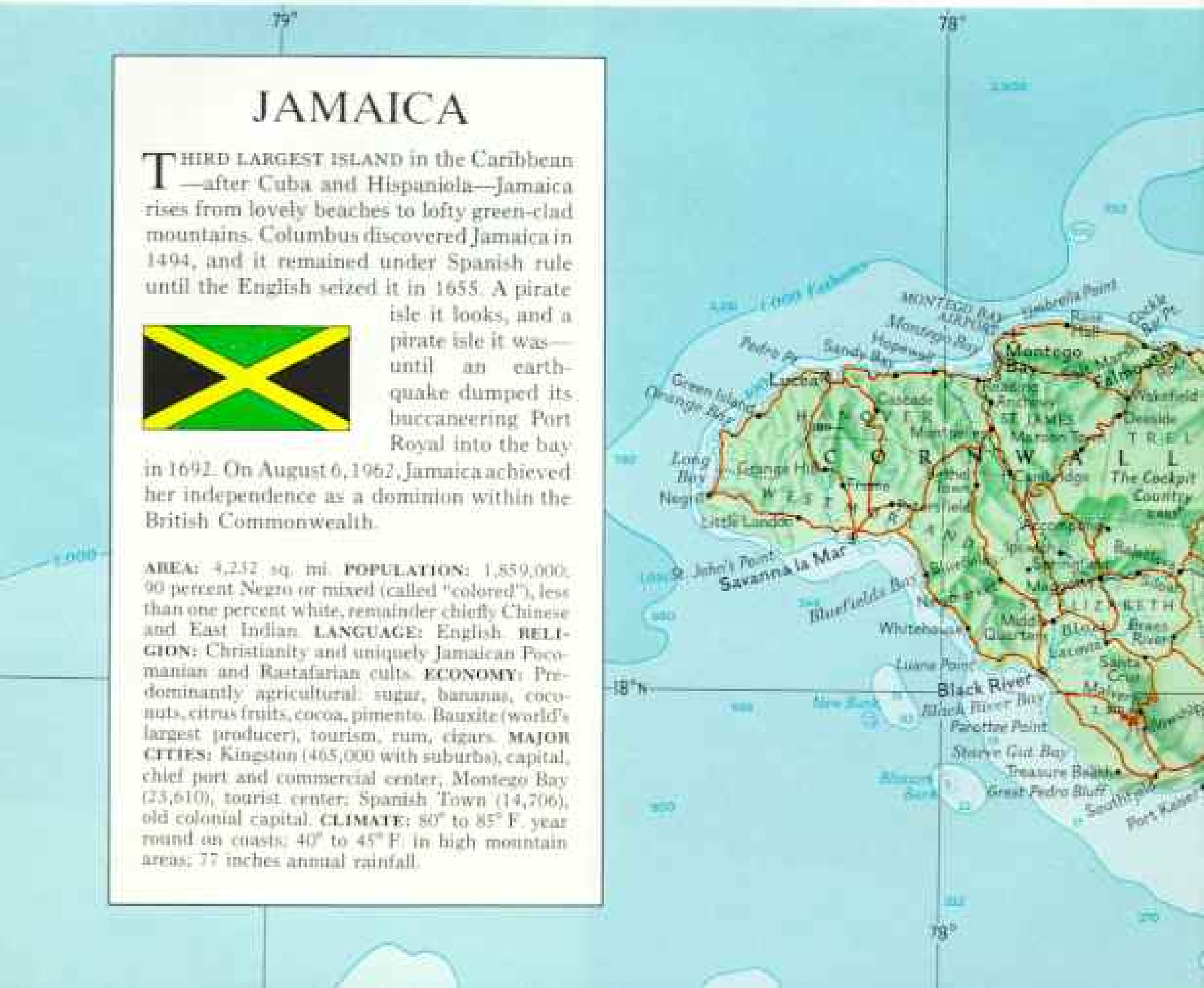
Today birth control is being encouraged, but as Sir Neville Ashenheim, Leader of Government Business in the Senate, told me, "It would give us immediate relief only if we could make it retroactive 20 years."

Emotions regarding color complicate even that inadequate solution. On a stone wall in

JAMAICA

THIRD LARGEST ISLAND in the Caribbean —after Cuba and Hispaniola—Jamaica rises from lovely beaches to lofty green-clad mountains. Columbus discovered Jamaica in 1494, and it remained under Spanish rule until the English seized it in 1655. A pirate isle it looks, and a pirate isle it was—until an earthquake dumped its buccaneering Port Royal into the bay in 1692. On August 6, 1962, Jamaica achieved her independence as a dominion within the British Commonwealth.

AREA: 4,232 sq. mi. **POPULATION:** 1,859,000; 90 percent Negro or mixed (called "colored"), less than one percent white, remainder chiefly Chinese and East Indian. **LANGUAGE:** English. **RELIGION:** Christianity and uniquely Jamaican Pocomanian and Rastafarian cults. **ECONOMY:** Predominantly agricultural: sugar, bananas, coconuts, citrus fruits, cocoa, pimento. Bauxite (world's largest producer), tourism, rum, cigars. **MAJOR CITIES:** Kingston (465,000 with suburbs), capital, chief port and commercial center; Montego Bay (23,610), tourist center; Spanish Town (14,706), old colonial capital. **CLIMATE:** 80° to 85° F. year round on coasts; 40° to 45° F. in high mountain areas; 77 inches annual rainfall.



Kingston I saw a crudely painted scrawl, "Birth Control Plan to Kill Black People." This represents only a minority, of course; the great majority of Jamaicans have the will to get along, regardless of color. One of my guides spoke for the majority when he said, with insight deeper than logic, "Why did God make black and white keys on the piano? You must play on both to get harmony."

Occasionally, however, the uneasiness about color takes another turn, and the white American tourist with all his envied wealth is resented. I saw another sign on a wall, the old "Yankee Go Home!" But, as is always so delightful about Jamaicans, cooler heads prevail—and always with laughter. Underneath this slogan a more elegant hand had traced, "Via BOAC."

Blue Mountains Crown a Crumpled Land

The poor Jamaican may long to migrate to America or to England, but the tourist, cocooned in a luxury hotel, wonders why anyone should dream of leaving this beautiful land. A velvety lushness pervades the landscape, and plumes of the great bamboo, in clusters 60 feet high, flaunt across hillsides like giant green ostrich tails. Year round, the northeast trade wind blows refreshment, keeping the coastal temperature at a balmy 80° to 85° F.

The island is tortoise-shaped, and dramatic mountains run in a west-east ridge down the center of its shell (map, below). Half of Jamaica rises to altitudes above 1,000 feet, often precipitously from sea level, and the Blue Mountains soar in steep humps to Blue Mountain Peak's 7,402 feet, the country's highest elevation.

The slopes are cloaked with rain forests and are rich in subterranean waters. For this is the "island of springs"—our best guess at the meaning of *Xaymaca*, the name Jamaica's first settlers gave the country. Originally from the Amazon River Valley, the Arawak Indians, spreading throughout the Caribbean, came to Jamaica about A.D. 750.

The beauties of the island last year drew 345,288 visitors, more than 80 percent from the United States and most of the rest from Canada. The accommodations they find range

Capital that earthquake could not kill: Kingston lay in ruins with more than 800 people dead after earth tremors and fire devastated the city in 1907. Rising anew, it now spreads over 40 square miles around Victoria Park. Between the city and the sandy finger of the Palisadoes lies one of the

all the way from a quaint lodge with delicious indigenous cooking at $12 a day per person to the ultimate in luxury. One hostelry at Port Antonio offers a two-week stay for a suitably ultimate price of $3,000 per couple, but everything is included—a house with two servants, horses if desired, plane outings anywhere on the island, caviar and champagne on the beach, liquors, cigars, and so forth.

The relaxed hotel where I stayed with my family at Port Antonio lay on the long, narrow peninsula that divides the twin harbors, and behind it soared the bamboo-clad peaks of the Blue Mountains. Like most luxury hotels throughout the island, mine always offered some Jamaican cuisine as well as pampering the American palate with excellent beef. Much of the fun of my family's Jamaican holiday was to experiment with such exotics as *chocho* (a squashlike vegetable), pumpkin soup, *gungo*-pea soup, curried goat, and *bammies* (cakes made with cassava flour).

But the island's paramount dish is the humble salt cod and akee. The akee is the national fruit, a big red pod with yellowish flesh and black seeds (page 865). If eaten before the pod bursts, it can be poisonous, but ripe, boiled, and blended with cod and

largest and finest natural harbors in the world, soon to be served by a new wharf complex on reclaimed land.

"**Red Stripe,**" as Jamaicans call their constables —and the local beer—brings order to Kingston traffic. Cars whizzing past the white-gloved policeman drive on the left in proper British fashion.

Beneath Commonwealth flags, red-robed undergraduates troop across the campus of the University of the West Indies in Kingston. Some 3,500 English-speaking students attend each year.

sautéed onions and tomatoes, it is delicious.

Though not as dear as the akee to the Jamaican palate, the banana is more important to the Jamaican pocketbook and dominates shipping in Port Antonio. Jamaica's second largest agricultural income producer after sugar, the banana is cultivated by more than 80,000 small growers.

We were wakened one morning at six by the hooting of the banana boat *Northland,* as she slipped into West Harbour just under our window. To watch the loading, we drove to the United Fruit wharf and there talked with wharf manager Astley Maxwell.

"They don't take the bananas right into the hold any more," he told me. "We're mechanized now. The growers bring them by truck and train, wrap them here, then put them on these conveyor belts that feed into the hold."

The growers still carry bananas to the processing shed on their heads—but woe to anyone who tries to take their picture. I was photographing a little girl when a young man shot up on a bike, seized the shilling I'd given her, and threw it back at me. "No! No! No!" he shouted. He waved toward my son Jimmy. "Would you take your boy picture wid bananas on head?"

The incident points up a serious socioeconomic problem. Jamaicans are turning away from agriculture as demeaning, and swelling the unemployed in Kingston, where there just aren't enough industrial jobs available.

The biggest tourist attraction in the Port Antonio area is rafting on the Rio Grande. Jimmy and I drove up to Berrydale to have a look, when a downpour struck. We took shelter in the little headquarters shed, and Cap'n Reggie Gay, the rafters' manager, told us, "No raftin' today. That river is swollen with three days' rain."

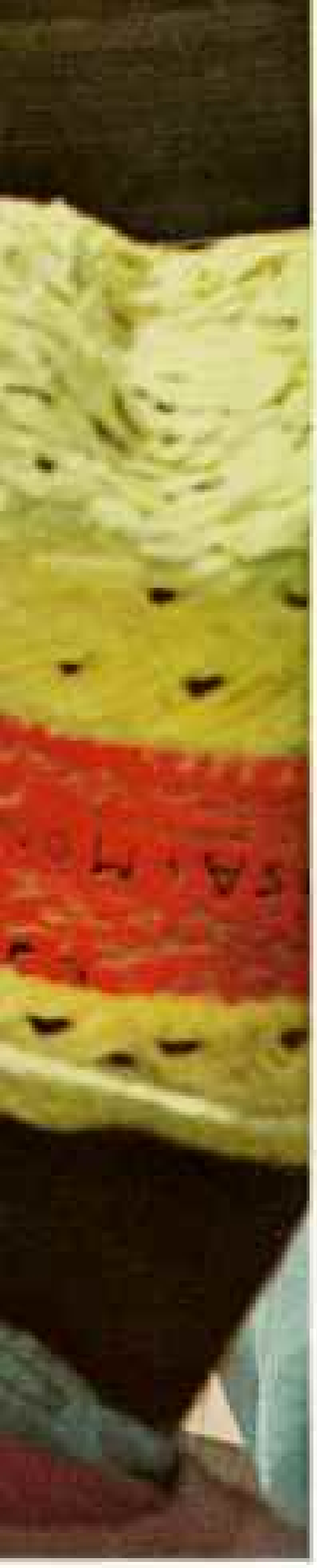
The river ran boiling brown, and I wondered aloud how fast one could go on that swift current.

"Wouldn't try it meself," the cap'n replied, "and I got 25 years on this river. But if you make it, you make it in 45 minutes. Ordinary, takes two-and-a-half hours to run to Rafters' Rest—that's six and a half miles."

River Turns Clear and Placid

Two days later, in what Jamaicans call "full sun," Cap'n Reggie poled Hannah, Jimmy, and me (the girls wouldn't risk it) down a calm, sparklingly clear river, and our 25-foot raft of great bamboo trunks proved entirely river-worthy (pages 854-5). It is a magnificent trip through sheer defiles, foamy rapids, and out into broad, lime-colored calms.

Ten miles by road behind Port Antonio, in Moore Town, 600 feet up in the Blue Mountains, where it rains more than 200 inches a year, lives one of the five colonies of Maroons —the oldest independent Jamaicans, a nation



New Prime Minister, 44-year-old Hugh Shearer became head of Jamaica's Government in April, 1967.

Queen of Jamaica: Elizabeth II of Great Britain and her husband Prince Philip smile their thanks to calypso singers at Lucea during a Caribbean tour.

With regal splendor, the Queen addresses the opening session of Parliament at Gordon House on March 4, 1966. At desks on the floor, the Acting Prime Minister, the late Donald Sangster, sits to her right and Opposition Leader Norman Manley to her left.

Symbolic chief of state, decoration-bedecked Governor General Sir Clifford Campbell (below) acts as the Queen's representative in Jamaica. The former teacher is the first Jamaican to hold the post.

within the nation (pages 862-3). In 1739 the British, by treaty, recognized the Maroons' sovereignty—a century before the freeing of Jamaican slaves. Their name derives from the Spanish *cimarrón*, meaning "wild," and they are chiefly descendants of Negro slaves who ran away from the Spaniards during their 150-year occupancy of the island.

We drove up to visit the Moore Town Maroons' chieftain, Col. C. L. G. Harris. Of the 8,000 Maroons in Jamaica today, about 2,500 live in Moore Town, and they have elected Colonel Harris their leader. Because the military titles of their British enemy impressed the Maroons, all chieftains take the title colonel.

Colonel Harris, a dignified man of 50, lives with his wife and six children in a neat little pink house, and he cordially invited us in.

"After the English drove out the Spaniards in 1655, they tried to recapture my ancestors," he told us with an impeccable British accent. "But our people were mainly fierce Coromantees, masters of guerrilla warfare and camouflage. They chose these mountains and the rough Cockpit Country in the west because they were so inaccessible."

Maroon Hospitality Belies "You No Come"

The British gave in and granted the Maroons the sovereignty still recognized by independent Jamaica. "We pay no taxes on our treaty land and we conduct our own trials in most matters," the colonel told me. "But otherwise we are Jamaicans, too. We vote in the national elections. We pay the income tax and the tax on land we bought ourselves. But one holiday we've never celebrated—August 1—because the Maroons took their freedom themselves and did not wait for the freeing of the slaves on that date in 1838."

The other principal Maroon colony, at Accompong, is even less accessible than Moore Town. It lies in the Cockpit Country, 40 miles southeast of Montego Bay as measured by a tortuous dirt road—and 1,400 feet skyward. Maps distinguish the area chiefly by blank space and such forbidding district names as Look Behind, and Me No Sen, You No Come.

I went up with Douglas Burke, head of the Montego Bay Tourist Office, in a four-wheel-drive station wagon. The trip took two-and-a-half hours each way, and we

In languid reverie, visitors float down the Rio Grande close to steep, vine-canopied banks, past great bamboo and wild cane, and across small rapids. Rivermen pole the buoyant bamboo rafts on the 2½-hour voyage.

KODACHROME BY THOMAS NEBBIA © N.A.S.

skirted a hundred "cockpits," great green bowls eroded out of the island's limestone, surrounded by humpbacked knolls. Some pits stretch 1,500 feet across and 500 deep.

We visited Col. Walter James Robertson, aged 93, for the past 16 years chieftain of the 1,500 Cockpit Maroons. He asked me to sign his guest book and showed me an earlier handwritten entry dated January 15, 1964: "We bring greetings to Colonel Robertson and the Maroons from President Lyndon Johnson and the people of the United States." It was signed by the late Adlai E. Stevenson, Permanent U. S. Representative to the U. N.

Walking back to the car, I was stopped by a man in rough working clothes who introduced himself as "Mann O. Rowe, Secretary of State—like Dean Rusk, you know. I want to show you something."

Mr. Rowe, a political rival of Colonel Robertson, went into his house and came out with a package wrapped in old newspapers, which he tenderly unfolded. Inside, neatly handwritten, yellowed and cracked, was a copy of the independence treaty.

With his finger, Mr. Rowe underlined the words "... shall be for ever hereafter in a perfect state of freedom and liberty. ..."

"You see," he said proudly, "we are a sovereign power."

Nature Beckons the Hotel-bound

Between the two Maroon settlements, as the visitor drives, lies the 134-mile stretch of Jamaica's golden North Coast. Just west of Oracabessa, the march of the American-style luxury hotel begins. In any of dozens of concrete-and-glass hostelries from here to smart Montego Bay (opposite), an American can live in a self-contained world tailored to the American taste.

But in an area where natural beauties invite, few North Coast visitors would wish to stay hotel-bound. According to Bernard Lewis, Director of the Institute of Jamaica, "the island has more species of fern than North America and Europe together." Fern Gully, a shady 3½-mile tunnel of greenery back of Ocho Rios, rises 800 feet through hundreds of them.

Nearby, Dunn's River Falls cascades a mountain stream to the sea over a giant natural stairway (page 842), and makes scholars wonder whether Ocho Rios—Spanish for "eight rivers"—is really a corruption of another Spanish word—*chorreras*, "spouts."

At Runaway Bay, Jack Lewis guided me through his Green Grotto, full of strange formations of stalactites and stalagmites. Then he drove me over his mountainous Runaway Spice Estate. Here miles of glossy-leaved pimento trees contribute to a spice crop in which Jamaica leads the world. From the purple pimento berry the nation produces in a good year as much as six million pounds of allspice, which combines flavors of many spices, including cloves, cinnamon, and nutmeg. The berries add zest to German sausages, and the essence of both berries and leaves is used in many perfumes.

The North Coast mingles much history and legend. In May, 1494, Columbus discovered Jamaica, but at St. Ann's Bay, not Discovery Bay. Just west of St. Ann's, in 1510, the Spaniards established Jamaica's first settlement, Sevilla Nueva. Then malaria drove them across the island to found a new capital, Villa de la Vega, now the site of Spanish Town.

The Spaniards drowsed away a century

Turquoise waters of Montego Bay glisten in an eternal summer tempered by trade winds. As if on colored glass, sailboats moored off the Yacht Club pier swing over beds of coral. Many celebrities from colder climes make this resort their winter playground.

Underwater realm opens to a snorkeler in Montego Bay. Hovering above star coral, she opens a sea urchin with her knife to attract the reef's bright-colored fishes.

and a half in Jamaica, using it chiefly as a base from which to pursue easy gold in Mexico and Peru. They began the slave plantation system, and, when within 50 years the 60,000 pleasure-loving Arawaks perished through overwork, disease, suicide, and persecution, the Spanish stepped up the importation of slaves from Africa.

When Oliver Cromwell's forces attacked the Spanish West Indies, the English took Villa de la Vega in a single day in 1655. Five years later they drove the last Spanish guerrillas off the island, not at Runaway Bay, named for the event, but east of Ocho Rios.

The North Coast saw the rise of many great plantations of the English period, and the plantocracy, minus the slaves, survives. Near Port Maria, I visited retired British Maj. Douglas Vaughan, owner of Brimmer Hall Plantation's 680 acres. "We produce almost 100,000 stems of bananas and half a million coconuts annually," he told me, "as well as akee, pimento, limes, and breadfruit."

I took the jitney tour of the plantation, which educates 12,000 visitors a year. Each banana plant, I learned, produces only one bunch, or stem, taking nine to twelve months. After the harvest the plant is cut down, and a ratoon comes up from the root to start next year's plant (opposite). I asked my guide for a taste of a tree-ripened banana and he laughed. "No good. If the bananas ripen on the tree, they stay full of water and taste bad."

No. 1 Problem: Unemployment

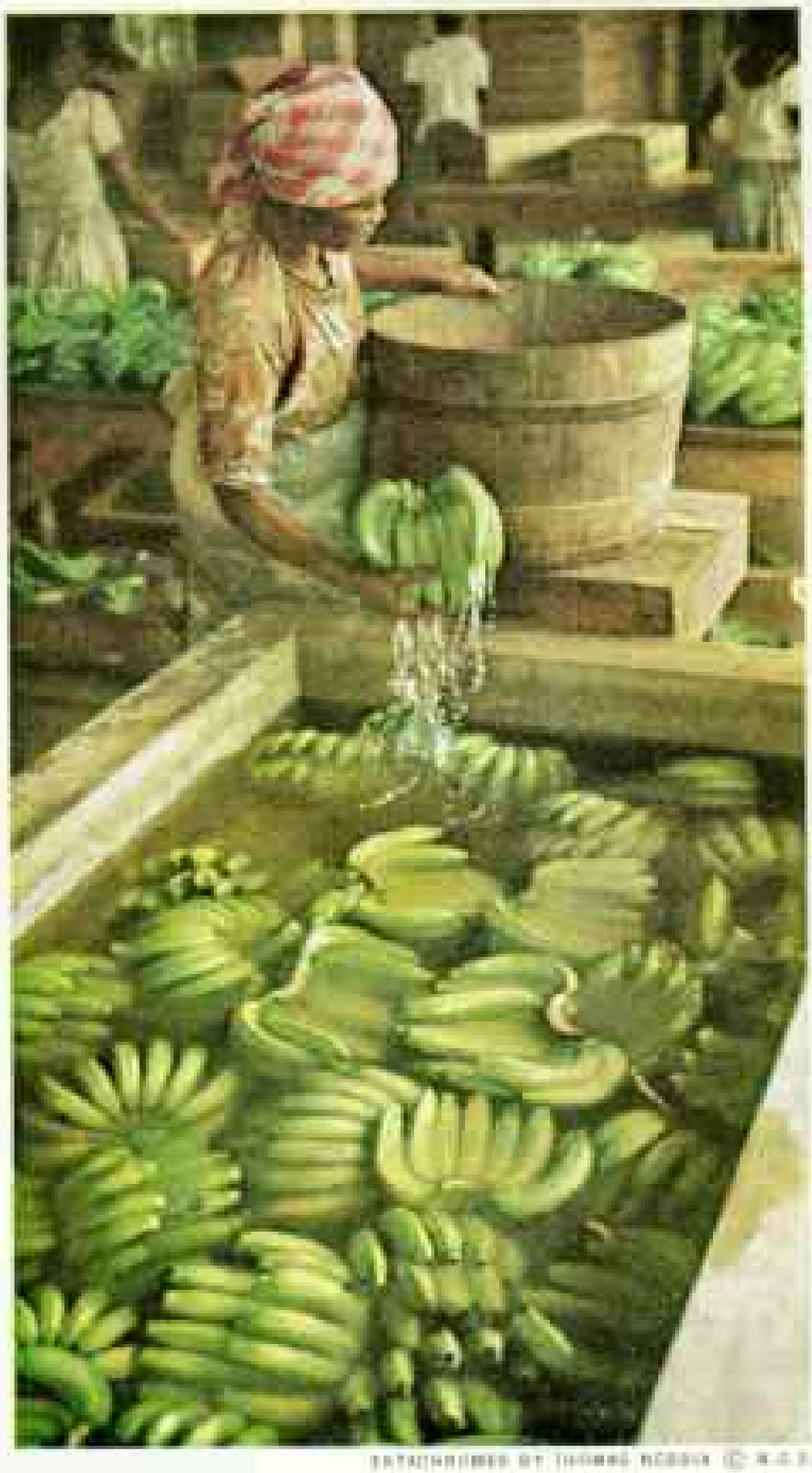
From the North Coast to Kingston the most scenic main route is the twisting Junction Road over the Blue Mountains. Its 54 miles, from Annotto Bay to the capital, can be negotiated by a cautious American driver in about two hours; by a Jamaican in one.

Almost destroyed by earthquake in 1907, Kingston has been rebuilt in reinforced concrete on strictly utilitarian lines. It has a striking mountain background and a fine landlocked harbor, with nine square miles of navigable waters (pages 850-51). But also it has, along its waterfront and in its west end, slums where the poorest of the metropolitan area's 465,000 inhabitants crowd whole families into single rooms.

To me Kingston is stimulating not as a

The plant must fall to harvest the fruit. A worker pulls down a fragile banana stalk and slices off its single stem of green bananas. Later, the trunk will be cut to the ground to encourage a ratoon, or return shoot, for next year's crop. The author, in white shorts, takes notes during a tour of the 680-acre Brimmer Hall Plantation near Port Maria.

Green-fingered "hands" of bananas rinse in water. A kerchiefed woman dips each cluster into a solution that seals the stems against insects and rot. Packers beyond arrange the hands in cartons.



In the varnished calm of evening, banana-boat loaders begin their night's work. Power craft tow lighters to and from a freighter anchored in the shallow bay at Oracabessa. Spaniards brought the first banana plants to the Indies from the Canary Islands in the 16th century. United States merchants built up foreign trade after a Yankee sea captain took home a few stems in 1870. Today almost all of Jamaica's annual export of 10,000,000 stems goes to the United Kingdom.

House called Folly began to crumble shortly after completion in the early 1900's; its concrete had been mixed with sea water. The author's son Jimmy runs past the Port Antonio mansion, as if chased by *duppies*—Jamaican for ghosts.

Harvest by hand continues in the sugar fields as it has for 300 years. But modern machines will turn the cane into sugar, molasses, and rum. This worker hoists a bundle of cane tops, saved for fodder or for rooting as new plants. Some 25,000 small farmers grow almost half the island's sugar crop, its most important agricultural export.

sight but as the brain and energy center of the young country. Here I met the men of government and politics who must wrestle with Jamaica's chief problems: an unemployment rate of 15 to 20 percent, and the marginal existence of the small farmers, the backbone of the nation.

I talked about these problems with Norman Washington Manley in his tiny downtown law office. Mr. Manley, now Leader of the Opposition, served as Premier from 1955 to 1962. A socialist of the British stripe rather than of the Russian, he is a slim man of 74 with a mane of iron-gray hair.

To him things are worse even than they seem. "Unemployment is probably 25 percent among young people of 16 to 25. And among women who are heads of families it is probably 40 percent."

Mr. Manley's answer? "Land-holding reform is the basis on which other things must rest." He is alarmed that 350 individuals and companies own an average 2,200 acres each, while the nation's 113,240 small farmers own only an average one and three-quarters acres per family.

"This is basically the plantation economy of colonial days," he declared. "As far as I am concerned, when my party gets back into power, we will put a 500-acre ceiling on land ownership. The government will acquire all land over 100 acres not adequately used, and develop it through agricultural cooperatives and otherwise."

Small Farmers Get New Markets

The party in power, the Jamaica Labour Party, does not care for Mr. Manley's solution. Its grand old man, former Prime Minister Sir William Alexander Bustamante, now 83, has retired from politics, and so I sought the party's views from the present Prime Minister, Hugh Shearer (page 853). I met him in his office over tea, a giant of a man with a flashing smile. His views are forthright:

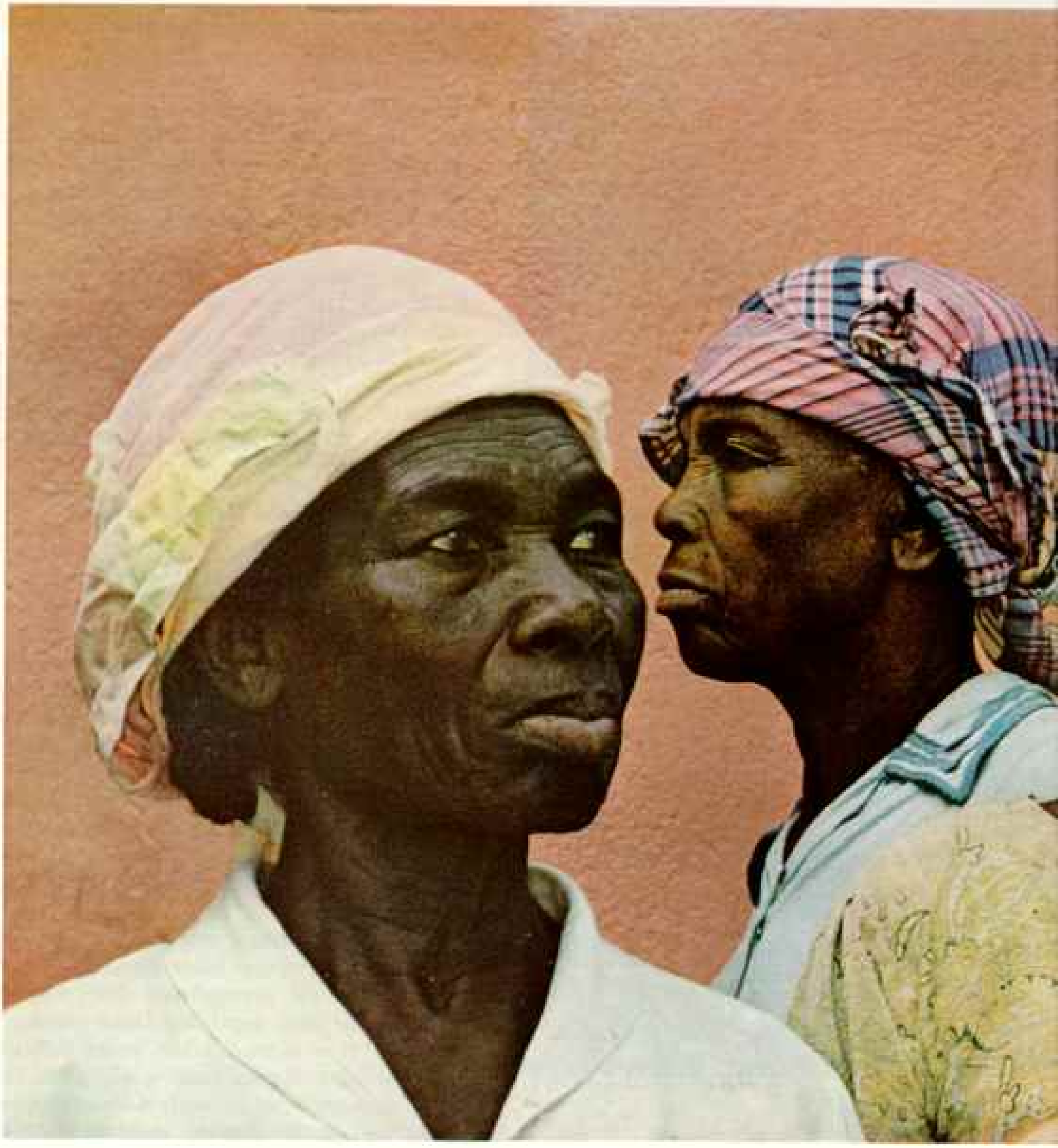
"Our party believes in private enterprise," he told me emphatically. "The opposition believes in socialism, nationalization, government control. So the dividing line is the state versus the people."

The Prime Minister was much concerned about the agricultural labor situation.

"Many of the unemployed don't like to work on the land because it lacks prestige," he said. "It is manual labor under difficult circumstances. Agricultural work, as in the sugar industry, must be made more attractive. Employers must provide improved water supplies, eating facilities, social facilities—to bring conditions near those in the factory and remove the stigma attached to farm jobs."

Minister of Trade and Industry Robert C. Lightbourne also proved to be as involved with agriculture as with industry. He too opposed Mr. Manley's land plans.

"Our answer," he said, "is to provide markets for the small farmer. We used to export sugar and bananas and import about everything else; and we remained poor. We had to have the courage to ban the import of crops like carrots, melons, iceberg lettuce, and show our farmers how to produce them. At the same time we've given government help to develop canning, packaging, and freezing processes to absorb surpluses and create new



jobs. Once you have this chain established, your agriculture automatically builds up.

"I am more interested in using what we have than crying about what we don't have. Take tourism. Some said the only cure was to legalize casino-type gambling. I did not agree. So we put in John Pringle, and doubled the industry in two years."

The dynamic young John Pringle, developer of several North Coast resorts, bellwethered tourism to a peak $78,000,000 last year. E. Stuart Sharpe, John's successor as Director of the Jamaica Tourist Board, keeps up the pace, for as he explained:

"Every additional 10,000 visitors can generate employment for some 1,800 Jamaicans."

But all is not problems and puzzlement. Some of my most memorable encounters with Kingston personalities are vignettes of delight.

A tradition of the Christmas season in Kingston, as in England, is the Pantomime. The Kingston version is a brightly costumed musical built around a different Jamaican theme each year. I saw "Morgan's Dream of Old Port Royal," a bouncy spoof of the exploits of Henry Morgan, the 17th-century buccaneer who became lieutenant governor of the island. After the performance I went backstage to meet Louise Bennett-Coverley, feminine lead of most Pantomimes. Known

PHOTOCHROME BY THOMAS NEBBIA © N.G.S.

fondly throughout Jamaica as "Miss Lou" or "Aunt Lou," she is a folk poet and an outstanding student of the Jamaican dialect.

A pleasingly plump lady, Miss Lou taught me how to talk Jamaican: "Now, *walla walla* is like *mecky mecky*, all dirty and messed up; only walla is for people and mecky for things. The opposite is *boonoonoonoos*, any thing or person that's very sweet. But, when we say, '*Dat boog, mon,*' we mean it's pretty low—that comes from the Ashanti."

As we parted, Miss Lou said, "Walk good. Now that's real Jamaican. It's our way of saying goodbye and it doesn't matter if you're walking, driving, or flying."

What do they hear whispering on the wind, these women of Moore Town who call themselves Maroons? Set apart by pride, they listen to a past that will not die. Their 16th-century ancestors escaped Spanish masters for the high country, earning the name Maroon from *cimarrón*, wild. In later generations, the menfolk waged so fierce a guerrilla war against English planters that the British made peace in 1739. A treaty guaranteed the Maroons freedom and lands "for themselves and posterity for ever" in exchange for the return of runaway slaves.

To find folk talk and folkways in action, I did not have to leave Kingston. In the Trench Town district, behind a little shop where he sells Sno Cones, Mallica Reynolds holds forth on Sunday nights as Kapo. This is the ritualistic name he assumes as leader of the Pocomania cult, a revivalist group.

For four hours, in his rude cement-floored chapel, Kapo preaches to his flock and leads such hymns as "Every Day There Will Be Sunday, Bye and Bye." The orchestra of drums, maracas, and tambourines beats out an irresistible rhythm as women in red-plaid dresses dance before the altar, exhaling violently: "Hup! Hup! Hup!" (pages 866-7).

Sister Forbes Breaks the Barrier

The repeated exhalation causes hyperventilation, an abnormal loss of carbon dioxide, and soon one of the women falls semiconscious to the ground. The dancers move round her, singing while she writhes, and Kapo shouts, "I glad to see Sister Forbes break de barrier! Gabriel, put her away, take her dis way!" Sister Forbes gradually recovers and returns to the dance.

After the ceremony, Kapo, still in his turban and flowing gown, showed me the studio in his home behind his shop and chapel. There he carves magnificent primitive statues out of lignum vitae. One of Jamaica's best-known sculptors, entirely self-taught, he also paints startling primitive oils.

A sculptor of a more sophisticated bent is stately, white-haired Edna Manley, wife of the Leader of the Opposition. But like Kapo, she emphasizes the Negro in her work and has become renowned for two statues of national Negro hero Paul Bogle—one in Kingston, the other in Morant Bay.

At the Manleys' home she and Mr. Manley told me how Bogle had led a rebellion in Morant Bay to call attention to injustices to Negroes 30 years after the abolition of slavery. A ruthless governor had Bogle and his

followers hanged and their bodies dumped into pits behind the Court House. Today the burial site is a national monument, and before the Court House stands Mrs. Manley's statue of Bogle, machete in hand.

Bidding Mr. and Mrs. Manley goodbye, I said, "Walk good." They both beamed.

From Kingston I made sorties into the southern half of the island, including one into the Yallahs Valley, deep in the Blue Mountains, where I visited a government youth camp. At Chestervale, 3,500 feet up, 360 underprivileged boys, aged 15 to 20, farm while learning such trades as auto mechanics, barbering, and plumbing. I met three of their teachers over a mess-hall lunch: young American Tom Winn, one of the 135 Peace Corps workers in Jamaica, and two young Englishmen of Voluntary Service Overseas (the British peace corps).

"The boys stay 18 months," Tom told me. "Few have had much previous education."

A group of the boys gathered round us, each known by a nickname—Radio (because he talks so much), Silent, Doublehead, Three Foot. Their minds were not on education but on *duppies*, the ghosts of Jamaica.

"You always see duppy at night," Radio explained. "When duppy ketch you, if he set on you, he blow on you and you die. But sometimes he don' trouble you. Me and me brodher laying down one night. De light turn blue and we see a duppy has on a hat—but no face!"

"You catch a duppy and put him in a can," Silent said.

(Continued on page 869)

Little castles from the sea, lustrous giant conch and helmet shells line a roadside stand at Salt Marsh. In the shallows where the mollusks "walk on the sea grass," fishermen gather pink *Strombus gigas* and black-and-white *Cassis tuberosa*. After extracting the meat, they marinate it in lime juice, cook it in coconut oil, and serve it with rice. Now the cleaned shells await souvenir buyers.

In plantation days the blowing of a conchshell before sunrise summoned slaves to the canefields. After emancipation in 1838, most estate hands moved to small acreages to live as they wished, harvesting the crops of their fields and the fruits of their sea.

Burst pods of akees signal danger past. If eaten earlier, the fruit poisons and may kill. For a spicy dish, Jamaicans boil the yellowish meat and mix it with salt cod, tomatoes, and onions. The first black akee seeds came from Africa in 1778.

Color-splashed catch of coneys, rock beauties, and parrotfish at Alligator Pond soon will swim in a peppery sauce. Cooks call the recipe *escoveitched*, after a Spanish word for pickled fish.

Driven to frenzy by rhythmic drumming, dancers climax a Pocomania revival meeting in Kingston. Turbaned "shepherd" Mallica Reynolds leads the "trooping and laboring." The congregation, mostly women, exhale violently—"Hup! Hup!"—as they straighten from bent positions and hop sideways

ENTRANCEWAY BY THOMAS NEBBIA © NATIONAL GEOGRAPHIC SOCIETY

in a circle. Some fall almost unconscious, possessed by spirits, they believe. The cult's name means "little madness," explains Reynolds, who says that his own religious name, Kapo, "pertains to prosperity." Most Jamaicans attend orthodox Christian churches, but nearly 1,000 call themselves Pocomanians.

"No, in a bottle," said Radio. "I see a man put a bit o' milk in a bottle. Him say, 'I ketch him! I ketch him!' Put in de cork and t'row him in de sea. Duppy stay till de bottle wash up and somebody take out de cork."

Another day I took the 64-mile road west from Kingston to Mandeville. Along the way Tom Concannon, a British architect (he is senior executive architect for monuments in Jamaica's Town Planning Department), showed me some of the great remains of the British colonial period.

Mystery Surrounds Colbeck Castle

In Spanish Town's elegant square, Tom explained: "Though this looks like a Spanish plaza, not a building here or anywhere in town dates from Spanish days. The Spaniards had a town here called Villa de la Vega, but in time the British wiped it out."

The square is the West Indies' finest grouping of English colonial architecture: King's House, the Rodney Memorial (opposite), House of Assembly, and Court House. On the colonnaded portico of King's House, where Jamaica's governors ruled from 1762 to 1872, Tom said, "You're standing right where Governor Sir Lionel Smith stood in 1838 to read the proclamation bringing Negro slavery to an end."

In the old British Cathedral of St. James, built on Spanish foundations, Tom pointed out a black marble slab. Beneath it lies Col. John Colbeck, who "came with ye army that conquered this island" in 1655.

Historians long credited him with building Colbeck Castle, called the oldest and biggest "great house" extant, but Tom had another story for me. Twelve miles west of Spanish Town we visited the brooding fortresslike castle, standing now amid vast tobacco fields.

"It's a real 'oodunit," Tom said. "I don't think Colbeck built it at all. It's never mentioned in the early archives, and since it probably would have been the largest building in the Caribbean then, that's a mystery. Latest research suggests it was built around 1763. But what went on here and how it fell to ruin, no records show."

I said goodbye to Tom at Mandeville, a quiet town 2,000 feet up in the cool Manchester hills. It used to be a favorite summer resort of British colonials, but now its visitors are chiefly businessmen concerned with bauxite. The hotel where I stayed, a rambling wooden Victorian fantasy covered with gingerbread, reflects the tone of Mandeville, often compared to a serene country town in the English midlands.

One of Mandeville's leading citizens, lawyer Pat Delapenha, took me on a tour of the bauxite industry. Bauxite, the red earth from which aluminum is derived, is distributed over 1,000 square miles, or a quarter of the area of Jamaica (following pages).

The island is the world's largest producer of bauxite, with the Alcan, Reynolds, Alcoa, and

British memorial in Spanish Town commemorates a victory over the French. Island capital under Spain's rule, the inland town fell to English forces in 1655. Later France, as America's ally in the Revolutionary War, gathered an invasion fleet in the Caribbean. But British Adm. Sir George Rodney attacked the French ships off Guadeloupe, captured nine, and left the rest "shattered." Thus the admiral saved his nation's empire in the Caribbean and won for himself a monument—this Roman-style statue set in a colonnade on the town's main square.

Church bells ring and girls of Spanish Town quicken their step to Sunday services.

Kaiser companies turning out 9,000,000 long tons a year—23 percent of the world's total. In Jamaica, at present, only Alcan processes the bauxite to alumina, the compound from which aluminum is finally extracted; even so, its output makes the nation the world's biggest alumina exporter. Bauxite is Jamaica's greatest export-revenue earner, bringing in 40 percent of the total.

Pat and I inspected the open-pit mining at Alcan. Then we moved on to Port Kaiser on the south shore to see bauxite shipped, shortly before this operation moved to Port Rhoades, Kaiser's new facility on the North Coast.

Long lines of open freight cars brought bauxite from the Kaiser fields, 14 miles away. A huge cradle, the "car dumper," clamped one car at a time in its jaws, turned it upside down, and dumped the bauxite onto a conveyor belt for drying prior to loading into ships.

Pat told me, "I bought this land for Kaiser. Used to be Little Pedro, and its 45 acres were owned by 115 small fishermen. They would take only cash, and I used to come in here by canoe quite often with large packets of bills on me. I was afraid of being robbed, so I tied the cash to my trained monkey and tied him to my tent. The people had never seen a monkey and were terrified of him. They wouldn't even go near the tent."

Mining Stimulates Agriculture

Pat pointed out that the aluminum companies own 5 percent of Jamaica's arable land. By law, it must be used for agriculture before and after mining. So the aluminum companies either lease, or themselves use the land for cattle raising, farming, and reforestation.

Red gold of Jamaica: After Columbus reported that the island held neither silver nor gold, Spain paid it little attention. Its real mineral wealth lay hidden until 1942, when soil tests revealed a thick layer of bauxite, the aluminum-producing ore. Today four North American corporations mine a total of 9 million long tons annually, making Jamaica the world's leading producer.

Here on the property of Reynolds Jamaica Mines, Ltd., enormous buckets, each holding more than a ton of ore, move 6½ miles from the Lydford diggings to shipside at Ocho Rios.

Law requires that companies replace top soil and maintain agricultural output. Reynolds not only farms but also runs the largest cattle herd in the Caribbean—18,000 head. Here Jamaicans on horseback tend gray Brahmans brought from Florida and red Santa Gertrudis from Texas.

Protected by a product he helped create—an aluminum hat—a miner pauses at Alcan Jamaica Ltd., the only company that now processes bauxite into alumina on the island. The entire industry employs 5,000 Jamaicans.

Reynolds, for example, runs a herd of 18,000 beef cattle—largest in the West Indies. Thus Jamaica not only gets the bauxite but also increases her agricultural productivity.

My final Jamaica outing took me to Port Royal on the Palisadoes peninsula, which landlocks Kingston Harbour. There Jamaica's most lurid history was written.

During the last half of the 17th century, the port served as a base for the Welshman Henry Morgan and his privateers. With the connivance of Jamaica's governor and England's king, Morgan raided the Spaniards' Caribbean fleets and possessions of millions of dollars in gold and booty.

Around this audacious enterprise—which eventually earned Morgan a knighthood and the lieutenant governorship of Jamaica—grew up wicked Port Royal, with its "most ungodly, debauched people." Or so, at any rate, said their townsman, the rector of St. Paul's Church. When an earthquake struck and all but destroyed Port Royal in 1692, Jamaica's good citizens felt it a judgment of God.

The sunken city was probed and mapped during several months in 1959 when the National Geographic Society and the Smithsonian Institution sponsored underwater excavations directed by Edwin A. Link.* Since 1965 Robert F. Marx, a 34-year-old marine archeologist from California, has been carrying out more extensive excavations for the Jamaican Government (following pages).

Bob's most startling find has been a chest bearing the arms of Philip IV of Spain, chock-

*See "Exploring the Drowned City of Port Royal," by Marion Clayton Link, NATIONAL GEOGRAPHIC, February, 1960.

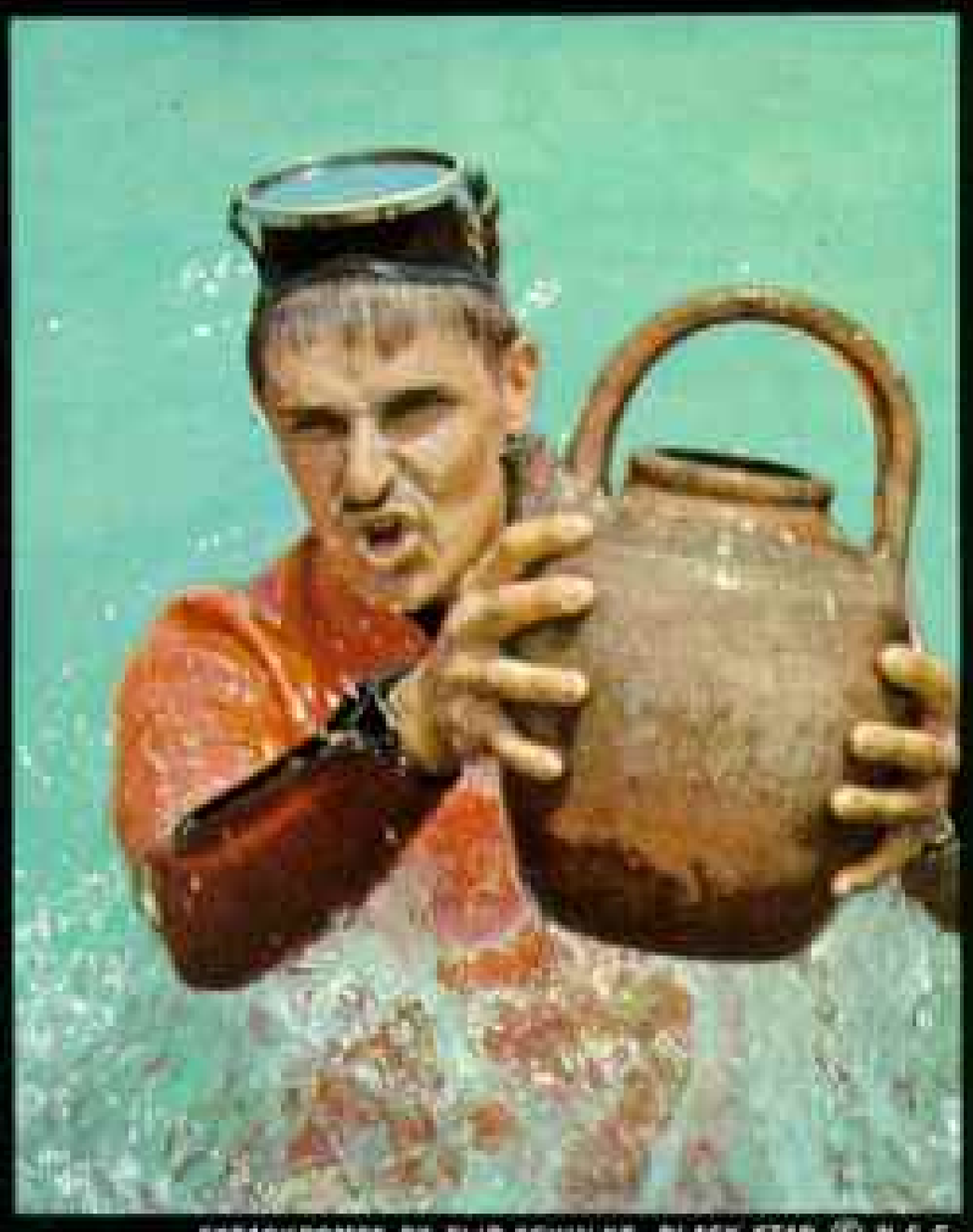
Relics from a gilded hades

PORT ROYAL GAINED NOTORIETY in the 1660's as the rowdy lair of Henry Morgan and his English buccaneers. Raiding Spanish ports and treasure fleets, he waged England's unofficial war against Spain and won for himself respectability—knighthood and the post of lieutenant governor of Jamaica. But privateers' gold and silver continued to pour into the city as "desperately wicked" people caroused in tippling houses. Then, like a judgment, an earthquake in 1692 drowned the wealth-laden port.

Sifting through silt-shrouded rubble, diver Kenute Kelly scoops up a handful of clay pipes, some with decorated bowls (above). More than 500 of the English-made pipes marked the site of a roisterers' tavern.

EXTACHROMES BY FLIP SCHULKE, BLACK STAR © N.G.S.

Pirates' booty, pieces of eight with the "L" mint mark of Lima, Peru, and the date 1684, rested underwater in a chest bearing the crest of Philip IV of Spain. Such silver coins once purchased contraband, slaves, and good times in Port Royal. Today the Institute of Jamaica at Kingston sponsors excavation and displays the finds.



EKTACHROMES BY FLIP SCHULKE, BLACK STAR © N.G.S.

Earthenware jug, brought up by marine archeologist Robert Marx, perhaps held fresh water used by Port Royal residents to dilute the burning rum known as "Kill-Devill." Directing excavation, Mr. Marx has recovered many undamaged relics, including a copper still, a silver watch, and even a tobacco leaf preserved in the mud, as he raised fallen walls, brick by brick.

full of silver pieces of eight, all of which now belong to the government.

"Each coin is worth a couple of hundred dollars," Bob told me. "They are in mint condition and of a period, between 1653 and 1691, from which pieces of eight are very rare."

I watched Bob and his two local divers slip into the water from his homemade barge of old oil drums and scrap lumber. He worked 260 feet offshore in only 12 feet of water, but to reach buildings and artifacts he had to excavate 15 feet of bottom, pumping it into the barge. The water is usually so murky that the divers must locate artifacts by touch.

1,800 Buildings Buried Under Water

"It's the most important underwater archeological site in this hemisphere," Bob said, "just as Port Royal was the hemisphere's most important city when it went down.

"This is our chance to find out what a whole 17th-century town was like—1,800 buildings slid into the sea here. We even find food—rock-hard butter and such. We know what tobacco they smoked—we found a complete leaf, oldest in the world, I guess. We can tell what spirits they drank—rum, wine, and brandy—by testing the stuff in bottles.

"We've brought up about 250 intact pieces of pewter—more than has been found on all other underwater sites in this hemisphere put together. We have 6,000 clay pipes, silverware, a silver pocket watch, and a complete copper rum still."

Today Port Royal is the focus of yet another ambitious plan. Sir Anthony Jenkinson told me about it at the hotel he runs beside the cove where Sir Henry Morgan and his buccaneers careened their ships.

"A hundred of us," he said, "have incorporated the Port Royal Company of Merchants, Ltd. We plan to reconstruct enough of old Port Royal to give the flavor of those days before the earthquake.

"We'll re-erect some of the old Port Royal buildings, and put up two new luxury hotels and a terminal for cruise ships with shops and restaurants. We have lovely beaches, like Lime Cay out there, and, as records prove, the driest, sunniest spot in Jamaica. Give us three to six years—you'll see."

How nice to find the old drive as well as promised new shapes rising phoenix-like from all-but-lost Port Royal. Somehow, to me, the impending revival of the town after 275 years symbolizes the indestructibility of the Jamaican spirit.

Jamaica, walk good. THE END

New Scarlet Bird in Florida Skies

—*and a pink one too*

By PAUL A. ZAHL, Ph.D.
National Geographic Senior Natural Scientist

BECAUSE he is a dedicated student of nature, Carter Bundy, an electronics technician for Pan American World Airways in Florida, built his house overlooking a lagoon studded with small islands in Greynolds Park, North Miami Beach, where hundreds of white ibises, herons, and egrets live amid the mangroves and casuarinas.

Free and unmolested, the birds make daily feeding flights to outlying swamps and tidal flats; by night they are back roosting. They come and go heedless of the golf course, suburban shopping center, and housing developments round about and the mammoth resort hotels in nearby Miami Beach. In spring and summer they build nests and rear young on the park's little islands.

One day I received a letter from Mr. Bundy outlining an interesting plan. It was inspired, he said, by an article of mine about a rookery of scarlet ibises I had found in the hinterlands of Venezuela.*

Why not, Mr. Bundy wondered, start a colony of these dazzling scarlet birds in Florida? Couldn't one merely take a few fertile eggs from one of the South American nesting sites and slip them under white ibis brooders in Greynolds Park? If whites could live there, why not the closely related scarlets?

"The possibility occurred to me," the letter explained, "after I compared your Geographic pictures of the South American scarlet ibis with the white ibises that live in our lagoon. I could find absolutely no differences—except for color."

His observation was entirely correct. *Eudocimus ruber*—the scarlet ibis, native only to northern and eastern South America—and *Eudocimus albus*—the white ibis, widespread in both the North and South American tropics—appear to be anatomically identical, differing only in feather pigmentation. The two birds have similar weights (about two pounds) and wingspans (some 40 inches). Even the eggs

*See "Search for the Scarlet Ibis in Venezuela," NATIONAL GEOGRAPHIC, May, 1950; also the book *Coro-coro, The World of the Scarlet Ibis*, by Paul A. Zahl, The Bobbs-Merrill Company, Inc., New York, 1954.

Vivid parent feeds a drab chick in Caroni Swamp Sanctuary, Trinidad. Opening wide its sickle-shaped beak, a scarlet ibis serves its groping youngster a predigested soup of crustaceans, mollusks, and aquatic insects. By transplanting eggs to nests of white ibises in North Miami Beach, naturalist Carter Bundy hopes to establish a permanent colony of the brilliant birds in Florida.

Alighting in the mangroves of Caroni Swamp, a scarlet ibis, *Eudocimus ruber*, displays its dazzling colors and the inky wing tips which it shares with the white species, *Eudocimus albus*. While the scarlet inhabits only South America and Trinidad (map, page 878), the white ibis ranges from southern United States coasts to northern South America, where the two often live side by side but have never been known to interbreed.

are indistinguishable. Yet *ruber* and *albus* are classified as distinct species.

Mr. Bundy's idea was intriguing, and I urged him to go ahead with the plan after obtaining official approval. The Department of the Interior and the State of Florida had no objection, and authorities on Trinidad agreed to send him eggs from nests in their thriving Caroni Swamp rookery.

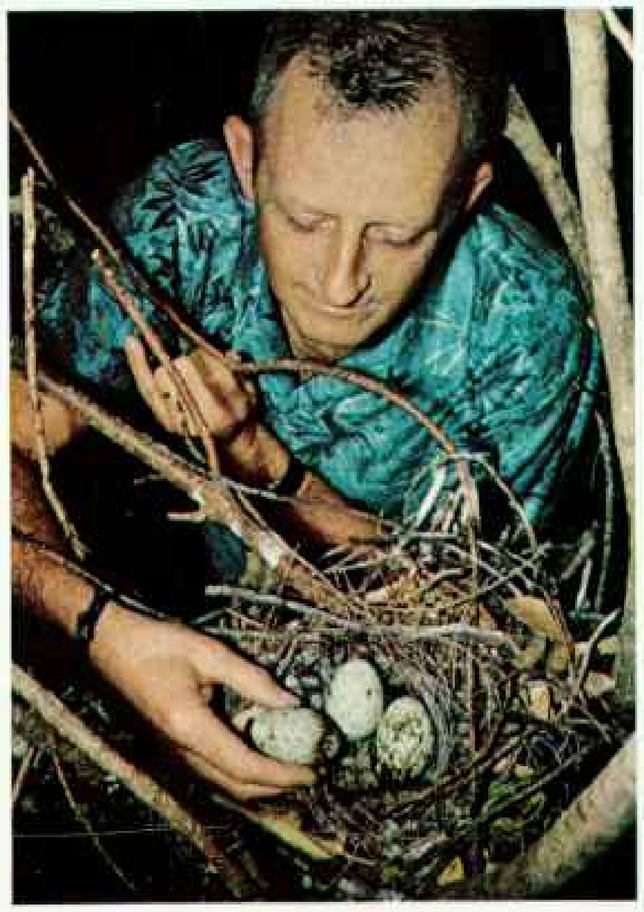
Several times I had pitched my bird blind in the midst of that Trinidad colony. Once, toward evening, a squadron of at least fifty gleaming red birds had swept down onto the mangrove thicket twenty yards away. Only the soft swish of wings had presaged their arrival, for although capable of low cooing, the scarlet ibis is one of the quietest of birds—no screeches or croaks, as when egrets or herons settle for the night.

Black-tipped pinions flashed as the blood-red birds maneuvered to perch on the mangroves. They were barely settled when a second group, numbering at least

No hint of future glory appears in a ten-day-old scarlet ibis at Caroni. The first red feathers will begin to show at nine months; full coloration at one year. In infancy, scarlet and white ibises look identical.

KODACHROMES BY PAUL A. DAHL © N.G.S.

First known cross-breeding of scarlet and white ibises in the wild produced these eggs in 1963. In the Greynolds Park rookery, North Miami Beach, Carter Bundy examines the results of a mating between a native white ibis and one of 17 scarlets hatched from eggs he obtained from Trinidad two years earlier.

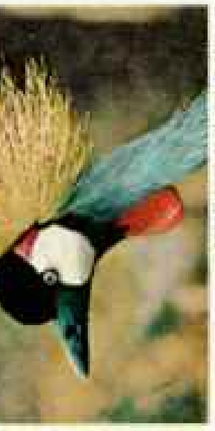


five hundred, came in just as quietly; another flock of equal size followed. They fluttered and sparred as landing space grew crowded. Branches sagged, causing groups to erupt here and there, like spurts from the surface of a lava lake. Soon the red multitudes covered the thicket as far as I could see.

Such birds, I felt, would indeed make a wonderful addition to the Florida scene.

Under the supervision of David Moore, then Conservator of Forests and Chief Game Warden of Trinidad, 24 scarlet ibis eggs were carefully removed from their nests, wrapped in cotton, and shipped to Carter Bundy in North Miami Beach. They arrived on July 5, 1961. With the aid of Laymond Hardy, a high school science teacher, Carter immediately substituted

to share in an exciting television visit to the "Winged World," TEAR OUT ATTACHED PAGE ▶



KODACHROME BY W. PHILIP KAHL, JR.

KODACHROME BY HEINZ SIELMANN

KODACHROMES BY FREDERICK KENT TRUSLOW (WILLOW) AND CONSTANCE WARREN

Explore the "Winged World"

FROM BACKYARD FRIENDS to exotic beauties, the fascinating story of birds unfolds in the latest of your Society's award-winning color television specials. Titled "Winged World," the hour-long documentary will be shown nation-wide by the Columbia Broadcasting System on Monday, December 11.

Remarkable sequences capture the behavior of birds in the wild. For one such episode, Heinz Sielmann crouched in a blind fifteen hours a day for three weeks. Cramped and weary, he finally emerged with motion pictures of the bizarre courtship ritual performed by the bowerbirds of Australia, which entice mates by building and decorating elaborate arbors.

With the globe-girdling Mr. Sielmann, you hunt the gables and steeples of a German village to learn about Europe's vanishing white storks. In Florida's Everglades, you watch a young anhinga juggle a stick with his rapier bill, as if practicing for the day he will flip and swallow the fish he catches.

Mr. Sielmann takes you to the remote Galapagos to witness tool use by one of Darwin's celebrated finches; you see it discard a twig and select a cactus spine to pry grubs from a limb. And you marvel at the balloonlike crimson glory of the frigate bird's distended throat sac, a courtship allurement.

With Jane and Hugo van Lawick-Goodall, you observe Egyptian vultures in Tanzania using tools. The creatures pick up stones in their beaks and hurl them at ostrich eggs, breaking the shells and feasting on the contents.

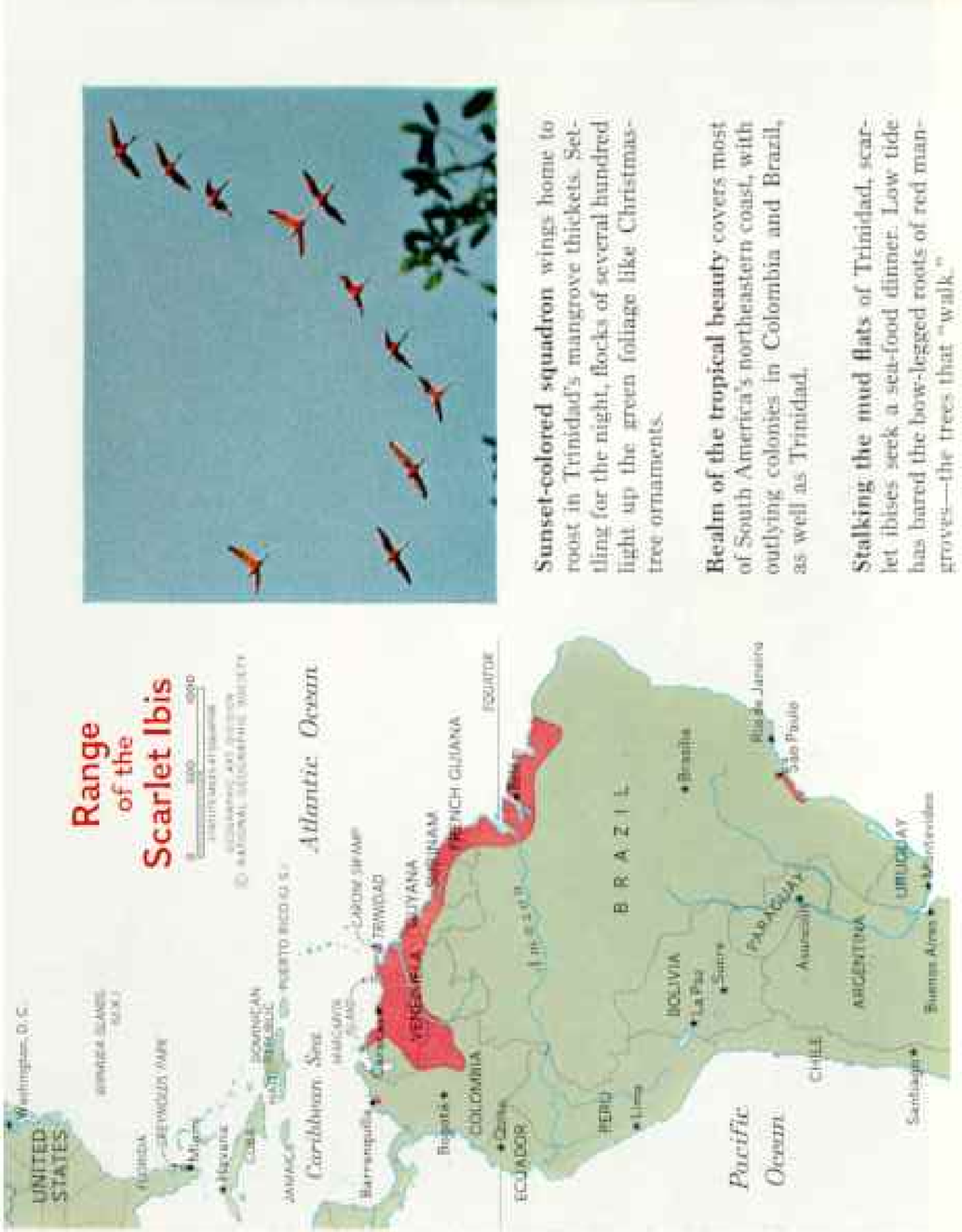
Slow-motion cameras will show you how wing feathers work in flight. You will explore the mysteries of migration, ponder the reptilian ancestors, learn the story of birds in all their intriguing variety.

Roger Tory Peterson, Peter Scott, Philip Kahl, Ronald Lockley, and other world-renowned naturalists contribute to the program, produced by your Society in association with David L. Wolper. Narrated by Alexander Scourby, it is sponsored by Encyclopaedia Britannica, Inc., and Aetna Life & Casualty.

Mixed bag of birds from earth's far corners rewards such camera-toting ornithologists as Heinz Sielmann (left). Bristling topknot of Africa's crowned crane resembles a Zulu headdress. Brilliantly iridescent, a fairy bluebird of Asia feeds her near-naked offspring; a Maine puffin holds a beakful of needlefish that droop like a sagging mustache. Stick by stick, a bowerbird of Australia builds an elaborate courtship arbor. A martial eagle of Africa clutches a bird dinner (left).

KODACHROME BY HEINZ SIELMANN

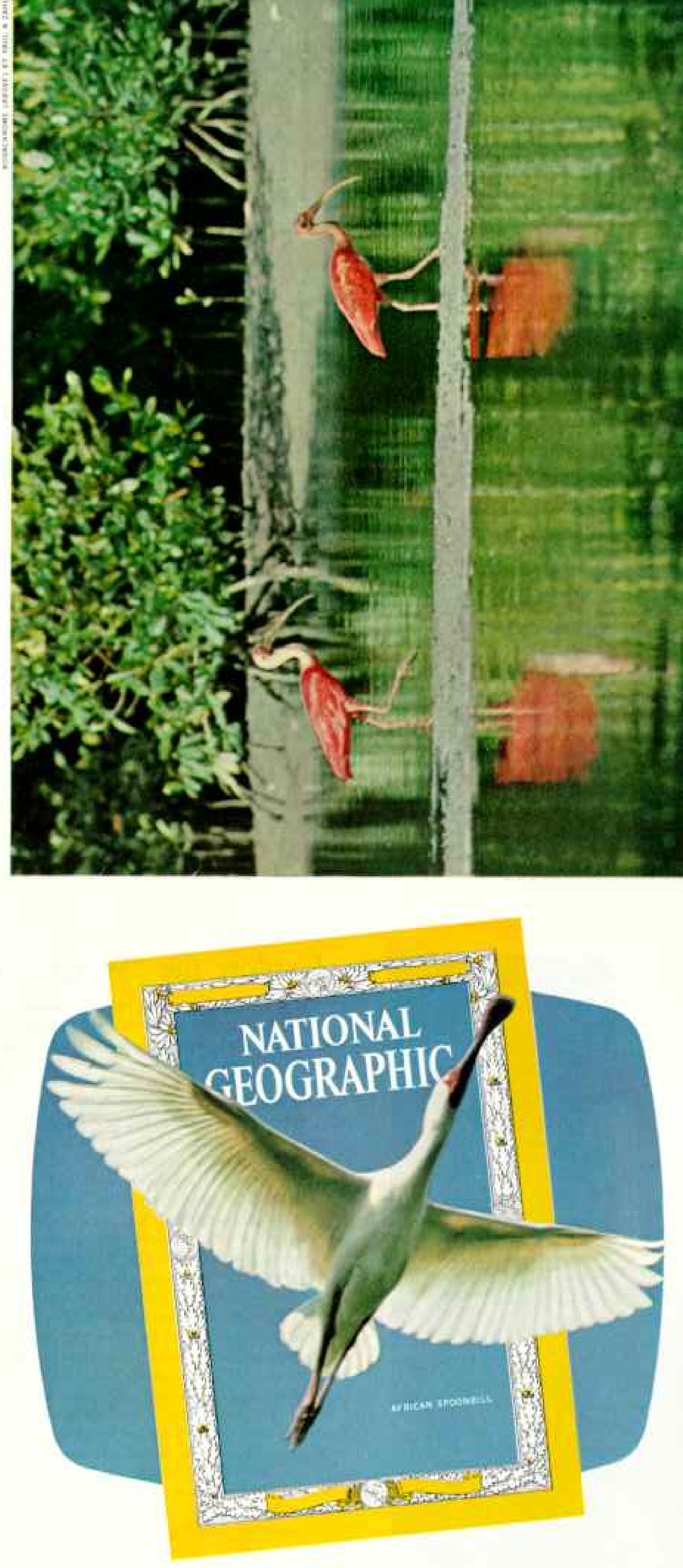
KODACHROMES BY W. PHILIP KAHL, JR. (BIRDS) AND DENNIS KANE © N.G.S.



Sunset-colored squadron wings home to roost in Trinidad's mangrove thickets. Settling for the night, flocks of several hundred light up the green foliage like Christmas-tree ornaments.

Realm of the tropical beauty covers most of South America's northeastern coast, with outlying colonies in Colombia and Brazil, as well as Trinidad.

Stalking the mud flats of Trinidad, scarlet ibises seek a sea-food dinner. Low tide has bared the bow-legged roots of red mangroves—the trees that "walk."



SEE IT ON TV MONDAY, DECEMBER 11

Winged World

them for an equal number resting in 11 white ibis nests in the Greynolds rookery.

The brooders seemed none the wiser, accepting the new eggs and tending them as their own. Within two weeks, 17 of the Trinidad eggs hatched, but the young showed no sign of their scarlet parentage. At this stage of life they wear the same gray plumage as white ibis nestlings. Still unsuspecting, the white foster parents took on full responsibility for feeding and care.

Youngsters Lost Amid Throng

As long as the young remained in their nests, they were easy to observe and identify from the lagoon shore. But when increasing size and agility enabled them to mingle with the rookery's scores of white ibis youngsters, Carter was unable to keep track of them, even with binoculars. He had considered leg banding for identification, but decided against it for fear of causing injury.

Now came a long and suspenseful wait, for Carter knew that the color would not appear until after the first full molt—about nine months after hatching.

Early one morning the following spring, his ingenuity and patience were rewarded. Sweeping the islands with his glasses, he saw a flash of red; bright against the green foliage stood an immature ibis with scarlet feathers on its upper body and wing coverts.

Later he saw others with changing plumage.

"It was thrilling to watch the metamorphosis," he told me. "By June four ibises had reached their magnificent scarlet color."

Which were male and which were female he had no way of knowing, for in ibises the sexes externally are alike.

Thirteen of the original 17 were missing, but sightings of strange scarlet birds in other parts of Florida and one in Texas that year indicated that more than four had survived.

During the next nesting season, 1963, two of these scarlets mated but hatched no young. Later, all four mated with white ibises. Nests were duly built, and eventually two scarlet-white pairs produced a total of three young. This crossing of scarlet and white struck us as most remarkable, and I visited Greynolds Park during this phase to confirm it by photography.

Park Superintendent Ollis R Smith gave me permission to erect a small burlap blind about twenty feet from one of the scarlet-white nesting sites. Thus concealed, I watched the scarlet member of the pair sitting there alone on her nest of coarse twigs. (I assumed it was "she," though of course it may have been "he.") She seemed wholly indifferent to the take-offs and landings, the squawks and bickerings of the scores of egrets and herons that nested nearby. Among them her plumage of tropical brilliance stood out in stunning contrast.

Suddenly I saw her rise and straddle the nest, revealing two brown-splotched eggs, each about the size of a pullet's. A handsome white ibis had just fluttered down into the foliage six or eight feet away and was striding toward the nest. The pinions of the scarlet bird flashed, and her head and beak nodded vigorously. Obviously the newcomer was the mate, arriving to take his turn in the nursery (page 881).

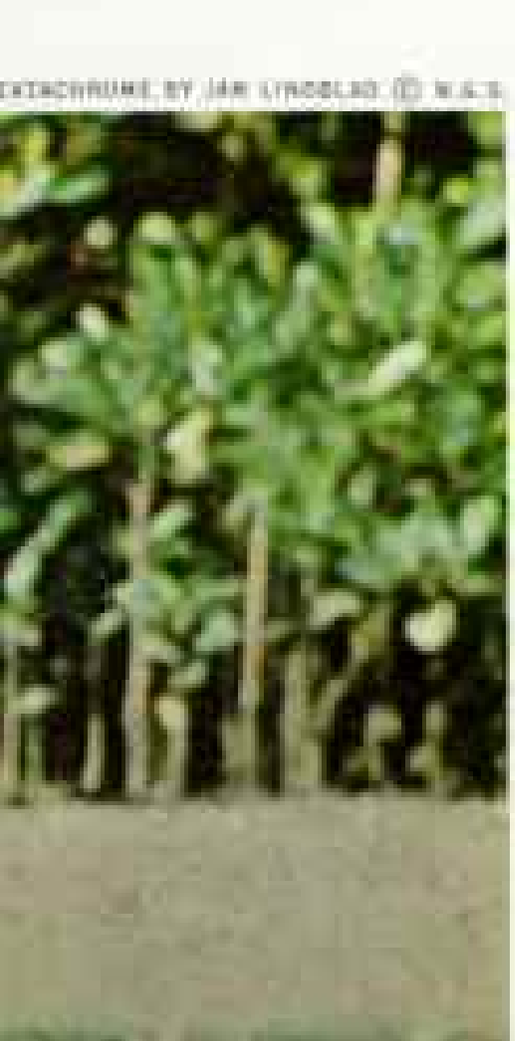
The two met with much touching and crossing of beaks. Then abruptly the red bird rose in flight, bound for distant food-bearing mangrove swamps. The white bird fussily nudged the eggs, then with dignity eased himself down on them.

Through the peepholes of my blind, I watched the brooder in his busy bird world. For almost two hours he remained virtually motionless, scarcely blinking. Then a flash of red in the foliage suddenly roused him. In over the half-bare branches strode his exotic scarlet mate. Again there was spirited beak play; then the white bird gracefully took off.

Hurricane Imperils Baby Birds

In the following year three nestings occurred, one involving paired scarlet birds, and two involving scarlet-white pairs. Only two young from these matings survived the summer, and they disappeared before it was possible to see what color they became.

In the summer of 1965 there were three scarlet-white matings and one scarlet-scarlet, with a total production of six young.



EXTACHROME BY JAN LINDBLAD © N.G.S.

EYECHROME BY OTIS IMBODEN © N.G.S.

Scarlet stranger in their midst: White ibises in the Greynolds Park rookery seem to draw no color line. Several have accepted scarlet mates, hatched from eggs brought from Trinidad in 1961 or from later matings in Florida of scarlet with scarlet.

AQUACHROMES BY PAUL A. ZAHL, © N.G.S.

White ibis and scarlet mate take turns incubating their eggs in the Florida park. The white father, or perhaps mother—sexes appear identical—snuggles on the nest (left). Then the scarlet takes over (right). Both share nest-building and feeding chores. Result? See next page.

Carter Bundy kept close watch over the hatchlings, but on September 7, 1965, Hurricane Betsy struck southern Florida. Winds of 40 and 50 miles an hour swept the rookery, and Carter, watching from his rain-drenched porch, saw in his glasses an empty nest which moments earlier had cradled two hatchlings from the scarlet-scarlet mating.

With the concern of a parent for threatened children, he splashed across the lagoon to the island. One baby bird was floundering in the wind-lashed water, the other struggling helplessly on the ground.

He carried the foundlings back to shore. For two days, as the storm abated, he fed them diced beef kidney. Then he returned them to their battered nest.

One parent flew in immediately, but the other never came back. The single parent managed to rear the two offspring all the way to the full-fledged stage.

One spring day in 1966, Carter Bundy stood on the shore of the lagoon, scanning the Greynolds rookery. During each of the previous nesting seasons he had made daily examinations, checking on how many scarlet birds built nests and, insofar as he could determine, how many progeny of previous matings developed scarlet plumage. But what he saw that day he could scarcely believe: There in the casuarina a *pink* ibis was building a nest with a white partner.

A few days later a richly salmon-colored bird, also mated to a white one, appeared in another part of the rookery.

The two were not immature; pink and salmon were their permanent adult colors.

Carter notified me immediately. "We've got color complications down here," he said.

Scarlet and white genes, it appeared, were working together to produce these intermediate hues.

Latest: Hybrid Mates With a White

Last summer Carter reported the successful mating of a hybrid bird (next page) with a white, the union producing two chicks—what color remains to be seen.

These developments may pose difficult questions. Is it correct to split ibis genus *Eudocimus* into two distinct species? Or is it possible that scarlets and whites are but color variants of a single species?

On this point we consulted Dr. Alexander Wetmore, Vice Chairman of the National Geographic Society's Committee for Research

KODACHROME BY CARTER BUNDY © N.G.S.

Red+white=pink! Offspring of a white and a scarlet, a salmon-pink surprise shares a buttonwood perch with cattle egrets at Greynolds Park. Mr. Bundy, who took the picture last summer, reported that this hybrid mated and two chicks resulted. He now has sighted a total of five ibises of subtly varied shades, from pale pink to rich salmon.

and Exploration and former Secretary of the Smithsonian Institution.

"Ability to produce hybrids," said this world-renowned ornithologist, "is only one element for judgment. When this occurs constantly where two types of birds are in contact, it may be definitive. But hybrid offspring in the wild, produced casually between species obviously distinct, are a multitude and of many kinds. For example, they are common among various surface-feeding ducks, and are known between such diverse species as the white-throated sparrow and the junco. Dozens of other examples equally strange have been recorded.

"With the ibises," Dr. Wetmore continued, "it must be recognized that in their South American rookeries where both are found nesting in company, no crossing has been reported. They act thus as distinct species regardless of their physical similarity.

"In zoos there has been cross-mating between white and scarlet ibises, and a few other apparent hybrids are known. The situation at Greynolds rookery is unique in the wild, but this, too, is an artificial, man-created situation. The scarlet chicks, conditioned by the care of white foster parents, find opportunity when adult only for chance mating with one of their small number, but with abundant choice among white partners. It will be interesting to observe whether scarlet and white birds, and their variously hued descendants, continue to exist side by side, and whether the red character in the offspring persists or is finally submerged in the more abundant white."

To the redoubtable Carter Bundy, the question of whether scarlet and white are one species or two is of interest, but only academically. What he wants is to see the glorious scarlet bird firmly established in Florida.

Needed: More Scarlet Ibis Eggs

If a visitor is lucky this winter, he may see a scarlet ibis or two—indescribably beautiful against the blue sky of the Sunshine State.

"But such a sight is all too rare," the man who started it all points out.

"Scarlets appear to prefer scarlet mates; two found each other last spring at Greynolds Park and raised young. But if no scarlets are available they'll settle for whites.

"What we need is a few dozen more scarlet ibis eggs from one of the large South American rookeries. Then we will have enough scarlets so that they will mate with each other, breed true, and give our land a new and enduring touch of bright, tropical beauty."

Singlehanded, Carter Bundy intends to try.

NATIONAL GEOGRAPHIC SOCIETY

WASHINGTON, D. C.

Organized "for the increase and diffusion of geographic knowledge"

GILBERT HOVEY GROSVENOR
President, 1920–1954; Editor, 1899–1939
Chairman of the Board, 1954–1966

THE NATIONAL GEOGRAPHIC SOCIETY is chartered in Washington, D. C., in accordance with the laws of the United States, as a nonprofit scientific and educational organization for increasing and diffusing geographic knowledge and promoting research and exploration. Since 1890 the Society has supported 407 explorations and research projects, adding immeasurably to man's knowledge of earth, sea, and sky. It diffuses this knowledge through its monthly journal, NATIONAL GEOGRAPHIC; more than 36 million maps distributed each year; its books, globes, and atlases; 30 School Bulletins a year in color; information services to press, radio, and television; technical monographs; timely exhibits from around the world in Explorers Hall; and a nationwide series of programs on television.

Articles and photographs of travel, natural history, and expeditions to far places are desired. For material used, generous remuneration is made.

MELVIN M. PAYNE, President
FREDERICK G. VOSBURGH, Vice President and Editor
ROBERT V. FLEMING, Vice President and Treasurer
LEONARD CARMICHAEL, Vice President for Research and Exploration
ROBERT E. DOYLE, Vice President and Secretary
THOMAS M. BEERS, Vice President and Associate Secretary
GILBERT M. GROSVENOR, Vice President and Associate Editor
OWEN R. ANDERSON, HERMAN J. A. C. ARENS, WILLIAM T. BELL,
HERBERT T. HENDERSON, W. EDWARD ROSCHER,
C. VERNON SANDERS, Associate Secretaries
HILLEARY F. HOSKINSON, Deputy Treasurer and Assistant Secretary

BOARD OF TRUSTEES

MELVILLE BELL GROSVENOR
Chairman of the Board and Editor-in-Chief
THOMAS W. McKNEW, Advisory Chairman of the Board

LEONARD CARMICHAEL, Former Secretary, Smithsonian Institution
LEO OTIS COLBERT, Rear Admiral, U. S. Coast and Geodetic Survey (Ret.)
ROBERT V. FLEMING, Advisory Chairman of the Board and Chairman, Executive Committee, Riggs National Bank
CRAWFORD H. GREENEWALT, Chairman of the Board, E. I. du Pont de Nemours & Company
GILBERT M. GROSVENOR, Associate Editor, National Geographic
ARTHUR B. HANSON, General Counsel, National Geographic Society
CARYL P. HASKINS, President, Carnegie Institution of Washington
EMORY S. LAND, Vice Admiral, U. S. Navy (Ret.), Former President, Air Transport Association
CURTIS E. LeMAY, Former Chief of Staff, U. S. Air Force
H. RANDOLPH MADDOX, Vice President, American Telephone & Telegraph Company (Ret.)
WM. McCHESNEY MARTIN, JR., Chairman, Board of Governors, Federal Reserve System
BENJAMIN M. McKELWAY, Editorial Chairman, Washington *Star*
MELVIN M. PAYNE, President, National Geographic Society
LAURANCE S. ROCKEFELLER, President, Rockefeller Brothers Fund
JUAN T. TRIPPE, Chairman of the Board, Pan American World Airways
FREDERICK G. VOSBURGH, Editor, National Geographic
JAMES H. WAKELIN, JR., Former Assistant Secretary of the Navy
EARL WARREN, Chief Justice of the United States
JAMES E. WEBB, Administrator, National Aeronautics and Space Administration
ALEXANDER WETMORE, Research Associate, Smithsonian Institution
LLOYD B. WILSON (Emeritus), Honorary Board Chairman, Chesapeake & Potomac Telephone Company
CONRAD L. WIRTH, Former Director, National Park Service
LOUIS B. WRIGHT, Director, Folger Shakespeare Library

COMMITTEE FOR RESEARCH AND EXPLORATION

LEONARD CARMICHAEL, Chairman
ALEXANDER WETMORE and MELVIN M. PAYNE, Vice Chairmen
LEO OTIS COLBERT, CARYL P. HASKINS, A. REMINGTON KELLOGG, Research Associate, Smithsonian Institution, EMORY S. LAND, T. DALE STEWART, Senior Scientist, Office of Anthropology, Smithsonian Institution, MATTHEW W. STIRLING, Research Associate, Smithsonian Institution, JAMES H. WAKELIN, JR., CONRAD L. WIRTH, PAUL A. ZAHL, and the senior officers of the Society; BARRY C. BISHOP, Secretary (on leave); EDWIN W. SNIDER, Acting Secretary

Assistant Secretaries: CHARLES P. BIXEL, FRANK S. DELK, JOSEPH B. HOGAN, RAYMOND T. McELLIGOTT, JR.
Assistant Treasurer: WILLIAM H. McCAULEY

Leonard J. Grant, Editorial Assistant to the President; Edwin W. Snider, Richard E. Pearson, Administrative Assistants to the President; Judith N. Dixon, Administrative Assistant to the Chairman and Editor-in-Chief; Lenore W. Kessler, Secretary to the Advisory Chairman of the Board

SECRETARY'S STAFF: *Administrative:* Earl Corliss, Jr., Ward S. Phelps. *Accounting:* Jay H. Givans, George F. Fogle, Alfred J. Hayre, William G. McGhee, Martha Allen Baggett. *Statistics:* Everett C. Brown, Thomas M. Kent. *Retirement:* Mary Whitmore (Assistant Supervisor). *Payroll:* Dorothy Dameron (Assistant Supervisor). *Personnel:* J. P. M. Johnson, Robert G. Corey, Sheila H. Immel, Margaret A. Shearer. *Membership Research:* Charles T. Kneeland. *Membership Fulfillment:* Roy J. Klockenbrink. *Member Relations:* Paul F. Moise. *Computer Center:* John Goedel. *Secretary's Files:* Mozelle L. Downs. *Promotion:* Stan Jennings, E. M. Pusey, Jr., Gordon Young, Phyllis Greene, Robert J. Warfel. *Personal:* James B. Mahon, Adrian L. Loftin, Jr., Nellie E. Sinclair. *Medical:* Thomas L. Hartman, M. D. *Explorers Hall:* T. Keilor Bentley (Curator-Director)

COVER: Wayfarers on a dusty road in Samaria follow the footsteps of Jesus across the Holy Land (page 739).
EXPLORERS HALL, WASHINGTON, D. C.

NATIONAL GEOGRAPHIC MAGAZINE

MELVILLE BELL GROSVENOR
Editor-in-Chief and Board Chairman
MELVIN M. PAYNE
President of the Society

FREDERICK G. VOSBURGH, *Editor*
GILBERT M. GROSVENOR, FRANC SHOR, *Associate Editors*

Senior Assistant Editors: Allan C. Fisher, Jr., John Scofield
Assistant Editors: Andrew H. Brown, James Cerruti, Robert L. Conly, W. E. Garrett, Edward J. Linehan, Kenneth MacLeish (Foreign Staff), Carolyn Bennett Patterson, Howell Walker, Kenneth F. Weaver
Senior Editorial Staff: Lonnelle Aikman, Jules B. Billard, William Graves, Stuart E. Jones, Robert P. Jordan, Joseph Judge, Nathaniel T. Kenney, Howard La Fay, Samuel W. Matthews, Bart McDowell; Senior Natural Scientist: Paul A. Zahl
Foreign Editorial Staff: Luis Marden (Chief); W. Robert Moore (Emeritus), Thomas J. Abercrombie, David S. Boyer, Helen and Frank Schreider, Volkmar Wentzel
Editorial Staff: Wayne Barrett, Thomas Y. Canby, Louis de la Haba, Rowe Findley, Werner Janney, Jay Johnston, Elizabeth A. Moise, Ethel A. Starbird, O. Mac White, Peter T. White
Editorial Layout: Howard E. Paine (Chief); Charles C. Uhl, John M. Lavery
Geographic Art: William Palmstrom (Chief). *Production:* Gilbert H. Emerson. *Artists:* Lisa Biganzoli, Victor J. Kelley, John W. Lothers, Robert C. Magis, Robert W. Nicholson, Isaac Ortiz. *Research:* George W. Beatty, Walter Q. Crowe, John D. Garst, Jean B. McConville, Dorothy A. Nicholson, Eugene M. Scheel, John P. Wood. *Administrative Assistant:* Mary L. Barnes
Editorial Research: Margaret G. Bledsoe (Chief), Ann K. Wendt (Assistant Chief), Edith C. Berg, Elisabeth J. Chappell, Leslie L. Dinsmore, Margery G. Dunn, Jan Holderness, Levenia Lisle, Frances H. Parker, Patricia Rosenberg, Elizabeth C. Wagner
Geographic Research: George Crossette (Chief), Newton V. Blakeslee (Assistant Chief), Leon J. Canova, Margaret Ladd, Virginia A. LeVasseur, John A. Weeks
Photographs: Robert C. Ellis, Jr. (Chief), John McConnell (Assistant Chief), Elizabeth L. Dooley
Library: Virginia Career Hills (Librarian), Margery K. Barkdull (Assistant Librarian), Melba Barnes, Vera Cassilly, Katharine P. O'Donnell, Louise A. Robinson, Esther Ann Manion (Librarian Emeritus)
Administration: Betty T. Sanborne, Administrative Assistant to the Editor; Harriet Carey, Virginia H. Finnegan, Alice J. Hall, Winifred M. Myers, Shirley Neff (Editorial Assistants); Dorothy M. Corson (Indexes); Rosalie K. Millard, Jeanne S. Dunker (Files); Evelyn Fox (Transportation)

ILLUSTRATIONS STAFF: *Illustrations Editor:* Herbert S. Wilburn, Jr. *Associate Illustrations Editor:* Thomas R. Smith. *Art Editor:* Andrew Poggenpohl. *Assistant Illustrations Editors:* Mary S. Griswold, O. Louis Mazzatenta, Charles Allmon (Incoming Photographs). *Layout and Production:* Arthur A. Terry. *Senior Picture Editors:* Bryan Hodgson, Robert S. Patton. *Picture Editors:* Charlene L. Murphy, Jon T. Schneeberger. *Librarian:* Alan J. Lessig. Barbara A. Shattuck (Assistant)
Artists: Walter A. Weber (Naturalist), Peter V. Bianchi
Engraving and Printing: Dee J. Aiello (Chief); Joe M. Barlett, Frank S. Oliverio, William W. Smith, James R. Whitney

PHOTOGRAPHIC STAFF: *Director of Photography:* Robert E. Gilka. *Assistant Directors:* B. Anthony Stewart, Dean Conger. *Film Review:* Albert Moldvay (Chief); Guy W. Starling (Assistant Chief). *Pictorial Research:* Walter Meayers Edwards (Chief). *Photographers:* James P. Blair, Bruce Dale, John E. Fletcher, Otis Imboden, Barry Littlebales, George F. Mobley, Winfield Parks, Joseph J. Scherschel, Robert F. Sisson
Photographic Laboratory: Edwin L. Wisherd (Chief); Milton A. Ford, Donald McBain, Robert S. Oakes, Claude E. Petrone, Carl M. Shrader

RELATED EDUCATIONAL SERVICES OF THE SOCIETY
Cartography—Maps, atlases, and globes: Chief Cartographer: William Chamberlin. *Associate Chief Cartographer:* Athos D. Graziani. *Assistant Chief:* William T. Peele. *Base Compilation:* Charles L. Stern (Supervisor), James W. Killion. *Name Compilation:* Donald A. Jaeger (Supervisor), Manuela G. Kogutowicz, George E. Stuart. *Map Drawing:* Douglas A. Strobel (Supervisor), Robert W. Northrop, Thomas A. Wall. *Map Editing:* Ted Dachtera (Supervisor), Russell G. Fritz, Richard K. Rogers, Thomas A. Walsh. *Projections:* David W. Cook. *Layout and Design:* John F. Dorr, Harry C. Siddley. *Revision:* Richard J. Darley. *Administrative Assistant:* Catherine M. Hart
Books: Merle Severy (Chief); Edwards Park (Associate Chief); Seymour L. Fishbein (Assistant Chief), Thomas B. Allen, Ross Bennett, Charles O. Hyman, James P. Kelly, Anne Dirkes Kobor, Patricia Goode Nicholson, John J. Putman, Jerry L. Reece, Jr., David F. Robinson
Special Publications: Robert L. Breeden (Chief); Donald J. Crump (Assistant Chief), Bruce Brander, Johanna G. Farren, Mary Ann Harrell, Geraldine Linder
School Service: Ralph Gray (Chief); Arthur P. Miller, Jr. (Assistant Chief), Kay Ross, Charles H. Sloan, Jana Knudsen Wiese
News Service: Windsor P. Booth (Chief); Matt C. McDade (Assistant Chief), Edward Cornish, Donald J. Frederick, Sabra Robbins, Paul Sampson; Isabel Clarke (Assistant)
Television: Robert C. Doyle (Chief); Dennis B. Kane (Assistant Chief), David Cooper; Patricia F. Northrop (Administrative Assistant)
Lectures: Joanne M. Hess (Chief); Robert G. Fleegal, Mary W. McKinney

EUROPEAN OFFICES: W. Edward Roscher (Associate Secretary and Director), 11 Stanhope Gate, Mayfair, London, W. 1, England; Jacques Ostier, 6 rue des Petits-Pères, 75-Paris 2e, France

ADVERTISING: *Director:* Harley L. McDevitt, 630 Fifth Ave., New York, N.Y. 10020. *Managers—National:* William A. Boggs, Jr.; *Eastern:* Joseph T. Feeney; *Assistant Eastern:* John B. Weist, New York. *Midwestern*—William Turgeon, Chicago. *Los Angeles:* Jack V. Sheehan. *San Francisco*—Thomas Martz. *Automotive:* John F. Grant, New York. *Travel:* Robert W. Horan, New York

How to rent a mule in the Grand Canyon, live on a working cattle ranch, and take home a piece of the Petrified Forest without getting arrested.

Too many people plan a trip to Arizona without really knowing anything about Arizona.

And we think it's a shame.

So we've put together a special Arizona kit—loaded with all sorts of information to help you get the most out of a vacation there.

We'll tell you what it costs to eat, sleep and tour everyplace from Tombstone to the Hopi Indian Reservation.

And how to golf your way across Arizona, starting with the 37 courses in Phoenix. (And the weather you can expect for it: 67-70°, 30% humidity.)

And how to see the Grand Canyon by mule, horse, bicycle and airplane.

And where to stay at if you want to spend your vacation lying by a pool without moving a muscle.

Plus all sorts of tidbits like where to find the ghost town with people still living in it, how to have dinner overlooking the Grand Canyon, and why *not* to buy the rug off an Indian's back (chances are he bought it from Sears).

Along with our Arizona kit (which is only $1, by the way), we'll also send you $40 worth of discount coupons for things like the Arizona-Sonora Desert Museum, the Phoenix Zoo, Meteor Crater, and so forth.

All you have to do is send us the coupon below.

And any Travel Agent will be happy to handle all the details.

American Airlines
Travel Planning Department
633 Third Avenue, New York, N.Y. 10017

Gentlemen:
Here's my dollar. Send my Arizona kit (which includes Arthur Frommer's Dollar-Wise Guide, "Plane and Fancy" handbook for the girls and Arizona "encyclopedia") to:

Name_____

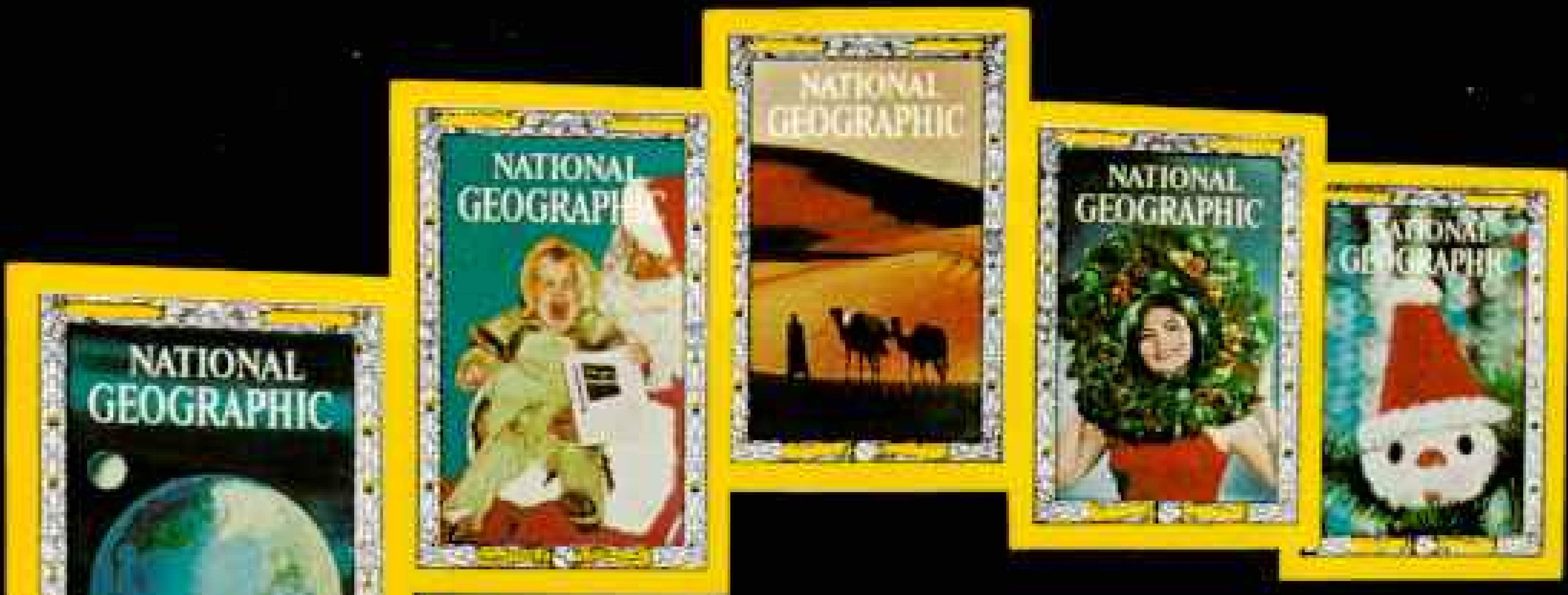
Address_____

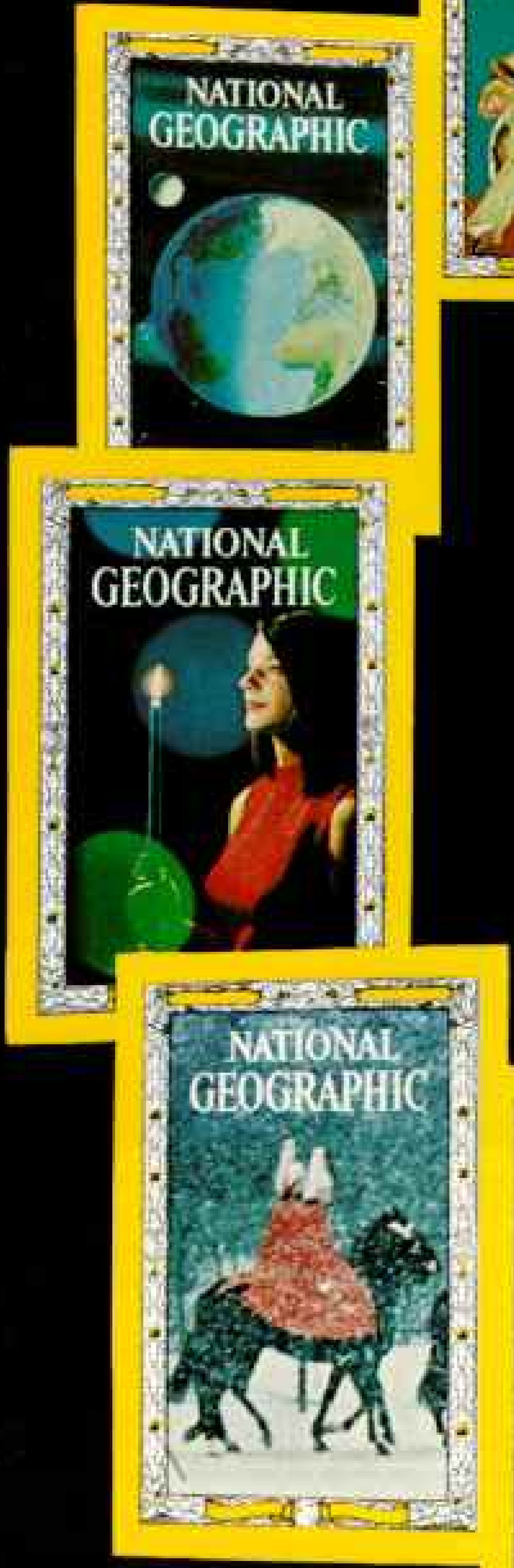
City_____ State_____ Zip_____

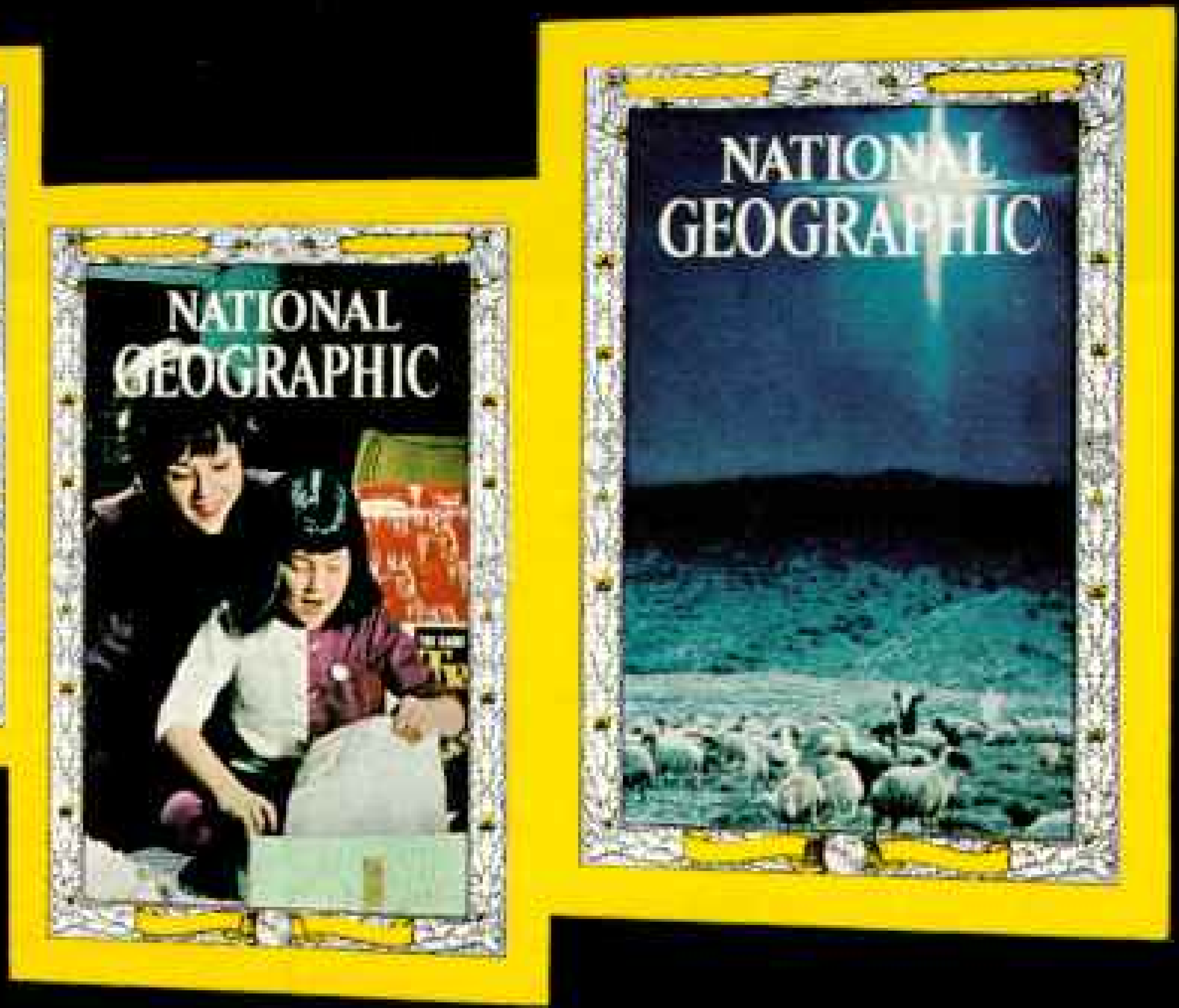
(Please allow 20 days for delivery) NG-12

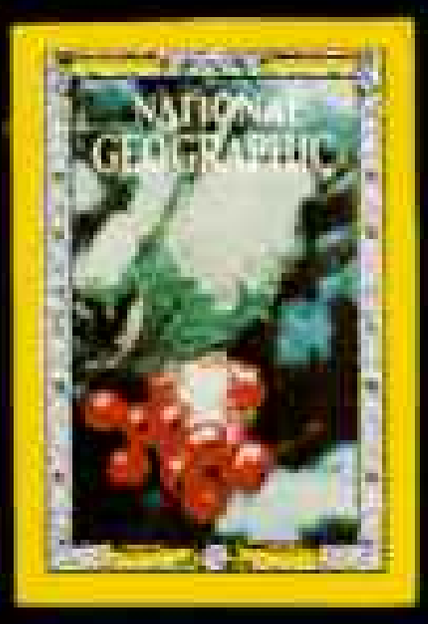
American Airlines

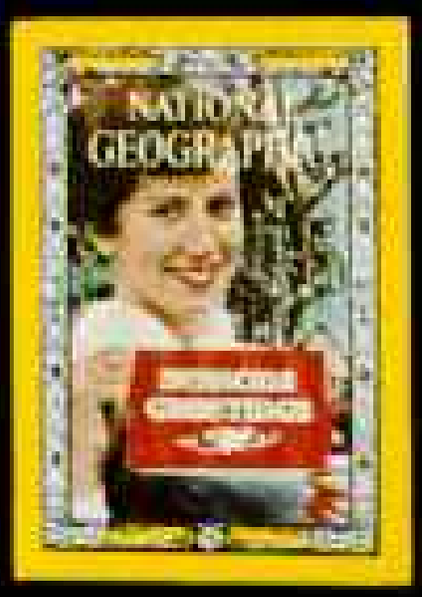
The airline built for professional travellers. (You'll love it.)

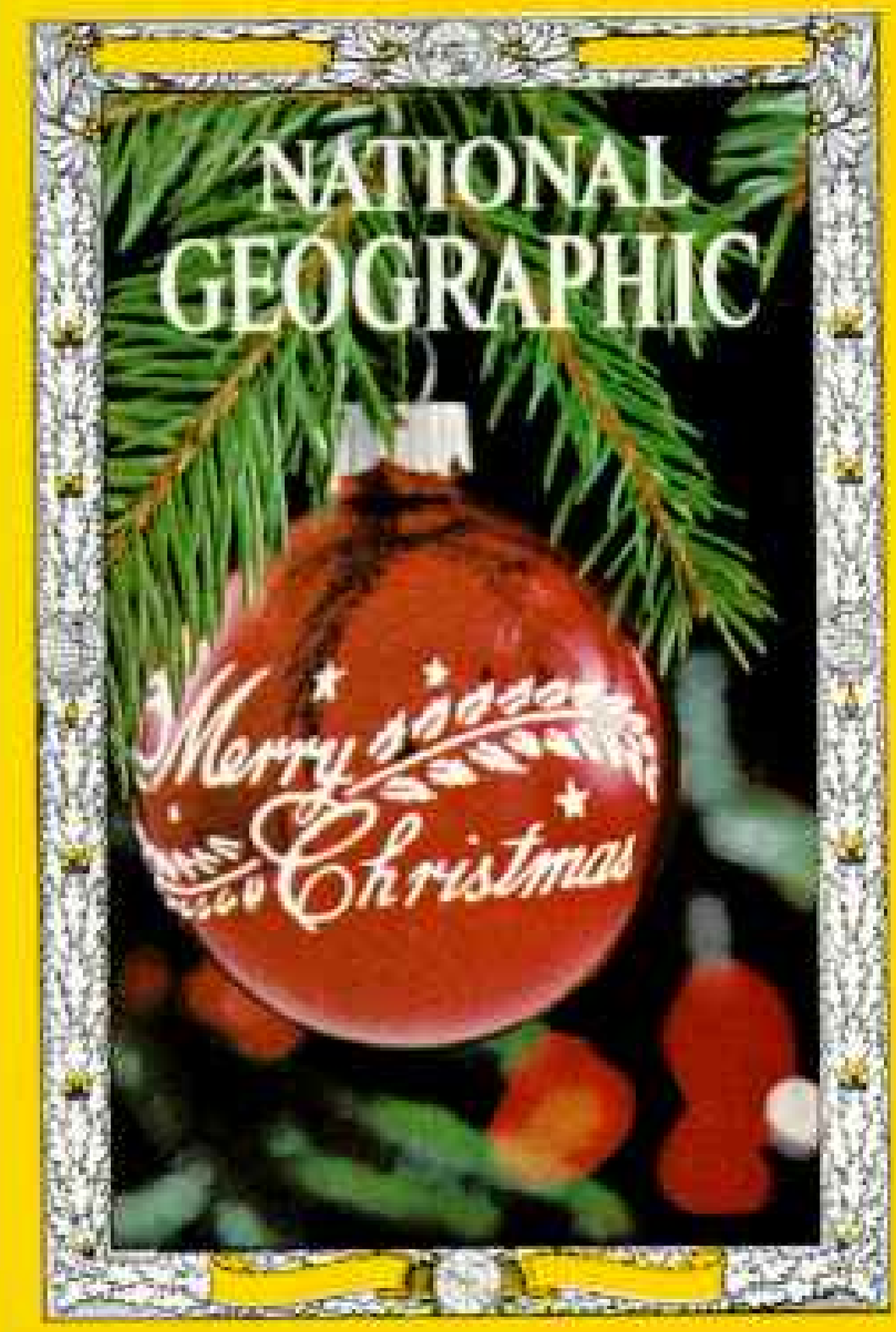












PLEASE ENROLL THE FOLLOWING PERSONS FOR MEMBERSHIP IN THE NATIONAL GEOGRAPHIC SOCIETY AS CHRISTMAS GIFTS FROM ME

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

STREET

CITY, STATE, ZIP CODE

Send gift card signed:

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

STREET

CITY, STATE, ZIP CODE

Send gift card signed:

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

STREET

CITY, STATE, ZIP CODE

Send gift card signed:

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

STREET

CITY, STATE, ZIP CODE

Send gift card signed:

$6.50 MEMBERSHIP DUES FOR 1968 CALENDAR YEAR INCLUDE SUBSCRIPTION TO NATIONAL GEOGRAPHIC.

ANNUAL DUES in the United States and throughout the world are $6.50 U.S. funds or equivalent. To compensate for international postage and exchange differentials, please remit: for Canada, $7.50 Canadian funds ($7 U.S. acceptable); for all other countries, $8 U.S. funds or equivalent. 80% of dues is designated for subscription to the magazine.

Life membership for U.S. and its outlying areas, $200 U.S. funds or equivalent; for Canada, $216 Canadian funds ($200 U.S. acceptable); for all other countries, $250 U.S. funds or equivalent. Remittances should be sent direct to National Geographic Society.

12-67

mail to: THE SECRETARY
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C. 20036

MY NAME:

PLEASE PRINT (MR., MRS., MISS)

STREET

CITY, STATE, ZIP CODE

Total remittance enclosed $

Bah. Humbug. I wouldn't give a movie camera to anybody because they're so confounded big and complicated and expensive.

Kodak has changed all that.

It fits right in your palm.

Old Scrooge there has a right to be afraid to give a movie camera—the old kind.

But Kodak has a brand-new wonderful kind of super 8 movie camera. As a gift, all it lacks is the wrapping paper.

It loads instantly.

The lucky person you give it to just slips a Kodachrome film cartridge in. That's all. He never has to thread, wind or flip film. He's ready to shoot a full 50 feet of super 8 color movies. Movies clearer and brighter than ever.

You'll enjoy giving this camera because you'll make somebody happy without having to spend much. The Kodak Instamatic M12 movie camera is less than $30. In a complete outfit (right), with Kodachrome film and batteries, it's less than $35.

Then there's the M18 with a zoom lens for wide-angle to telephoto shots, a CdS electric eye that sets the lens opening automatically and a detachable pistol grip. It's less than $80. In outfit, less than $85.

Because super 8 movies call for a super 8 projector, Kodak offers a choice there, too. So see your Kodak dealer. And don't be surprised if Scrooge is already there.

Kodak

Prices subject to change without notice.

Kodak Instamatic® movie cameras. From less than $30.

Big Ben's family name is Westclox.

When you talk about the weather, his Weather-Mates will give you something to talk about.

These new Westclox Weather-Mates make the weather a fascinating subject. Weather-Mates are beautifully designed home weather stations. With a Weather-Mate you can stay one up on the humidity, temperature, barometric pressure, and the conversation! So start talking about the weather...really talking about the weather with a Westclox Weather-Mate. Available at most jewelry, hardware, drug and department stores.

A. Gemini: thermometer, hygrometer, and barometer, $27.95*.

B. Capricorn: matching No-Cord clock and Weather Station, $29.95* each.

C. Taurus: thermometer, hygrometer, No-Cord clock, $40.00*.

D. Comfort Meter: thermometer and hygrometer, $9.98*.

E. Comfort Alarm: No-Cord clock, thermometer, and hygrometer, $27.50* and $25.00*

Hygrometers operate upon the extremely accurate nylon filament principle usually only found in the most expensive weather instruments. No-Cord clocks operate up to one year on a standard "C" battery.

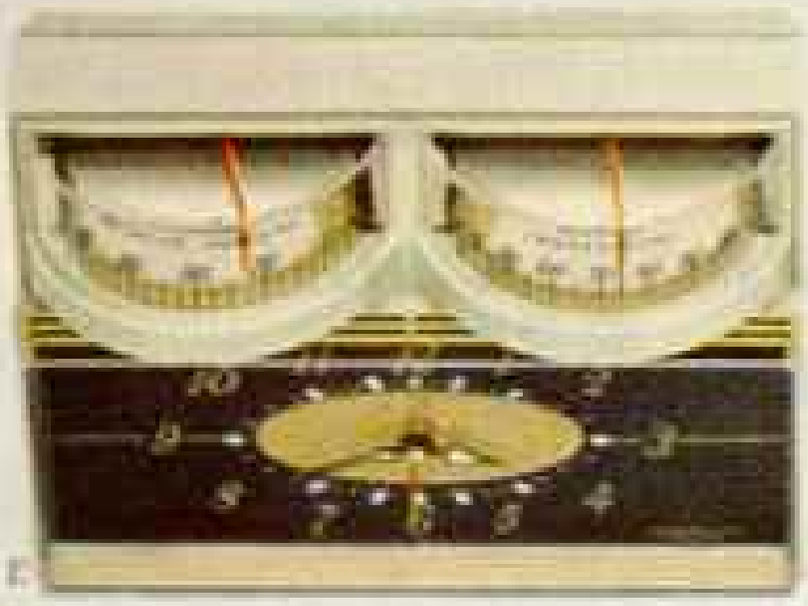
*Suggested retail price.

WESTCLOX
GENERAL TIME

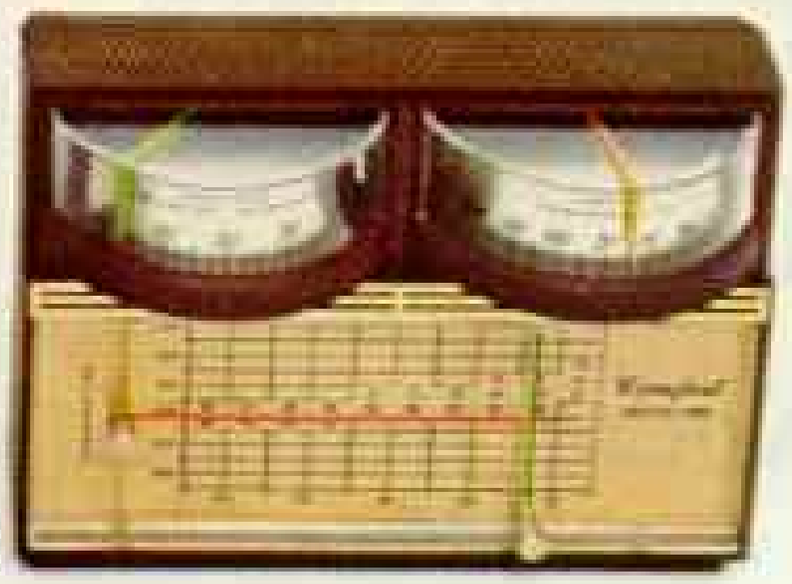
A

B

C



E



D

The color portable for people who are still nervous about color.

We know how you feel.

You finally get up the nerve to consider color, and we tell you not only to buy color—but portable color.

We have good reasons. We make the finest color portable around, and we can prove it.

For example, our portable is right up there with the heaviest. But every ounce means something. We have 63 Solid State devices. We use them instead of a lot of tubes that cause you problems.

Panasonic also has something called fourth IF stage...a mumbo-jumbo term that just means our set has more detail and clarity.

There's an extra circuit to keep planes, cars, razors and other things from bugging you. Even a gizmo that tells you when color is being broadcast.

Plus automatic degaussing to get rid of magnetic distortion that messes up your picture.

It's called the Buckingham, model CT-61P, and it's quite a set.

You won't be able to lift it with your pinky, but you can lug it around pretty easily and when you put it down, you'll see the kind of color that will calm your nerves for good.

PANASONIC
300 PARK AVENUE, NEW YORK 10017

Picture simulated.

The Out Island of Grand Bahama. No passport. No visa.

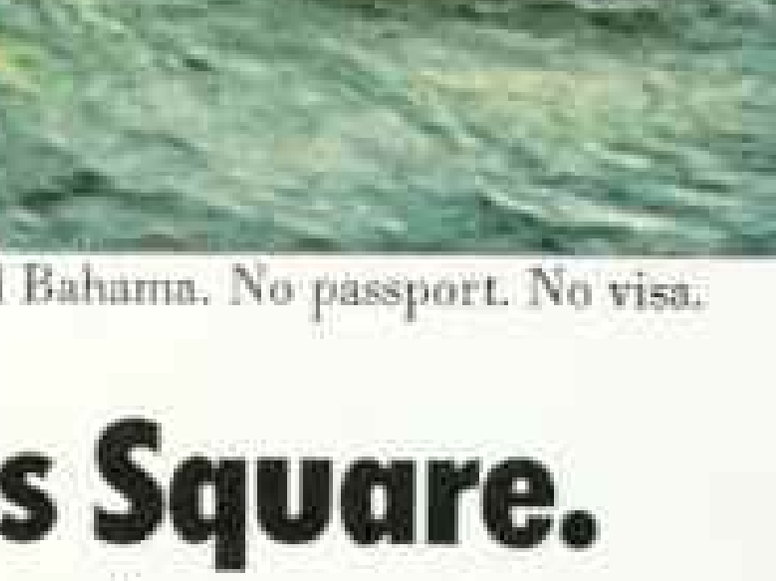
Just 2½ hours from Times Square.

An inexpensive plane ticket buys you a hot wind in your face.
A cool blue ocean at your feet. Nobody breathing down your neck.
And a chance to think things over.

Hurry hurry hurry.
The world is fast running out of islands like this.

Bahama Out Islands

700 of them. So near. And yet so far.



THIS CHRISTMAS, GIVE KREMENTZ JEWELRY . . . the classically beautiful jewelry that combines imaginative design with superb craftsmanship. With its heavy OVERLAY OF 14KT. GOLD, this finer jewelry has much of the permanence and all of the rich beauty of solid Karat gold.

And think of Krementz Jewelry, too, for Birthdays . . . for the Wedding Attendants . . . or as a gift to yourself.

Left, reading down: Forget-me-not: Earrings $13 Necklace $15 Earrings $17.50 Hat Brooch $17.50 Oval Brooch $16.50 Circle Brooch $15
Center: Ivory Rose Earrings $13.50 Earrings $12.50 Necklace $9 Circle Brooch $16 Bracelet $37 Brooch $22
Right: Pink Rose motif: Earrings $14 Brooch $12.50 Earrings $12.50 Circle Brooch $17.50

The small earrings are 14Kt. gold for pierced ears

Each article in five leatherette gift case
Wherever fine jewelry is sold

Krementz

Cuff Links $9 to $33
Tie Holders $6 to $16.50
Tie Tacks $4.50 to $12

Write for free illustrated booklet
Krementz & Co.
47 Chestnut Street
Newark, New Jersey 07101

1866 • 101 YEARS OF FINE JEWELRY • 1967

General Motors is people making better products for people.

Ben Bouier makes his mark of excellence with a brush.

Ben Bouier came to General Motors 13 years ago. As a janitor. He was soon a machine operator. He went to night school. Took electronics, engineering and drafting courses. Today, he's a Graphic Illustrator at GM. His job: Helping set up the quality control standards of excellence followed by GM car divisions everywhere.

Ben Bouier is only one of many highly-skilled, self-made men who have made their mark at GM by making the pursuit of perfection a way of life.

It's one of many good reasons why you will always find the Mark of Excellence on every Chevrolet, Pontiac, Oldsmobile, Buick and Cadillac car.

Benjamin H. Bouier, Jr., GM Manufacturing Development Staff, Warren, Michigan.

GM

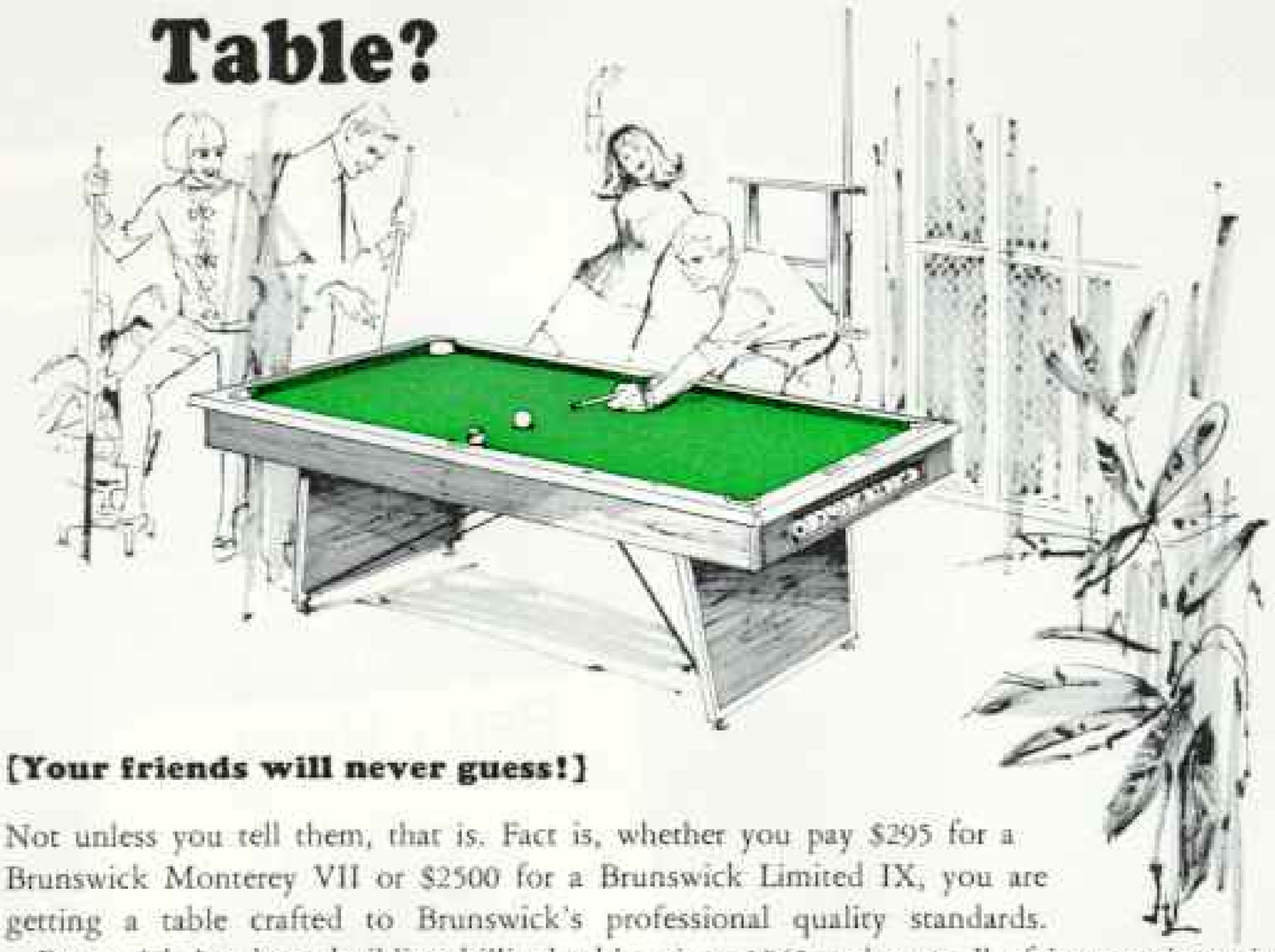
MARK OF EXCELLENCE

UNDERCOVER CAMERA.

It's a different point of view.
A different Super 8 movie camera
that only Bell & Howell could create.
A Bell & Howell breakthrough
in optical miniaturization, developed
through years of experience in
space technology, made it all possible.
The computer-designed zoom lens
system in our new Super 8 is so compact,
so precise, it's built-in. Sheltered.
Undercover. Until the action starts.
Then you'll get perfect pictures every time,
because Bell & Howell's exclusive Optronic Eye®
automatic exposure system is behind the lens.
It sees only the light the film sees,
so it can't make a mistake, even when you zoom
from brightest sun to dimmest shade.
Fingertip zoom control
lets you zoom
from wide angles
to dramatic telephoto
closeups.
The crisp f1.9 lens
system captures every
move, every shade of color.
And you can go into slow motion
instantly. Even in the middle
of shooting a scene.
All you do is drop in a Super 8
cartridge and shoot.
Electric film drive eliminates
winding. And there's a
fold-away grip for rock-steady movjes.
The new Bell & Howell Super 8.
A new, undercover look in movie cameras.
Only Bell & Howell could have created it,
so there's only one place where you can find it.
Where they carry Bell & Howell.

BELL & HOWELL

Only $295 for a Brunswick Home Billiard Table?



[Your friends will never guess!]

Not unless you tell them, that is. Fact is, whether you pay $295 for a Brunswick Monterey VII or $2500 for a Brunswick Limited IX, you are getting a table crafted to Brunswick's professional quality standards.

Brunswick has been building billiard tables since 1845 and puts all of its experience into every table made. This includes cushions made of live rubber that rebound the way they should, and beds that are (and stay) absolutely flat whether made of slate or lighter weight materials such as Brunswick's patented Levelite. Brunswick tables, regardless of price, are covered with wool woven especially for billiard play...and table accessories, including balls and cues, are premium quality.

An investment in Brunswick billiards is truly an investment in a lifetime of wholesome family recreation. Choose from an assortment of models priced right for you.

MODEL	Monterey VII	Monterey VIII	Brentwood VII	Brentwood VIII	Celebrity	Monarch	V.I.P. VIII	V.I.P. IX	Limited IX
SIZE	3½' x 7'	4' x 8'	3½' x 7'	4' x 8'	4' x 8'	4' x 8'	4' x 8'	4½' x 9'	4½' x 9'
TYPE OF BED	Honeycomb	Honeycomb	Permaleveł®	Permaleveł®	Levelite®	Levelite®	Slate	Slate	Slate
PRICE	$295	$315	$395	$415	$495	$595	$850	$950	$2,500

Brunswick

THE NO. 1 NAME IN BILLIARDS

Write for full information

CONSUMER DIVISION / BRUNSWICK PRODUCTS / BRUNSWICK CORPORATION / 69 WEST WASHINGTON STREET / CHICAGO, ILLINOIS 60602

The $52 week in Hawaii.

It's 7 days and 6 nights long. With a Waikiki hotel. Sightseeing. Limousines to and from Honolulu airport. We call it Pan Am Holiday 560. And $52 (per person, based on double-room occupancy) covers it. The only other thing to think about is airfare: as little as $200 round trip from California, $327 from Chicago, $400 from New York. But don't think of money now. You can pay later. Don't even think of details. Leave them for your Pan Am® Travel Agent. Just think Hawaii.

Pan Am makes the going great.

PAN AM

World's most experienced airline

This little tanker has a big mission: safer, cleaner seas

The men handling it are veteran tanker captains. The ship is a scale model of a giant super-tanker now being built. The water is an eight-acre training "sea" complete with waves, channels, moorings and piers. They're all part of a remarkable Marine Research and Training Center that Jersey opened last July in France.

Tankers used to get bigger a few thousand tons at a time. A captain would move up from a 49,000 to a 65,000 to a 79,000-ton ship, and pretty well knew what to expect from each new vessel. Past experience told him.

Now tankers are getting bigger 100,000 tons at a clip. The captain moves from an 80,000 tonner to a 190,000 tonner or larger, and he has to be prepared for differences in handling.

That's the situation Jersey's new training center was built to cope with.

Starting point was a lake near Grenoble. It was drained, dredged and contoured.

Next, typical moorings were added. A pier. A bend in the Suez Canal. And an offshore loading and unloading buoy such as you can find today in 24 major harbors.

Finally, a wave-making machine was installed and scale model tankers (like the one in the picture) were launched.

There is nothing like this Jersey training center anywhere else in the world. Tanker captains from Jersey affiliates will attend the center and it will eventually be opened to shipmasters throughout the free world.

By next July, some 150 shipmasters and pilots will have gone through the new center. They will all know more of what to expect from the new, giant tankers. And the world's seaways will be just that much safer.

STANDARD OIL COMPANY (New Jersey)

She's pretty cool for a gal whose roast has been ready since the 11th hole.

That's because she's sure her oven's keeping her roast warm and tender. Not dry and overcooked.

Most cook-and-keep-warm ovens aren't news. But hers is. It uses a new kind of system, ours, that converts heat to electricity for precise control.

At the end of a pre-set cooking period, her oven's temperature drops to 170°F. and stays there. There are no wide swings in the oven's temperature.

Our gal golfer probably couldn't care less why her roast stayed just the way she wanted it.

Or why her husband can set our new General Controls-brand home thermostat to the exact degree he wants, even in the dark.

Or why our precision controls and instruments are used in the hydraulic and fuel systems of the jet airliner that flew her son to London on his last vacation.

Or why our controls and instruments are used in an exact refining process for a high-octane gasoline that her daughter uses in her sports car.

Since our Controls and Instruments Division does care, she doesn't have to. Ever.

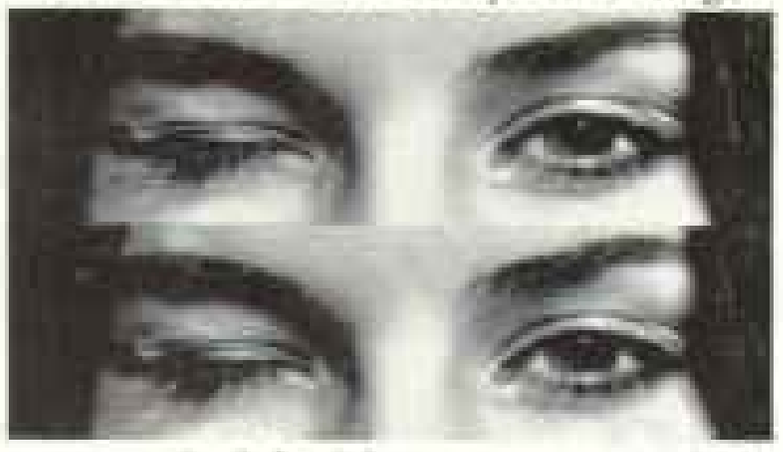
International Telephone and Telegraph Corporation, New York, New York.

ITT

When an Avis girl winks at you, she means business.

The Avis Winker Code

1 wink: She has a car ready and waiting.



2 winks: It's a compact.

3 winks: It's a convertible.

There you are. Standing in our competitor's line. And in a hurry.

If the Avis girl at the next counter winks at you, you're in business.

One wink means she can put you into a shiny new Plymouth inside of three minutes.

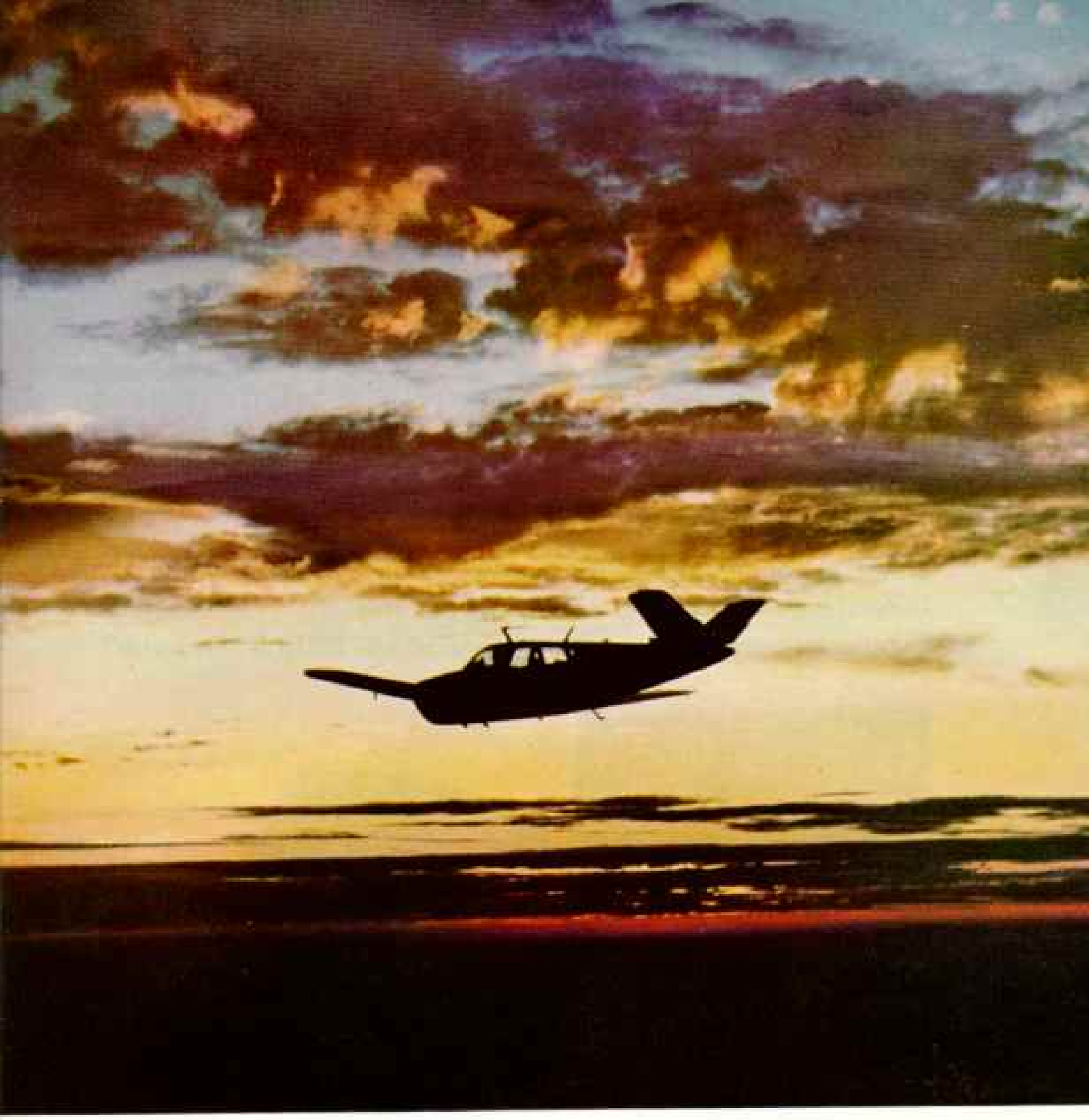
Two or three winks mean you can have a compact or a convertible.

(See Avis Winker Code at left.)

That is your signal to leave the line, come to the Avis counter and get a car without waiting. We will even accept No.1's credit card.

But if the Avis girl winks more than three times, please disregard the message.

It's strictly against company policy.



What airplane is so distinctive you can recognize it in the dark?

Chances are you guessed correctly —the V-Tail Beechcraft Bonanza. One of the most famous planes in the world and certainly the best known civilian aircraft.

Schoolboys and company presidents alike are quick to spot a Bonanza. It's been like that for 20 years. Since the first Bonanza was sold in 1947, more than 8,500 others have been eagerly accepted by new owners. The Bonanza is, in fact, the most popular high-performance single engine plane ever built.

The reasons for the Bonanza's success are as simple as its design —original thinking, years-ahead-planning and market research. Then a plane is built with the finest materials and craftsmanship. That's the way the first Bonanza was made, and that's the way they are made today.

These same guideposts are used in the production of all 18 Beechcraft models. All other Beechcrafts have distinctive design features of their own . . . and they all share one quickly recognizable trait—quality. A visit to your nearest Beechcraft dealer will show you what we mean.

Beechcraft

Beech Aircraft Corporation
Wichita, Kansas 67201

NATIONAL GEOGRAPHIC SOCIETY
Washington, D.C. 20036

Please send the SCHOOL BULLETIN to the person named at right. I enclose remittance of $_____.

- ☐ 1 year (30 issues) U.S. $2.00
- ☐ 1 year (30 issues) Canada $2.50
- ☐ elsewhere (30 issues) $3.00 (U. S. funds or equivalent)
- ☐ 3 years (90 issues) U.S. only $5.00

NAME_____

ADDRESS_____

CITY_____

STATE, ZIP CODE_____

Give your child new worlds to explore!

Watch grades improve when you give the National Geographic SCHOOL BULLETIN. Boys and girls love this colorful, 16-page magazine created just for them by the Society. Just $2.00 (in the U.S.) brings 30 issues, one issue each week, during the school year. The Geographic's educational subsidy makes this low price possible. Clip the coupon above and order the SCHOOL BULLETIN today!

"In our house it's a race to the mailbox to see which child gets the BULLETIN first, and their grades show they are getting a real knowledge of geography."

Only one car can make a Cadillac owner look twice.

Longtime Cadillac owners, accustomed to the finest, have high regard for the spirited glamour of the 1968 Fleetwood Eldorado—the world's finest personal car. While they may prefer one of Cadillac's traditionally styled models, they admire the bold concept of the Eldorado. For it reflects the fresh vitality of each of Cadillac's eleven great new body styles for 1968, all powered this year by the new 472 V-8—biggest, smoothest V-8 engine ever put into passenger car production. Shouldn't you, too, give Cadillac a second look?

Elegance in action

Cadillac

Cadillac Motor Car Division

The one-ticket airline.

Delta will sell more tickets this year than all the baseball clubs in the American League combined.

But in that mountain of tickets, there's just one that interests you.

Yours. The one with your name on it. Your reservations behind it. Your request for a rental car. Your connecting flights, return trip... maybe something special, like dietetic meals.

We know you don't want to hang on a phone all day to order that ticket. Or stand in line to pay for it. And if anybody acts like it's a favor to sell it to you . . . well, you've got the wrong airline.

So we start from there.

We call Delta the one-ticket airline, because to us one ticket *does* matter—yours. We'd like our tickets to be as easy to buy as subway tokens. They're not, yet.

But we're working on it. We've now got tickets by mail, tickets by teletype, and Delta ticket stock in business offices. Even "Write your own" tickets you can issue yourself.

But those are details. What matters is this: We regard every ticket we sell as a promissory note to you—for fast, positively confirmed reservations (through our nationwide Deltamatic® computer network). For good, smooth operations. For good food, good service.

And, certainly, good manners.

You might think we're sticking our necks out, making so many million promises every year.

But you'd be surprised how few we have to break.

DELTA

The one ticket that matters is yours.

A Sheaffer Desk Set makes writing a state occasion.
Giving it is giving something special.

A Sheaffer Desk Set looks the part. It's tastefully designed. Beautifully put together. In a word, elegant.

And the pens and ballpoints write as well as they look: cleanly, with precision and beauty.

A Sheaffer Desk Set is an appropriate gift for someone who signs terribly important things. It gives writing a touch of diplomacy.

Whatever you give, give something Sheaffer. It means something special.

Sheaffer's famous Imperial Touchdown® desk pen. Choice of over 50 boxes with pens and ballpoints from $2.95 to $140.00.

For Christmas, give a Sheaffer Desk Set.

Early American, with tambour doors and the biggest picture in color TV

Magnavox...the finest color TV... brilliant true color – automatically!

Just turn it on. Magnavox Automatic Color tunes itself—gives you perfectly tuned pictures that stay precise. Every channel. Every time. Automatically.

Exclusive Chromatone adds vivid depth to color, high definition to black and white pictures. Magnavox Quick-On flashes pictures on in just seconds. And superb Magnavox high fidelity assures you total program enjoyment.

You also have the satisfaction of owning the finest, most reliable color TV ever made. Select from over 40 elegant styles and beautiful finishes.

All this, yet Magnavox costs no more. We sell direct through franchised dealers (see Yellow Pages) to save you middleman costs.

Color TV from only $349.50.

Compact color TV in Contemporary styling

The magnificent

Magnavox

230 Park Ave., New York 17, N.Y.

Mediterranean color console

Grab an earful of the world!

19 Transistor 7 Band Shortwave/FM/AM 2-in-1. Newest for the portable people! A solid state masterpiece in genuine teak with chrome accents. World wide coverage. LW, 150-400 kc. SW_1, 1.6-4 mc. SW_2, 4-10 mc. SW_3, 10-20 mc. SW_4, 20-30 mc. Receives international shortwave plus FAA weather/navigation reports, CAP, ship-to-ship and ship-to-shore communications.

Toshiba Navigational MGC (Manual Gain Control) allows receiver to operate as sensitive direction-finding/homing device. 4 world-scanning antennas plus 2 external antenna connections.

7 keyboard band selectors. Electronic tuning meter. Switchable Automatic Frequency Control. Pilot lamp. 1.8 watt output. 2 speakers.

Full 1 year parts and labor warranty. The Toshiba Global Model 19L-825F. $180.00*

Toshiba. THE INTERNATIONAL ONE

Toshiba America, Inc. New York, N. Y. *Suggested Retail Price

The stopper

Konica Auto-S, the favorite rangefinder-35 of the pro, stops the movers. Automatically. Its sensitive electric eye adjusts for changing light as you follow your subject. Just point and shoot. Or set it manually, if you insist.

With ultra high speed Hexanon lenses and shutter speeds to 1/500 you have an edge on the fast action.

With f1.8 lens, under $100. With f1.6 lens, under $120. Also available with motorized drive and electronic shutter. Konica Camera Corp., Box 1070, Woodside, N.Y. 11377.

A BERKEY PHOTO COMPANY

KONICA Auto-S

"The Lens Alone is Worth the Price"

Buick Sportwagon comes with 2 or 3 seats, a 230-hp V-8 engine and a carpeted passenger area. Custom padded cushions are standard. So is a full line of GM safety equipment which includes a four way hazard warning flasher and energy absorbing steering column.

"It looks more like a luxury car than a station wagon!"

"Any given weekend, we carry boats, sails, masts, five or six children, picnic baskets, saddles, bridles, tack trunks, blankets– we even pack a nine-foot dinghy in the back of our Buick Sportwagon!"

Mrs. Graham Brown, Mother of five.

Wouldn't you really rather have a Buick?

"The children stretch out in the back, gaze up at the stars through the sun roof and they're off to sleep in no time."

GM

Announcing a minor improvement in slide projectors.

It's a new kind of light. Nothing more.

But it does some pretty revolutionary things. Because it's got a reflector built into it. Just like an automobile headlight.

And to show you what an improvement a reflector makes, we eliminated it from a headlight. The one on the left.

We call our new light the Luminac® lamp. (We invented it. And Sylvania makes it just for us.)

It produces brighter, whiter light than the lamps in other slide projectors. And it spreads light evenly across the screen.

So, with flash shots, it lights up the area the flash often leaves darker. The edges. And, with outdoor shots, the even lighting at the edges gives a greater sense of depth.

The Luminac lamp has another advantage, too. A lifespan at least twice as long as conventional lamps.

But there are many more good reasons to buy our slide projector besides our lamp. Like electronic focusing. Sound synchronization (a way to show "talkie slides" with a tape recorder). And excellent optics.

Things that, along with the Luminac lamp, make Airequipt slide projectors the most-advanced in the world. And the best thing that could happen to your slides.

AIREQUIPT
New Rochelle, N. Y.

"Not only are these books tremendously interesting, but each is a wonderful value!"

Order these colorful, exciting, around-the-world books for your family library!

Exploring Canada from Sea to Sea—World Beneath the Sea—The Revolutionary War—Isles of the South Pacific. Each cloth-bound book is color illustrated, contains 200 pages . . . and costs just $4.25 plus postage!

NATIONAL GEOGRAPHIC SPECIAL PUBLICATIONS
DEPARTMENT 444 WASHINGTON, D.C. 20036

☐ Please send me this year's four Special Publications, starting with *Exploring Canada From Sea to Sea*. Bill me $4.25 plus 25c for postage and handling, as each book is mailed.

And send the 1966 Special Publications checked below, billing me at the same low price for each book:

024 ☐ *Our Country's Presidents* 021 ☐ *Isles of the Caribbees* 023 ☐ *The River Nile* 022 ☐ *My Friends The Wild Chimpanzees.*

Name_____

Address_____

City, State, Zip_____

THE ELECTRIC TIMEX.® YOU DON'T WIND IT UP. YOU TURN IT ON.

From now on, you will never have to wind your watch again—if your watch is an Electric Timex. A tiny, replaceable energy cell does all the work, providing steady electric accuracy week after week, month after month, for more than a year of carefree time. The man's Electric is waterproof*, dustproof*, and shock-resistant. From $39.95. The lady's Electric—the first of its kind in the whole world—is convenient, uncomplicated, and simply beautiful. From $50. Isn't it time you wore one?

*as long as crystal, crown and case remain intact.

Statement of ownership, management, and monthly circulation of the

NATIONAL GEOGRAPHIC

OWNER AND PUBLISHER: National Geographic Society
EDITOR AND MANAGING EDITOR: Frederick G. Vosburgh
HEADQUARTERS OF PUBLISHER AND PUBLICATION: 1145 Seventeenth Street, N.W., Washington, D. C., 20036
STOCKHOLDERS: BONDHOLDERS: MORTGAGES: OTHER SECURITY HOLDERS: None

	Average no. copies each issue during preceding 12 mos.	Single issue nearest to filing date
A. TOTAL COPIES PRINTED (Net Press Run)	July '66-June '67: 5,430,833	June 1967: 5,843,000
B. PAID CIRCULATION		
1. Single Copy Sales	1,938	247
2. Mail Subscriptions	5,314,896	5,311,153
C. TOTAL PAID CIRCULATION	5,316,834	5,311,700
D. FREE DISTRIBUTION (incl. samples) BY MAIL OR OTHER MEANS	82,039	80,985
E. TOTAL DISTRIBUTION (Sum of C and D)	5,378,873	5,381,685
F. OFFICE USE, LEFT-OVER, ETC.	51,960	80,315
G. TOTAL (Sum of E & F)	5,430,833	5,843,000

This is Canadian territory.

Looks like Europe to you, doesn't it? Most map experts would agree. But we call it Canadian Territory because Canadian Pacific Airlines jets there regularly on part of our 56,000 miles of international routes. And this is something you should know about. For a very good reason. When you fly Canadian Pacific to Europe, you can add an extra foreign country at no extra cost—Canada. You can stop over in our gateway cities: Toronto, fastest growing city in North America; Montreal, exciting French-Canadian city and site of Expo '67; Vancouver, year-round vacationland of the great Northwest. Then fly to Europe direct from Vancouver via the polar route or nonstop from Toronto or Montreal. If you wish, you can return from Europe via New York. There's something else you really ought to know about Canadian Pacific Airlines: over 80 years of travel experience goes into every one of our Empress flights. We'd like very much to share this experience with you. For complete information, contact your travel agent or your nearest Canadian Pacific office.

Canadian Pacific Airlines

Boston, Buffalo, Chicago, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Seattle, Spokane, Washington, D.C., Amsterdam, Antwerp, Athens, Brussels, Copenhagen, Dusseldorf, Frankfurt, Genoa, Hamburg, Hong Kong, London, Madrid, Milan, Paris, Rome, Zurich

Norelco is just like Christmas. It's getting closer and closer.

Home Barber Shop.
Motor-driven, with 3 trimmer attachments and illustrated instructional booklet packed in a colorful barber pole.

30 days of close Microgrooves™ shaves on penlight batteries.
Norelco Cordless 'Flip-Top' Speedshaver® 20B. Comes in mirror wallet.

A woman's shaver in a Greek column.
The Classic Beauty. One side for legs, one for underarms.

A shaver plus ten beauty attachments.
Lady Norelco Beauty Sachet 25LS. Like having a beauty salon at home.

Closest, fastest and most comfortable shaver on wheels.
Tripleheader 35T. Pop-up trimmer, attractive metal wallet.

Perfect first shaver.
New 'Flip-Top' Speedshaver 2S. Microgroove heads, on-off switch, handsome snap-open wallet.

Twice as many shaves per charge as any other rechargeable.
New Rechargeable Tripleheader 45CT. Shaves with or without a cord, more features. Smart travel wallet

And **listen** closely to these other Norelco gifts.

The Carry-Corder® 150. Slips in a face cassette, record, playback anything – anywhere – up to 14 hours. Cordless, convenient.

The Fidelity World Receiver Deluxe. For portable – at any price – matches it for quality, features and performance. Receives FM/AM, SW/ST Weather, Marine and Aircraft.

Norelco®

The close, fast, comfortable electric shave.

POLAROID®

If you can afford it, give it.

Not everyone can shell out $160 or so, just like that.

Not even for the gift of the year for the man of the house.

That's why Polaroid Color Pack Cameras start at under $50.

But if you can put your hands on that kind of money, here's what you'll be giving:

A superb Zeiss Ikon single-window range- and viewfinder that automatically corrects for parallax and field size.

A transistorized shutter that lets you make black-and-white pictures indoors *without flash* and even make perfect time exposures up to 10 seconds automatically.

A sharp triplet lens. 2 exposure ranges for color, 2 for black-and-white. Beautiful portraits and close-ups (with special Polaroid camera accessories).

An all-metal body with brushed chrome finish.

A flashgun.

And the kick—not quite like anything else—of making big, beautiful color prints in a minute, black-and-white prints in seconds.

It's the finest automatic camera Polaroid has ever produced.

The kind of gift that makes everybody look good.