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Map of Bible Lands and the Cradle of Western Civilization

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THE NATIONAL GEOGRAPHIC MAGAZINE

CHANGE COMES TO BIBLE LANDS

BY FREDERICK SIMPICH

TODAY, from Egypt to Iran, that old phrase "the changeless East" is obsolete.

Near those bulrushes where Pharaoh's daughter found Moses, a Cairo film company may be on location, starring a popular Arab actress.

Around the Mount of Olives, Palestine boys build crude windmills that make electricity to run their radio sets.

Flying boats, linking London with Australia, alight for fuel on the Sea of Galilee; on the stony Land of Moab, white-painted arrows point pilots on their desert way, and Iraq trains whistle for Babylon—and Ur Junction!

Busiest man in Baghdad is an American engineer up to his sunburnt neck in air-cooling installations.

In Iran (Persia) the Shah makes European dress compulsory.

NEW PROOFS OF OLD TESTAMENT HISTORY

Visitors, students, and archeologists still haunt the scenes of Bible events and other sites famous from antiquity where "diggers" are continually finding proof of Old Testament history.* But because the East *is* changing today, it is more interested in electric iceboxes, bus lines, radio news, or oil refineries than in determining whether a certain marble bath once belonged to Pontius Pilate or the Queen of Sheba.

I don't mean by this that the Near East is all modernized, or that its standards of living approach those of the Western World.

Change, as you see it, is most visible in the building booms of cities, or in the oil fields, and is largely motivated by the internal-combustion engine, with the advent of which came motor highways, air lines—more accelerated life.

Of change on desert and farming hinterlands, you see less. Shepherds still throw stones from slings, as when David slew Goliath. Bedouins slay sheep to seal a vow, and keep the covenants of bread and salt.

Jews still pray at the Wailing Wall, orthodox men in long curls beside Hebrew girls in Paris frocks.

WORLD WAR SPED UP CHANGES

Some pilgrims ride to Mecca now in motorcars, noisy with Arab radio music; recently an Egyptian company released a film of the Hadj, showing the Holy Carpet on its way from Cairo to the Kaaba. Till lately, a cameraman daring that feat would have been torn to pieces! †

Change is resistless; yet Hebrews, Christians, and Moslems still look with reverence on these old Bible lands as the birthplace of their three great religions.

It was the breakup of the Ottoman Empire, after the World War, and the rise of the Turkish Republic, the new Kingdoms of Iraq and Saudi Arabia, and the advent of foreign mandates over Syria and Palestine, plus oil, which speeded up these now far-reaching changes.

With this issue of the NATIONAL GEOGRAPHIC MAGAZINE appears an unusual

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Archeology, the Mirror of the Ages," by C. Leonard Woolley, August, 1938, and "New Light on Ancient Ur," by M. E. L. Mallowan, January, 1930.

† See "Pilgrims' Progress to Mecca," 22 illustrations in duotone, NATIONAL GEOGRAPHIC MAGAZINE, November, 1937.

BRITISH TOMMIES "FRISK" ARABS FOR ARMS NEAR JERUSALEM'S JAFFA GATE

In fighting between Arabs and Jews, hundreds on both sides have been killed and wounded from gunfire, bombs, and mines set under highways. Both peoples object to the proposed partition of the country, whereby each would be colonized in a separate district and Britain would retain control of a corridor from Jerusalem to the sea and of certain other regions (page 748).

map; none like it has ever been printed. On it are shown historic routes and places famous in Old Testament, Roman, and Crusader times, as well as such modern works of man as railways, oil fields, pipe lines, airways, canals, power and irrigation dams, and industrial towns (page 751).

On it you can see the site of ruined Babylon, where Nebuchadnezzar built his palace and then ate grass with the wild asses; also, in contrast, you see the railways and irrigation dams which now transform this reputed site of Eden.

New motor roads in Syria and Palestine are seen to parallel those trails beaten by Assyrians, Hittites, and Egyptians a thousand years and more before Romans and Crusaders passed this way.

Look at that new railroad, just opened, that begins on the Caspian Sea, crosses Iran's high, wild mountains, and ends on the Persian Gulf. With its oil-burning engines, its sumptuous Pullman sleepers, its bold bridges and long, costly tunnels, this $150,000,000 project is the pride of the Shah. It fulfils a golden dream of long decades, a railroad across Persia from north to south; a dream once shared by the Tsars of Imperial Russia, who, by the so-called "Will of Peter the Great," were not supposed to rest till they had gained a southern outlet to warm salt water!

To report on these striking transitions from old to new, I was sent here in 1938. With me came my staff colleague, W. Robert Moore, to make his revealing camera studies which illustrate this article.

INTO EGYPT BY AIR

Today, both military and commercial planes fairly swarm about the Mediterranean. Airports are everywhere: Marseille has truly an international harbor of the skies. From it we flew out to sea, over long-bandit-ridden Corsica, past Elba, past Monte Cristo's isle, Rome, Brindisi, Athens, Mirabella on Crete, then over more hours of misty, blue Mediterranean till suddenly Alexandria popped up from Egypt's flat horizon.

It rushed at us, bigger and clearer every second, till, in fancy, our plane seemed turned into a giant news camera, a flying "Eyes of the World," and Alexandria was

Photograph by W. Robert Moore

NO MAN MAY WEAR HIS STREET SHOES INTO A MOSQUE

Moslem worshipers commonly step out of theirs at the mosque door and go to prayers in their sock feet. To accommodate an "infidel" visitor, as when the author visited Cairo's large Rifaiyeh mosque, modeled after St. Sophia at Istanbul, they put these clumsy canvas slippers on over his shoes.

not real, but a motion picture of itself.

Under us, as we circled, turned King Farouk's summer palace, facing the beach at the end of the city's Rio-like, 10-mile-water-front drive; blocks and blocks of modernistic apartment houses; parks, Pompey's Pillar, shady gardens and the sumptuous homes of men rich from land and cotton deals; then tanneries, soap works, railway yards.

"Some day I must go to Alexandria," I felt, still under imagination's spell. Then we hit the water, and customs men flocked about. "Wake up," I thought. "This is no travel newsreel; it's Alexandria, itself."

CATACOMBS AND TICKER TAPE

Like other Egyptian cities, Alexandria has been under French and English influence for generations; so change here is less startling than in Baghdad or Haifa. Yet what a past, and what a present!

At Abu Qir, northeast of here, Admiral Nelson and Napoleon's men shot it out; near by a Frenchman found the Rosetta stone. Down in the catacombs, Moore and I saw where Greek and Roman families used to pray and be buried, and the local museum is full of relics of long ago. But modern Alexandria, busy with cotton, grain, banking, sea trade and air traffic with all Africa and the East, lives in the present.

Nobody could tell me, for example, where its once-famous library had stood; nor did anyone know much of that historic wood-burning lighthouse, one of the Seven Wonders of the Ancient World, which legend says could reflect a beam far to sea and set fire to enemy ships. But excited brokers in Alexandria's noisy cotton exchange can tell you the latest crop forecasts for faraway Texas or what cotton sold at in Liverpool three minutes ago—as ticked off to them.

Fly from Alexandria to Cairo and you see how towns and plantation homes dot this Nile Delta, as they dot our lower Mississippi Valley. Its green belt stops abruptly where ditches end.* High up you may see sand clouds from the Sahara and feel dust in your eyes.

New Heliopolis, near Cairo, is the "Newark Airport" of Egypt. Hard by it lies ruined On, of Bible times; under On's "Virgin's Tree," tradition says, the Holy Family

* See "Land of Egypt," by Alfred Pearce Dennis, National Geographic Magazine, March, 1926.

Photograph by Egyptian Army Air Force

MORE THAN 5,000 YEARS AGO THESE PYRAMIDS OF GIZA WERE BUILT TO BE THE TOMBS OF KINGS AND QUEENS

Compared with them, near-by Cairo is a new city. Such overflows in this part of the delta now are prevented by barrage and canal control works. The new irrigation system also enables farmers to reap three crops a year, instead of only one, as when they had to depend on the Nile's annual rise. In the Great Pyramid at the right a ventilating shaft was so placed that when Sirius, the Dog Star, crossed the meridian—marking the beginning of the Egyptian year and the flood-time of the Nile—its rays would shine straight down into the royal chamber of Cheops. The Sphinx is seen between the two larger pyramids, slightly in the foreground.

Photograph by Egyptian Army Air Force

ZAMALIK BRIDGE AT CAIRO OPENS TO LET A STRING OF NILE SAILBOATS PASS

The largest city of Islam stretches along the Nile in the shadows of the Pyramids. More than a million Africans, Orientals, and Europeans form its polyglot population. In winter, visitors from all over the world flock here, including students who come to study in museums of Egyptian antiquities and of Arab art, or at the University of El-Azhar. With its mosques, fascinating bazaars, palaces, night clubs, and race tracks, Cairo is the gayest capital in this Levantine world.

slept after fleeing from Herod across Sinai with the child Jesus.

At Heliopolis, trunk-line planes land passengers from Capetown or London; here, too, come the "Misr," or local Egyptian ships, air ferries to Port Said, Cyprus, Haifa, and beyond. With its real estate brokers, wide avenues, flashy private homes, and mammoth hotel sprawling over acres of sand, Heliopolis is truly a symbol of progress in new Egypt.

Southwest lies Cairo, that Cairo of mosques, citadels, entrancing museums, and dark, pungent bazaars so familiar to all visitors. There's the Sphinx just beyond, and, as always, the rather self-conscious fat man and his giggling wife being photographed on a weary camel at the foot of a pyramid. There, too, is that perennial, acrobatic Arab who offers to climb to the top of a pyramid and back in seven minutes —for a shilling.

ALL ABOARD, FOR JERUSALEM!

If you want to drive your car up toward Port Said and ferry across the Suez Canal at Qantara, you can get to Jerusalem by night instead of taking forty years to walk it as the Children of Israel did. If you would fly, there's the air line;* or, in clean coaches with fans, shower baths, and good meals, you can go by train.

To enjoy this ride, glance first at the story of this Bible land. That Land of Goshen, where the Israelites slaved for Rameses, lies along this lower Nile. Here Joseph interpreted the dreams of Pharaoh; here came the plagues of frogs and lice; and from this Land of Bondage Moses led the Chosen People.

Today, electric pumps hum where the Israelites drew water with ropes; motor wheels make tracks where Pharaoh's horse chariots rumbled; and archeologists dig up palaces which the Children of Israel may have helped to build.

By air we crossed Lake Manzala, with fishermen's huts on its estuaries, and so to Port Said. Flattest-looking town on earth, almost completely surrounded by water, Port Said seems to squat on mud and sand bars hardly above sea level.

Peach-tinted buildings, flamboyant with billboards that shout their canned milks, cigarettes, and whiskies, turn their brazen faces to a cosmopolitan water front.

From high over Port Said you look due south down the long, straight canal piercing the desert like a blue streak. Seen from the air, ships in the canal seem motionless.

Stretching for miles along the Mediterranean coast, southeast of Port Said, lies the low, useless Plain of Tina; beyond is historic Sinai Peninsula, almost an empty geological antique. Yet, what a milestone in Old Testament and Hebrew history!

Desolate, hostile Sinai belongs to Egypt. As Maynard Owen Williams says: "Sinai is still Holy Ground. We crossed where the sea parted to let the Israelites walk through. We followed their reputed trail to the hillside where they set up the Golden Calf; up to the mount where Moses received the Ten Commandments; we even saw what the monks at St. Catherine's Convent say are the roots of the original Burning Bush.

"Except for some manganese mines, an abandoned observatory once operated by our own Smithsonian Institution, and some miles of rabbit-wire to help motorists over the sands, Sinai today must be very much as it was when the Children of Israel saw it."†

Gaza, on the coast of Palestine, is the first real town you strike going north. From the canal up to Gaza, the railroad was built by the British in that "Last Crusade," which took Palestine away from the Turks in the World War. Delilah cut Samson's hair somewhere about Gaza; and here he pulled down the temple.

Armies, from Assyrian to Australian, have pounded on Gaza for nearly 3,500 years. Today it seems almost on its last legs!

One odd phenomenon persists—its annual invasion of myriad quail, migrating here from Europe, flying over the Mediterranean.

Said John D. Whiting,‡ scholarly American resident of Jerusalem, who kindly

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Flying Over Egypt, Sinai, and Palestine," by Brig. Gen. P. R. C. Groves and Maj. J. R. McCrindle, September, 1926; and "Resurrection of Ancient Egypt," by James Baikie, September, 1913.

† See "East of Suez to the Mount of the Decalogue," by Maynard Owen Williams, NATIONAL GEOGRAPHIC MAGAZINE, December, 1927.

‡ See, by John D. Whiting, in the NATIONAL GEOGRAPHIC MAGAZINE, "Among the Bethlehem Shepherds," December, 1926; "Bethlehem and the Christmas Story," December, 1929; "From Jerusalem to Aleppo," January, 1913; "Jerusalem's Locust Plague," December, 1915; "Last Israelitish Blood Sacrifice," January, 1920; "Petra, Ancient Caravan Stronghold," February, 1935; "Village Life in the Holy Land," March, 1914; and "Bedouin Life in Bible Lands," January, 1937.

Photograph by Kodak (Egypt)

WITH OWLISH EYES THIS NILE BOAT STARES DEAD AHEAD

The superstitious practice of painting eyes on the bows of boats is common all through the East. From the Mediterranean to the China Sea, you hear sailors say: "Ship no got eye, how ship can see?"

Photograph by Dimmick, courtesy Sir John Ward

IN THE WAKE OF SINDBAD'S GREAT FLYING ROC, EUROPE-FAR EAST PLANES LAND AT BASRA'S AIR-COOLED HOTEL

Photograph by W. Robert Moore

LONDON-AUSTRALIA FLYING BOATS REFUEL ON THE SEA OF GALILEE, WHERE CHRIST WALKED ON THE WATER

An Imperial Airway's seaplane, coming from India on its regular schedule, alights here at 686 feet below sea level.

Photograph by Publishers Photo Service

"O LITTLE TOWN OF BETHLEHEM, HOW STILL WE SEE THEE LIE!"

Had the Three Wise Men returned in October, 1938, they would have found Bethlehem presenting a warlike appearance, with armored cars and trucks with British "Tommies" rumbling into the square before the Church of the Nativity. Barbed wire and machine guns confronted bearded monks and priests as they entered the church.

© Charles E. Brown

EASTBOUND, A BRITISH-INDIA STEAMER FEELS HER WAY THROUGH THE HOT SALT WATER OF THE NARROW SUEZ CANAL

In the background stands a freight train on the railway that runs from Ismailia to Suez; between it and the canal is seen a motor highway. On the bank is one of the canal control stations. Dredges of several types are constantly operating to keep the canal free of drifting sands.

TEL AVIV STREETS ARE LINED WITH APARTMENTS WHOSE OVERHANGING BALCONIES RESEMBLE DRESSERS WITH DRAWERS PULLED OUT

So great has been the influx of Jews into this boom town that houses cannot be built fast enough; all buildings are crowded and rents are high. Many have no baths; portable tin tubs may be seen airing on the back porches of even modernistic buildings. Buses are crowded; yet people by hundreds walk the broad tree-lined streets. Merchandise is shown in attractive shop windows, and, except for disorder incident to Arab troubles, the people seem happy in this new environment.

Photograph by W. Robert Moore

DIZENGOFF CIRCLE IN TEL AVIV, THE MIRACLE CITY, WHICH HAS MUSHROOMED IN A FEW SHORT YEARS FROM EMPTY SANDS

Among all the population of 350,000 or more, one sees few Gentiles. Here are Palestine's finest theaters, orchestras, most of her printing presses—in fact, here is the center of her intellectual life, just as her political hub is at Jerusalem (page 708). Here, too, are distilleries which manufacture perfume, a factory which makes myriad false teeth, and a noisy, turbulent, Coney Island beach life.

BORN IN PALESTINE, TRAINED IN FARM DUTIES, THOUSANDS OF JEWISH BOYS ARE HAPPY IN THIS NATIONAL HOME

Some colonies are composed entirely of children, whose time is divided between school and shop or garden work under the guidance of trained teachers from Europe. These boys are on their way to set out young trees.

JEWISH SCHOOLGIRLS REVIVE AN OLD BIBLICAL CEREMONY IN THE FEAST OF THE TREE

Each plants a sapling near her school, village, or public park. Symbolic plays indicating the importance of the tree are performed; such dramas may include sacred recitations, an arboreal dance, and community singing.

© Orient by Kluger

A NEW JERUSALEM IS GROWING UP OUTSIDE THE WALLS OF THE HOLY CITY

The semicircular building in the foreground is the administration building of the Jewish agency for the new National Home in Palestine. In the background spreads Rehavia, an evergrowing Jewish suburb. Many luxurious new homes are also being built by Arabs, outside the old city walls.

guided me about the Holy Land: "In Gaza I once watched the quail arrive. Arabs stretched a net along the sand dunes on the beach early one morning. Then we all hid and watched the tired quail come floundering in; before noon the Arabs took nearly 6,000; they loaded coops of them on camels, for market; many they shipped to England, alive."

East of Gaza, tradition says, lies Ramath Lehi, where Samson slew 1,000 Philistines with the jawbone of an ass.

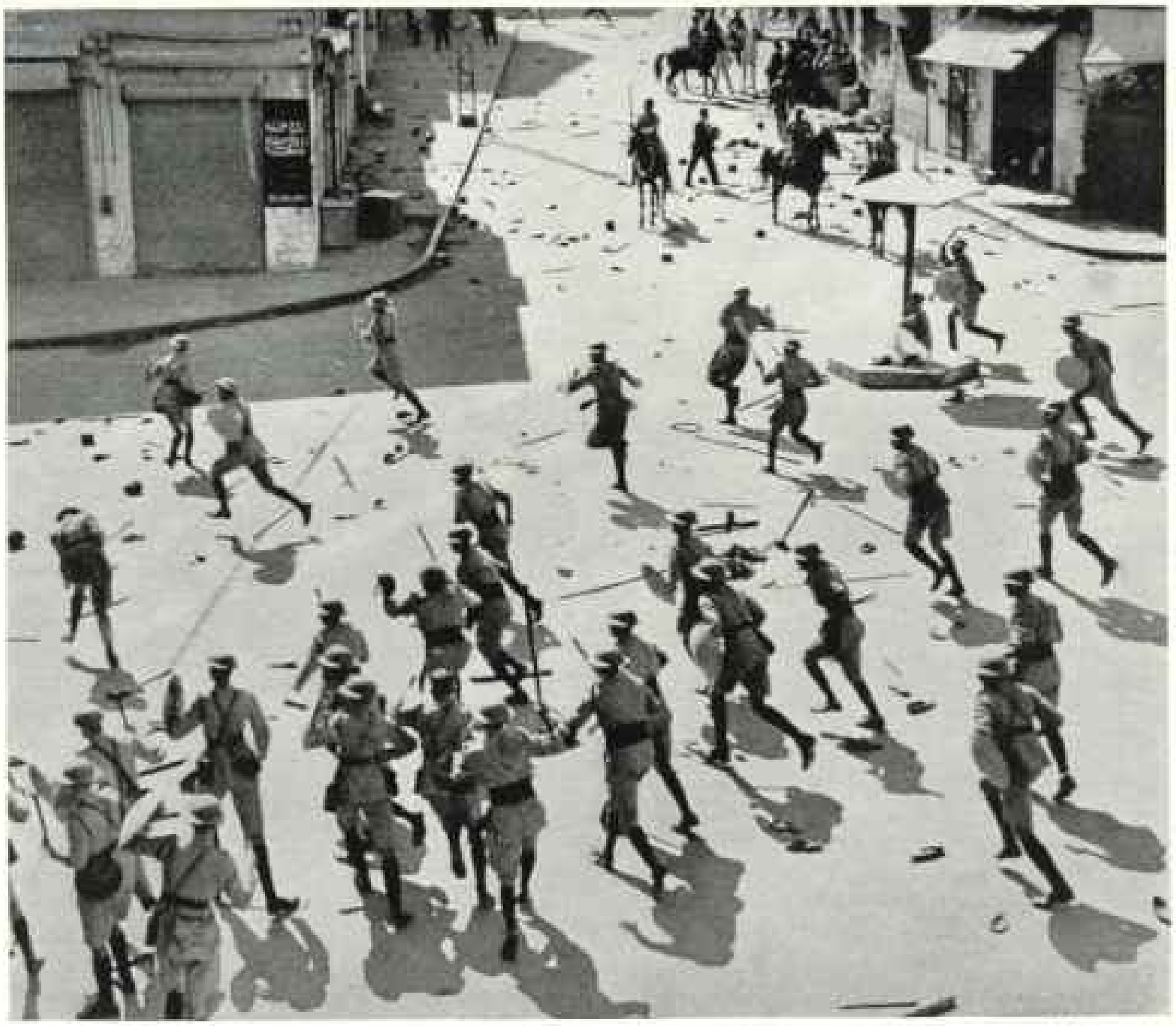
PALESTINE AND CALIFORNIA

How much like southern California western Palestine looks! Miles of grainfields, citrus groves, and vineyards, dotted with red-roofed, white-walled houses.

Even the growing towns have the look of southern California architecture, especially booming Tel Aviv! This world's first new-made, 100-per-cent-Jewish city is a phenomenon of this changing East. Only naked sand dunes formed its site a few years ago; now it is a gaudy, neon-lit, Monte Carlo-like beach city of some 150,000, all Jews, and ruled by them. Aldermen, policemen, postmen, bus drivers, teachers, bricklayers—all are Jews (pages 705, 706, and 750).

Truly a miracle city, this. It has Palestine's noisiest night clubs, fanciest beach pajamas, gayest sidewalk cafes, biggest talkie theaters, finest concerts and art exhibits, some fifty papers and magazines, and factories that range from perfume distilling to one that makes and exports bushels of artificial teeth!

You can even buy a ram's horn. I blew on one; it works like a Missouri fox horn, but is smaller, emitting a shrill whistle effect. You wonder how that sound ever knocked down the walls of Jericho!



Photograph from Wide World

BACK TO SHIELDS AND BLUDGEONS IN THE HOLY LAND AS JAFFA POLICE BATTLE ARABS IN STREET RIOTS

Note the man at left center; a rock has just hit him in the head. Two others, in lower left, hold up their shields to ward off missiles. How odd that again, after so many centuries, men should be fighting in the Holy Land with shields and clubs, as in Crusader times! In this particular riot, Arabs were protesting against the arrival of more Jewish immigrants at Jaffa.

While I was there, a rabbi blew the ram's horn in a synagogue protest meeting, called during the Arab troubles (page 720).

In Tel Aviv, with all its schools, printing presses, strikes, and street demonstrations, you see Palestine's most conspicuous symbol of the Jewish nationalistic movement. Politically, Palestine is ruled from Jerusalem; but Tel Aviv is Jewry's social and intellectual center.

What struck me at Tel Aviv's Luna Park, and among its careless beach crowds eating corn-on-the-cob and playing handball, was the youth of its people.

In this almost perfect climate, these people are happy that this land is theirs; that here they are free to face life's adventure, and to build a new city along their own cultural lines.

From Tel Aviv and Jaffa you motor up the old Crusaders' road to Jerusalem, the same road that Richard the Lionhearted followed.*

Nearing Jerusalem, our romantic Crusader road entered rough, rocky hills, dotted with ruins of forgotten times.

RIFLEMEN FIRE FROM AMBUSH

In these hills we met a patrol of armored Fords, loaded with British soldiers. We quickened our speed, for, in the summer of 1938, all roads lined with trees or old walls were favorite ambushes from which motorcars and buses were fired on.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Crusader Castles of the Near East," by William H. Hall, March, 1931, and "Road of the Crusaders," by Harold Lamb, December, 1933.

"What to do?" complained Pot Rash, our Arab driver. "If I wear my fez, the Jews snipe at us; if I take it off, the Arabs will think I'm a Jew and *they'll* shoot!"

"Just drive fast," said Whiting. "I've been shot at eleven times—they can't hit you!"

"We've passed a lot of funerals," argued Pot Rash.

BOOM MIXED WITH TERROR IN JERUSALEM

Our first morning in Jerusalem, Moore and I went to see the site of Solomon's Temple, and the rock from whence Mohammed ascended into Heaven (page 723).

At an old well, which may have been dug in King Solomon's time, three wild-looking Arabs were drawing water. "Shoot 'em, Bob," I said. "That's a picture!"

Near by stood another Arab, eating a cucumber. The instant he saw Moore's camera he fell into a rage. He threw away his cucumber and ran up and grabbed at the camera, flourishing his long knife in Moore's face.

"Back up, Bob!" I cried, and Bob did! But, in backing, he still shot the picture, which is the way of his kind.

Arab terrorism paralyzed all Palestine in the summer of 1938. British soldiers, armored cars, and police swarmed everywhere, using African dogs to trail assassins. To shield passengers from bombs and flying stones, bus windows were covered with wire nets. Every day saw murder in Jerusalem streets, or along the hill roads of Judaea, or in Haifa, Tel Aviv, or fanatical Nablus.

Yet, even during this terror, Jerusalem's building trades lagged but little. Outside its walls a newer Jerusalem swiftly rises. Both Jews and Arabs, in keen competition, are building luxurious new homes, new shops, installing bus lines—in fact, a new Jerusalem that is both Hebrew and Moslem.

Mecca of pious Christian, Jew, and Moslem, this Holy City through 5,000 years has been visited by more pilgrims than has any other town on earth.* In riot or quiet, its chief income is still from visitors. "I sold 50,000 bottles of Jordan River water in one season," said a dealer. "They take it home to baptize new babies."

Walk down into a vast cave east of Damascus Gate and you reach a quarry; men say Solomon took rock from here for his temple. Pick and wedge marks, made 3,000 years ago, are as fresh as yesterday's. Now Masonic groups come here to hold lodge ceremonies; you see names and addresses from such cities as Omaha and Seattle scratched on cave walls; and, of course, here is an opportunist who carves and sells stone mallets, squares, keystones—all Masonic emblems.

On the Mount of Olives rises now the new Hebrew University, and here is built a world-famous Jewish library; throughout all Palestine you hear of the rapid revival of the Hebrew tongue.

As Palestine's capital, Jerusalem is the seat of government, the British High Commissioner, and all foreign consulates.

ON THE ROAD TO JERICHO

Robbers still roost along that lonely road north through barren hills from Jerusalem down to Jericho, on which you pass the "Good Samaritan Inn"; legend says Christ told the parable of the good Samaritan at this spot.

Beyond a monastery, hugging a canyon cliff, at the place where ravens fed Elijah, we saw six men digging a well, while twelve friends stood guard with guns, against Arabs!

New Jericho, with villas of winter residents, stands on its oasis across the road from ruins of the Biblical town whose walls fell when Joshua's men marched around it seven times. Planes rise from an airport near where Elijah ascended in a chariot of fire.

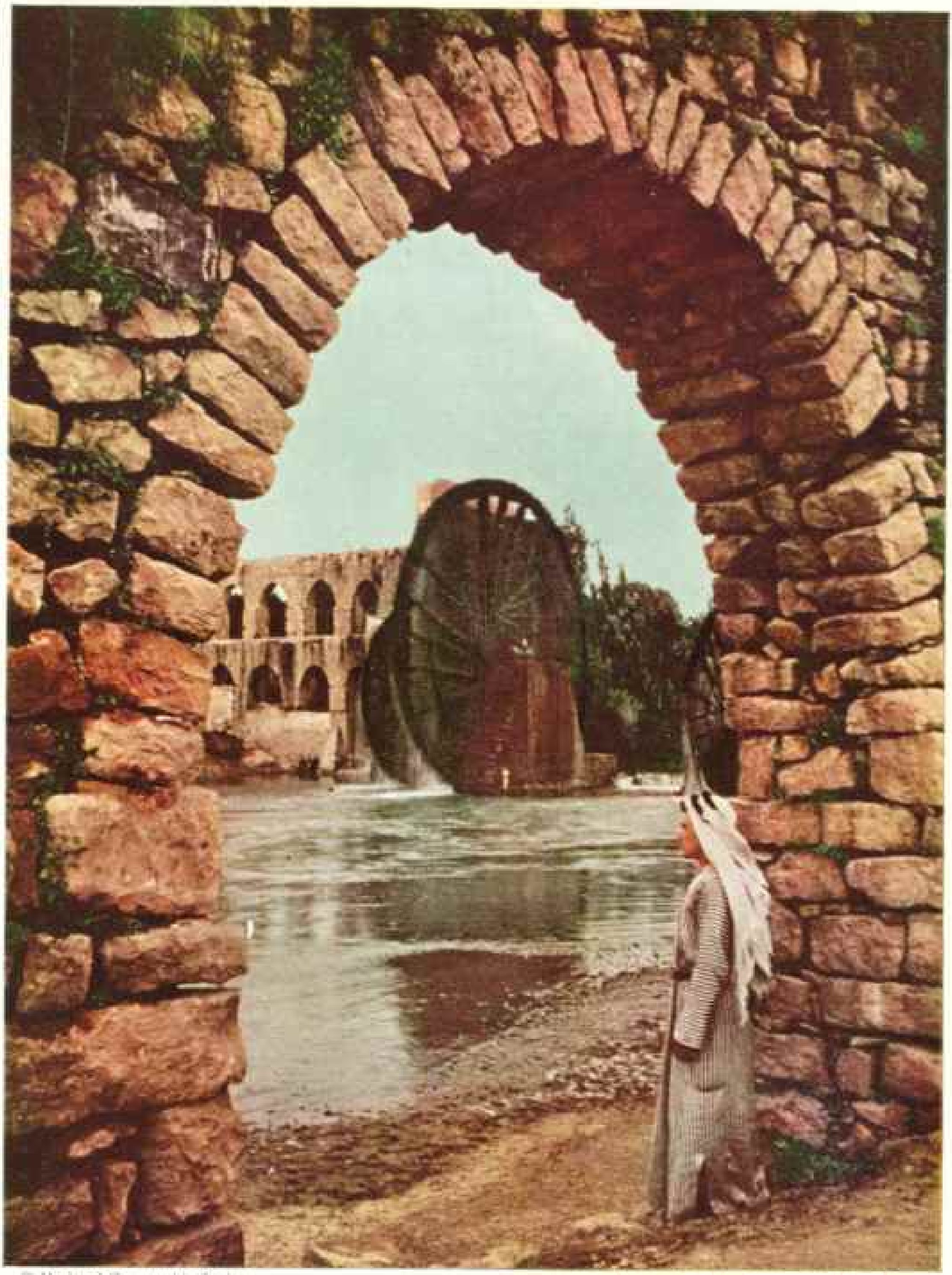
Beyond Jericho is the Valley of the Jordan, through which that stream flows into the Dead Sea, 1,286 feet below sea level, the lowest spot on earth.

At the sea's north end, behind wire barricades, stands a chemical factory. From the heavy water it extracts potash (page 726).

This big lake, with bare, blue hills around it, looks at first glance like an ordinary body of water. There even lies a motorboat with the good old American name of *Minnehaha*. There's the big Floridalike Kallia Beach Hotel, where playboys and girls of Jerusalem flock to dance and swim on moonlight nights.

But look at the signboards! In Arabic, Hebrew, and English, they warn swimmers not to get the caustic Dead Sea water in eyes or mouth. I know; it hurts! Any careless Jordan River fish that ventures

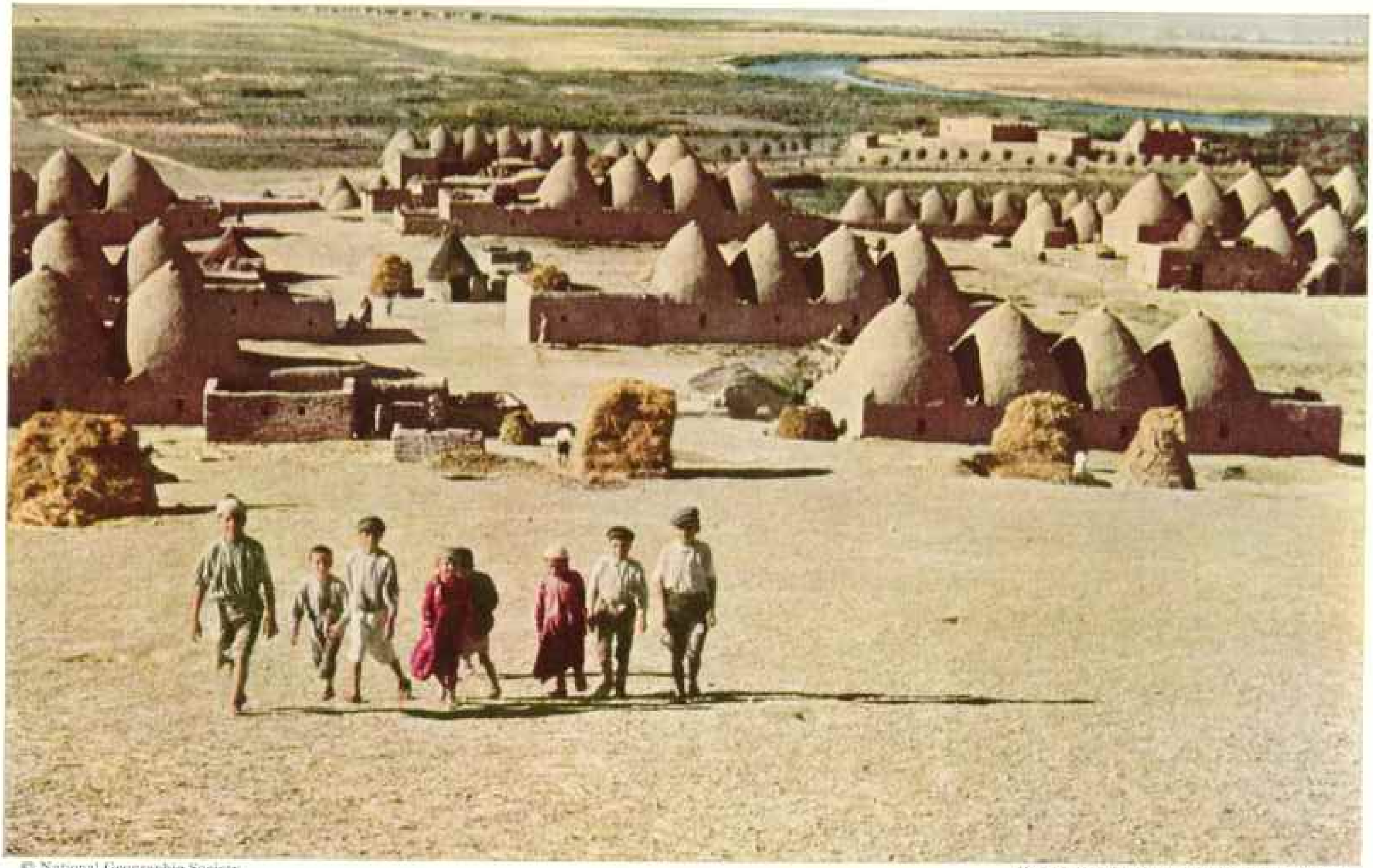
*See, in the NATIONAL GEOGRAPHIC MAGAZINE, by Maj. Edward Keith-Roach, "Pageant of Jerusalem," December, 1927, and "Changing Palestine," April, 1934; and "Impressions of Palestine," by James Bryce, March, 1915.



© National Geographic Society Kodachrome Photograph by W. Robert Moore

GROANING WOODEN WHEELS, RIMMED WITH BUCKETS, LIFT WATER FROM SYRIAN STREAMS

Some wheels are more than 60 feet high. On a still day their bowls and squeaks are audible a mile away. Arab swimmers often grab a paddle on the wheel's upswing and ride it completely around or dive off while high in the air. This wheel pours water into the stone aqueduct which supplies houses and gardens in the city of Hama (Hamath), through which Abraham passed.



Kodachrome Photograph by W. Robert Moore

SURVIVORS OF THE ONCE MIGHTY ASSYRIAN KINGDOM RULED BY SENNACHERIB FIND SHELTER NOW IN SYRIA

Assyrian refugees were colonized on the Khabour River (right background) by the League of Nations. Windowless, with one low door, their thick-walled beehive huts resist summer heat and wintry winds.

Kodachrome Photograph by W. Robert Moore

ALAOUITE WOMEN DANCE ON THE BEACH NEAR ANCIENT SELEUCIA, NOW SOUEIDIE, FROM WHICH ST. PAUL SAILED FOR CYPRUS

These women have no souls, according to the belief of their menfolk! Moslem Alaouites do not marry, as we understand the word; they simply buy as many wives as they can afford. Women have no social rank; here a father may with propriety sell his own daughter.

ALAOUITES CELEBRATE A MYSTERIOUS FESTIVAL NEAR ANTIOCH

The odd, white-plastered object resembling a coconut cake is an outdoor altar on which sometimes offerings of perfumed charcoal are burned. Beneath it a priest may be buried.

© National Geographic Society Kodachrome Photographs by W. Robert Moore

LEAGUE OF NATIONS PROTÉGÉS GARB FOR A HOLIDAY

These Assyrians speak Syriac, a dialect of the same Aramaic language which Christ spoke. They inhabit sugar-loaf houses, so built because timbers for roof beams are scarce (Plate II).

"SWING MUSIC" TO THE TOOTS OF ARAB FLUTES

Of ancient origin, and known for their peculiar doctrines and practices, these Moslem Ismailites are followers of the religious leader Aga Khan III.

 Kodachrome Photographs by W. Robert Moore

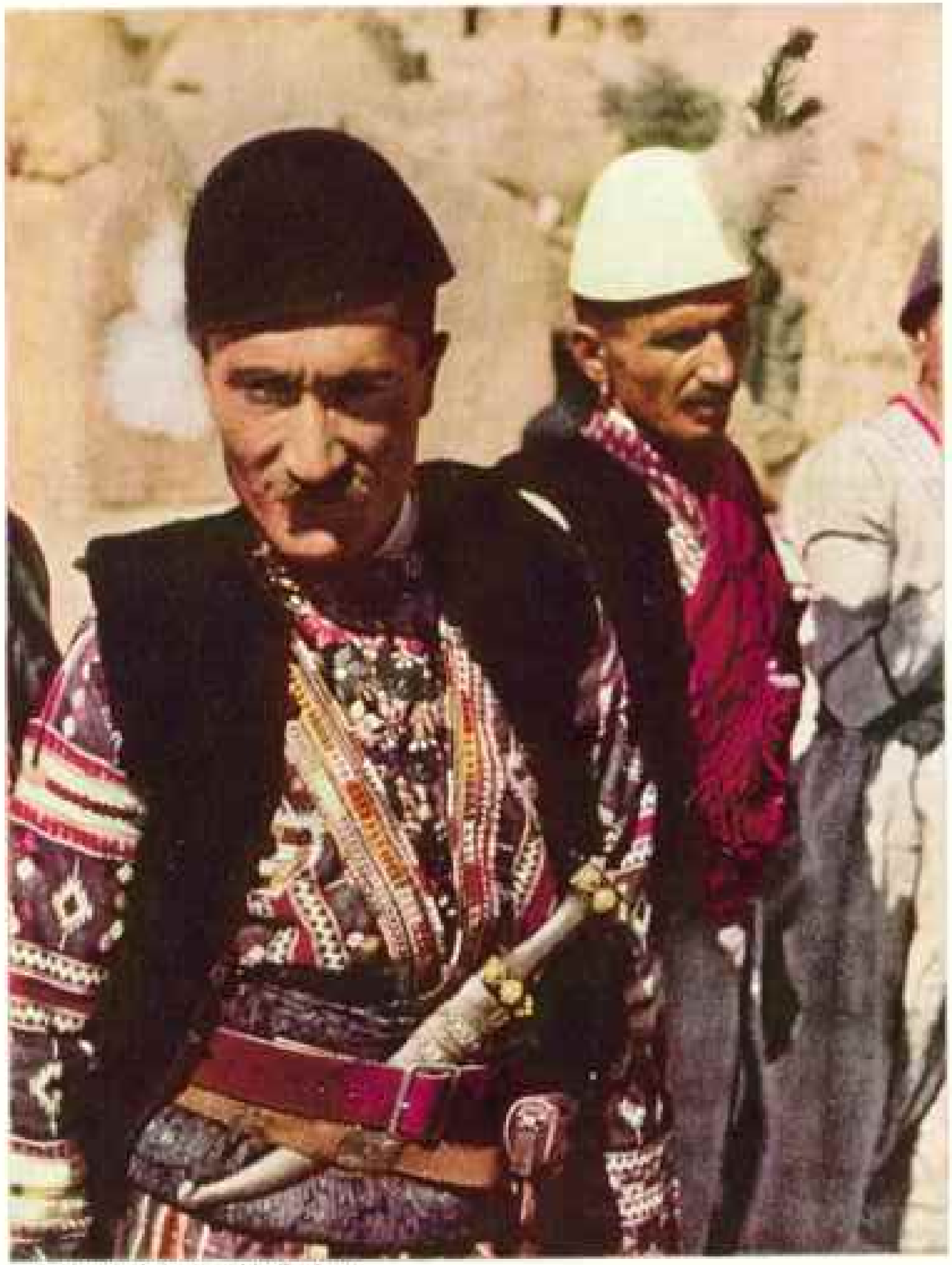
NOT ORIENTAL RUGS BUT SQUARE YARDS OF APRICOT JAM!

Fragrant orchards flourish about Baalbek's ruined temples to Venus, Bacchus, and Jupiter, which rose above an earlier one to Baal. About these classic piles Syrians sun-dry "blankets" of jam.

Kodachrome Photograph by W. Robert Moore

IN THIS CHANGING EAST, SNOWY LEBANON SLOPES NOW LURE THE DEVOTEES OF SKI AND BOBSLED SPORTS

Besides their development of industry and irrigation, French engineers have covered the Levant States (Syria) with a network of motor highways. Easily accessible now, Lebanese resorts are popular the year round. Goats and sheep graze in the rich Litani Valley, near ancient Baalbek.



THEIR ANCESTORS SERVED THE KINGS AT NINEVEH

Though these men are exiled now to Tell Tamer, with the few other surviving Assyrians, their forebears ruled a glittering world capital, ornate with marble palaces and gates flanked by giant figures of winged bulls.

Kodachrome Photographs by W. Robert Moore

DESPITE BRAIDED TRESSES, HE'S A WARRIOR

This sun-bronzed Arab soldier serves in the desert corps at Deir-ez-Zor. Today French, British, and Turkish drillmasters train their men on plains that once felt the tramp of Assyrian, Roman, and Crusader legions.

WATER JARS, ANCIENT SYMBOLS OF WOMAN'S TOIL

Pontius Pilate built Jerusalem's waterworks; Caesarea piped water from the hills; Damascus has had running water for centuries. Yet, in villages women are forever trudging, balancing jars on their heads.

 Kodachrome Photographs by W. Robert Moore

THE STORY OF JESUS IS BEAUTIFUL IN ANY TONGUE

With rapt attention, this priest of Tell Tamer reads from an old, hand-illuminated Holy Book in the Syriac language, opened to selections from the Gospels of John and Mark. The illustration depicts the Master riding an ass.

down into this evil lake chokes to death and pickles like a Bismarck herring.

Huge saltworks stand at the sea's south end, near some oddly shaped salt formations. One column, local tradition says, is Lot's wife, who "turned to a pillar of salt" when she looked back to watch the ruin of Sodom and Gomorrah. These "wicked cities of the plain," destroyed by "fire and brimstone," stood hereabouts, where you still see signs of old volcanoes; their sites have long been sought by French archeologists.

Turning back up Jordan Valley, we crossed the river on Allenby Bridge and entered Trans-Jordan.* This territory, also under British mandate, is ruled by an emir; ancient Amman, "Philadelphia" in Greek days, is its oasis capital.

Here you see the ruins of the largest Greek theater in the East, and a railway that runs south through hills and away toward Mecca. At Machaerus in those same hills, Salome danced for the head of John the Baptist.

In the Jordan they show you the ford where the Israelites crossed. Upstream is a hydroelectric plant. From it steel towers march across Palestine carrying power lines.

By way of fanatical Nablus, where a handful of the original Samaritans still survives and where fine olive oil soap is made, we went to Tiberias, on the Sea of Galilee.

Turning a bend, we came suddenly on a burning railway station, with excited men running about.

"Look, Whiting!" I said. "They're burning the depot."

"Step on it, Pot Rash!" ordered Whiting, as truckloads of British soldiers, their guns at "ready," came rushing from somewhere.

On Jewish farms near Galilee, women in blue shorts were hoeing, while their men stood guard with rifles, watching for Arabs, just as pioneer New Englanders carried their muskets to the fields and to church, alert for Indians.

Modern Tiberias town, by Galilee, is now a pleasure resort. Busloads of giggling Girl Scouts had just arrived and were gleefully changing for a dip as we came up. On the Sea of Galilee rested a flying boat, London-bound from the Far East (p. 702), and leg-weary Australian passengers from it were laughing and jesting at the hotel bar.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Visit to Three Arab Kingdoms," by Junius B. Wood, May, 1923; and "Petra, Ancient Caravan Stronghold," by John D. Whiting, February, 1935.

Galilee! Here Christ preached, cured the sick, walked on the water, raised the dead, and told the Disciples where to cast their nets. We ate fish from Galilee, and I wondered if they were the same kind the Disciples caught.

On Galilee Christ calmed the tempest. "Such sudden squalls still whip up," said a pilot, "sometimes so suddenly that it makes us trouble."

We flew away, east, to Baghdad and the Iranian frontier, to see what changes are afoot there.

OVER DESERTS TO THE GARDEN OF EDEN

Today you can go from Palestine east to Baghdad either by air-cooled motorbus or by one of several air lines.

Both land and sky lanes parallel an oil pipe line, which stretches from Iraq to the Mediterranean.

"Boisterous, hard-as-nails Oklahoma and Texas oil-field workers laid that line," said a British official, "and I lift my hat to them. I know what an incredible job they did, for I was their boss. They drank, they fought, they got in jail whenever we worked near a city, but I desire, here and now, to pay them this tribute, through your magazine: They did the job, in terrific heat and thirst; they dug and dynamited their way through all those 618 terrible miles and laid our pipe to the sea. What *men* they were!"

For long after you pass Amman, with an airport convenient for trans-desert flyers caught in dust storms, you see few signs of life until you reach Rutba wells. This ancient watering place has served caravans since time immemorial.

With its stockade, camel police force, resthouse, wireless station, and cool water, it is a welcome stopping place for both land planes and trans-desert bus lines.

Heavily loaded, a convoy of some thirty Baghdad trucks, bound for Damascus, had just arrived. Searching for smuggled guns and ammunition, police were forcing angry drivers to unload the whole heavy train—a heartbreaking task.

Always, going on east, we followed the pipe line. At Al Falluja the motor road crosses the Euphrates on a steel bridge. Near by sprawls a vast, white pattern of barracks and hangars, the camp of the British Air Force, here to help Iraq's king keep the peace.

Downstream from Al Falluja, a new dam spans the Euphrates. Canals from it now irrigate the old "Garden of Eden," for cen-

© G. Eric Matson

PRIESTS BLEW RAMS' HORNS WHEN JERICHO WALLS FELL

Jews call this sacred object a "shofar." It is not a musical instrument but a signal horn to call people together or warn them of danger. A ram's horn was sounded in a Tel Aviv synagogue during recent Arab troubles; one was used in the procession accompanying the Ark of the Covenant.

turies a dry waste after raiding Mongols cut the ancient ditches; one of these was the great Nahrwan Canal, longer than either the Suez or Panama ditches. The late Sir William Willcocks, famous English hydraulic engineer, once showed its sand-filled outline to me. No wonder Herodotus in his day could write that once Babylonia was a "sea of verdure."

South of Babylon stands mystic, windowless An Najaf, from whence a British consul and I years ago barely escaped with whole skins when we sought a glimpse of its strange underground chambers, inhabited then by robber gangs who lived by looting the passing pilgrims.

Today railroad trains whistle through the Garden of Eden; they rumble past the site of the Hanging Gardens and that Babylon palace where the Hand wrote on the wall at the feast of Belshazzar (page 731).

BAGHDAD KEEPS PACE WITH CHANGES

I hadn't seen Baghdad for many years. But for a few familiar old mosques, minarets, a bridge of boats across the Tigris, and the cone-shaped tomb of Zobeide (the late Mrs. Harun-al-Rashid), I wouldn't have known it at all.

In 1911 I wrote in the old New York *World's* Sunday magazine: "One day sight-seeing buses will rumble along the Tigris and the man from Cook's will lead his teachers and preachers through Baghdad's crowded, odoriferous bazaars."

Well, there they are!

Wide new streets perforate many once-dense quarters. Noisy motor horns and coffee-shop radios drown the muezzin's call. The local English *Times* circulates 5,000 daily. Imported European cabaret artists entertain the narghile-sucking effendis for whom, in my day, night life meant a half-blind old man thumping on a goatskin drum while a steatopygic Armenian girl in soiled silk and cheap spangles pranced through her clumsy steps.

South, down the Tigris, is the rejuvenated port of Basra, old haunt of Sindbad the Sailor.

Since the World War, says Sir John

Ward, Director General of Navigation for Iraq, this port has grown more than during all centuries past.

BASRA IS IRAQ'S GATE TO THE SEA

Today, steamers from all seafaring nations call here, including a fleet of nearly 100 tankers owned by the Anglo-Iranian Oil Company. Of oil alone more than ten million tons a year are shipped. That would be equal to 200,000 carloads! What a train!

Railways from Baghdad end at Basra's water front: Pullman cars often stop on the wharf so that passengers may step from train to ship, or vice versa. From Basra's vast palm gardens the world buys about 85 per cent of all its dates. Boatloads of horses, for polo, races, and cavalry, go to India.

Unchanged in design since Sindbad's day, some 6,000 Arab sailboats also call here each year. They trade even to far-away Zanzibar and long had a bad name as slavers.

Photograph by Maynard Owen Williams

DOWN WILL COME BABY, CRADLE AND ALL—IF MAMMA TRIPS!

With her child sound asleep in the basket, this Arab woman of Nablus goes her way with apparent indifference. Fancy a fond young American mother facing traffic with her first-born balanced on her head!

English, Netherland, and French air lines all serve Basra, air riders shuttling between London and Paris on one end and Hong Kong, Manila, Singapore, Sydney, or even Tasmania, on the other (page 702).

On the top floor of a great air-cooled hotel, which has its own customs hall, immigration, passport, and medical offices, is a control tower; it houses the wireless, the direction finders, and meteorological centers, where weather reports come in by teletype.

Here again, however, it is not size or structure which stuns the imagination, but the *speed* at which this long-somnolent East is being transformed.

PERSIA, AS SUCH, NO LONGER EXISTS

Iran is the new name for Persia.* For millenniums this was a lotus land of horsemen and hawking, of polo, poetry, and perfume, of fire worship and tribal feuds. Only by caravan, over rough roads, could it be penetrated.

* See "Persian Caravan Sketches," by Harold F. Weston, and "Modern Persia and Its Capital," by F. L. Bird, NATIONAL GEOGRAPHIC MAGAZINE, April, 1921.

Now its new railroad spans plateaus and mountain ranges (page 696). Highways spread their net.

Feudalism is no more. The free-to-fight-anybody warrior tribes, such as the long-turbulent Bakhtiari, have been disarmed, the leaders liquidated, and the rest put to work. No more old-time nomad trekking from mountain to plain, after grass.

Today, the use of Persian in letter writing and advertising is compulsory. Even signboards over hotel, bank, or travel agency must be printed only in Persian—no more foreign ABC's!

"This causes visitors constant confusion," said a local banker. "They can't read Persian, so they can't tell a Cook's or an American Express signboard from that of a Palace Hotel. The new law extends even to labels on canned goods and liquors."

OIL PAYS FOR MODERNIZING ANCIENT LANDS

In this Near East oil signs were plain in ancient days. Legend says Noah calked his Ark with asphalt from springs near Hit. When Zoroastrianism was Iran's state religion, its holy fires fed on gas issuing from the earth.

Today, producing fields stretch from Baku south to the Persian Gulf; at Al Kuwait and on Bahrein Island the Standard Oil of California and other American and British interests are active.

Iran's main fields lie southeast of the Zagros Mountains, with the main pipe line running down the Karun Valley. When I first saw this then-fever-cursed Persian coast in 1909, pioneer American "well shooters" from Texas, sweating in awful heat, were dragging pipe-laden barges up the Karun River to these new fields. Today, as in rich Masjid-I-Sulaiman fields near Shush, the "Shushan" of the Bible, where Esther was crowned Queen, the great Anglo-Iranian Oil Company has completely revolutionized the old way of native life.

From the wells a railroad runs down to the Karun River, where it connects with steamers for Ahwaz and Abadan.

Till a few years ago Abadan was a poor village of half-wild Arab fish-and-date-eaters. Now it boasts one of the world's greatest refineries. Here are hundreds of Europeans and their families, besides thousands of native workers. With its sport clubs, amateur dramatics, races, and fancy-dress balls, Abadan is a social yardstick that measures the new rhythm of Near Eastern life. Imagine what changes Sindbad's giant roc would see, could that old bird come back and fly beside your plane!

THE FRENCH RULE IN SYRIA

Back in Palestine, I rejoined Whiting for a trip through Syria.*

At the frontier, on the Damascus road, we came to that barbed-wire barricade stretched by the British to control border gunrunning (page 726).

Here was excitement; vandal Arabs had just pulled down and dragged away a half mile of the fence. Another band seized a steam roller and at pistol point forced its crew to use their big engine as a ram in breaching the barricade.

Life seemed quieter on Syria's side of the long wire fence. It was like leaving war-torn Sonora, in a Mexican revolution, for a night's rest in Arizona.

Often called "the world's oldest city," Damascus bows but stiffly to modern progress (page 745). Amid the soothing freshness and quiet beauty of fascinating gardens, its serene old spirit still lives.

DAMASCUS STILL TAKES IT EASY

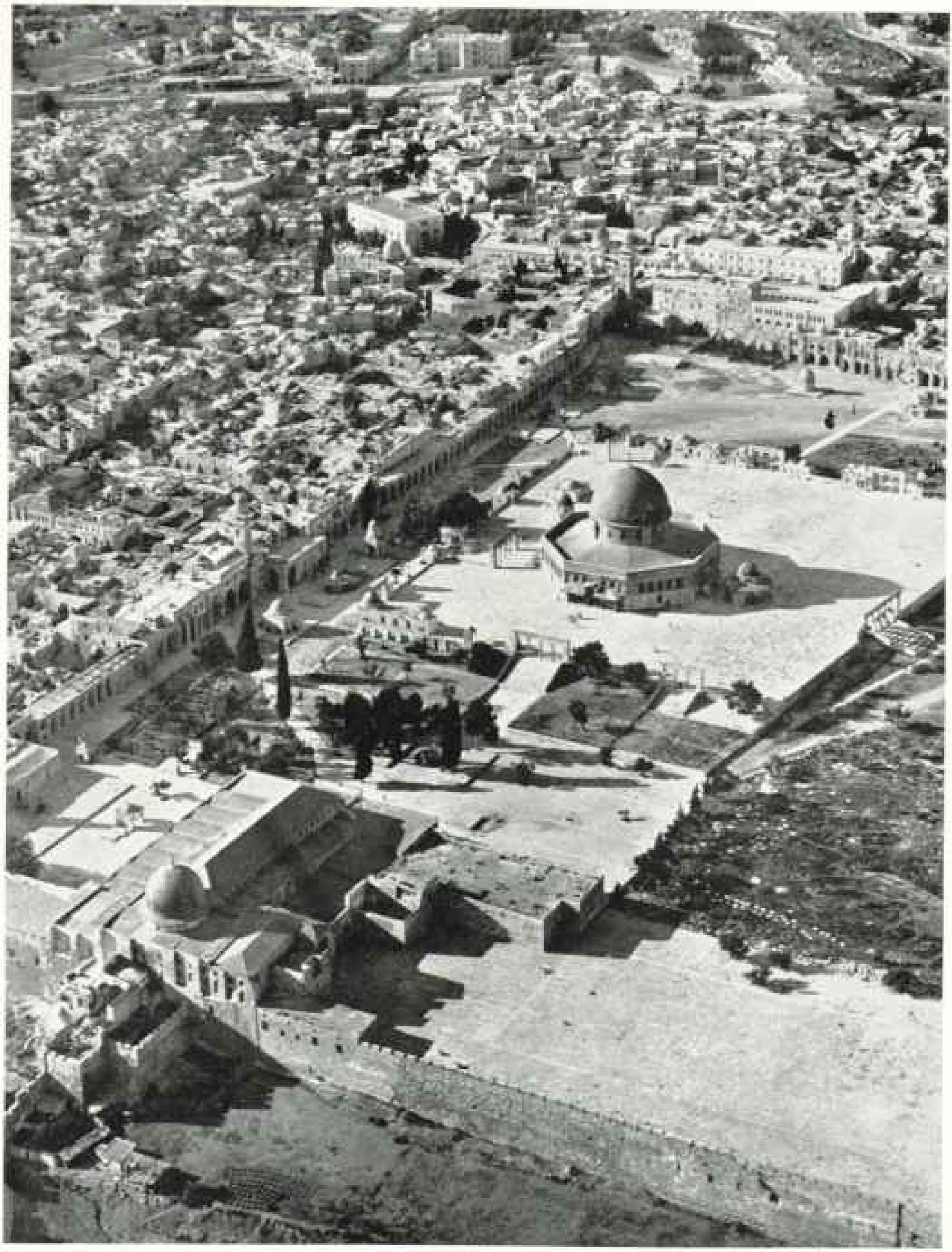
Beneath my Omayad Hotel window, the Abana River rippled as softly as on that night when St. Paul's friends lowered him in a basket from the city wall. Here, as from Cairo to Baghdad, if a traveler feels drowsy, he simply picks out a shady spot where cars can't hit him, pulls his shirttail over his face to keep off the flies, and goes to sleep.

Not everybody sleeps. We saw bazaar boys, not over twelve, sewing on harness, shoes, and shirts, working from dawn till dusk. One boy filed ivory, making fine combs, like those found in ancient tombs. Across the arcade, fragrant with pleasant, spicy odors, an Americanized Syrian sold ice cream cones from a Frigidaire.

Beside the tomb of Saladin another lad played a mouth organ, while his father read a Paris newspaper.

Art students from Europe were copying ancient tiles of delicate design in the museum to which the French have brought rare treasures from Palmyra; here is a classic tomb chamber, complete even to

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Skirting the Shores of Sunrise," by Melville Chater, December, 1926, and "Syria: The Land Link of History's Chain," by Maynard Owen Williams, November, 1919.



MOSLEMS SAY MOHAMMED ASCENDED INTO HEAVEN FROM THE ROCK BENEATH THE DOME AT JERUSALEM

This Mosque, built on the site of Solomon's Temple, was mistaken for that edifice by Crusaders when they reached the Holy City. When a temple mob was about to kill St. Paul, Roman soldiers rushed in to save him. Orthodox Jews joined with Moslems in the belief that the Rock marked the exact center of the world. The second dome, in left foreground, is that of the Mosque El Aksa. Beyond the City Wall, in far background, rise some modern buildings of the new Jerusalem (page 708).

Photograph by W. Robert Moore

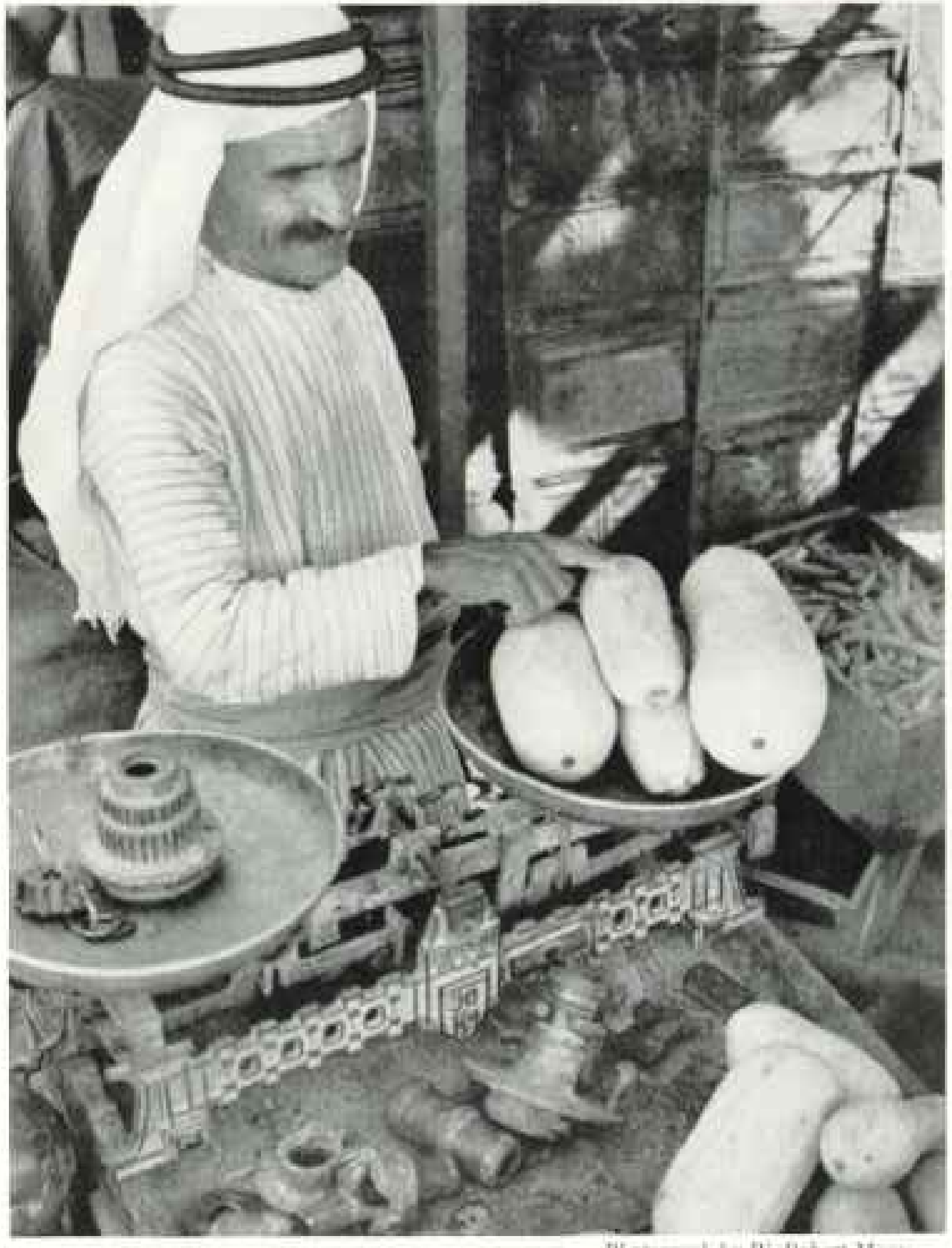
IN HIGH-POWERED AMERICAN MOTORCARS THESE BEDOUIN SHEEP BARONS COME TO INSPECT THEIR FLOCKS

Of the Anazeh tribe, this nomad band summers on the desert near Rakka, east of Aleppo. They own more than 100,000 sheep, some 15,000 to 20,000 camels, and the sheiks roll about Aleppo streets in five shiny new automobiles. Goat-hair tents of the tribesmen appear in the left background.

Photograph from Keren Hayesod, Ltd.

ONE JEW FIGHTS ARABS; THE OTHER, MOSQUITOES!

Much of Palestine, being high, dry, and rocky, is free of mosquitoes. In lower regions, however, such as the Jordan Valley and the flat coastal plains, stagnant water in ditches and marshes breeds the "wiggle tails." Malaria has been much reduced by oil spraying and other control work.



Photograph by W. Robert Moore

"WEIGHING HIS HAND!" SAYS THE LENS

And look at the scales—a homemade balance set, rigged from old automobile parts! Arabs are said to be quick at numbers; they developed algebra. Probably only this Arab can figure how much, in piasters, four vegetable marrows (long, tender gourds) cost when they weigh one big and one little gear wheel!

© G. Eric Matson

MEN RECOVERING POTASH SALTS FROM DEAD SEA WATERS WEAR BOOTS TO PROTECT THEIR FEET FROM IRRITATION

Swimmers in the buoyant lake can't sink; but the water burns their eyes if any gets in them. Somewhere on these shores stood Sodom and Gomorrah, those wicked cities at the destruction of which Lot's wife paused to look and was turned into a pillar of salt, according to the Bible story.

Photograph from Pictures, Inc.

TO HALT GUNRUNNERS AND RAIDERS, THE BRITISH BUILT THIS WIRE BARRICADE ON THE PALESTINE-SYRIAN BORDER

Known as "Tegart's Wall," for the officer who conceived it, the fence protects the most lonely stretch of the frontier. Often Arab vandals struck at it, even with steam rollers, in their campaign against Jewish colonists. Workers are seen repairing the fence after a raid had breached it.

Photograph by W. Robert Moore

PALESTINE'S BARREN, ROCKY HILLS BORDER THE GREEN JORDAN VALLEY WHOSE SACRED RIVER LOOPS SOUTH AND EMPTIES INTO THE DEAD SEA

In this stream Jesus was baptized. To it hordes of Christians have come to be immersed and from it water has been carried away in thousands of bottles for the baptism of infants yet unborn. Upstream a powerhouse generates current for use in towns and cities of Palestine. The Children of Israel, en route to the Promised Land, according to tradition, crossed the river at a spot just below the lower right corner.

TWO "GEOGRAPHIC" MEN COME TO A CROSSROAD OF HISTORY

From Aleppo this paved Syrian highway leads west to Antioch. Here it crosses a section of ancient stone Roman road, still in good condition. Both run parallel for some distance. At one point the author saw yet a third solid stone pavement, with deeply worn wheel ruts, running under the Roman road; it may be of Hittite origin.

Photograph by W. Robert Moore

ARABS LINE IRRIGATION DITCHES WITH CEMENT IN SYRIA

Since France assumed the mandate over this former Turkish possession after the World War, her engineers have developed highways, irrigation, and other useful public works. Here, near Homs, women work with men on a canal leading from a large lake which reclaims new farming land.

Photograph by Maynard Owen Williams

IN NABLUS, ANCIENT "SHECHEM," A FEW SAMARITANS STILL SURVIVE

The history of this Holy Land town dates back for 4,000 years. Here, under an oak, Jacob hid the idols his family had brought from Haran, and here Joseph came hunting his brothers. Chief among its industries is the manufacture of soap, from olive oil. During the Arab–Jewish feuds of 1938 it was the scene of much disorder.

stone doors that swing on stone hinges. And there's a clay floor tile over which somebody's dog trotted before the clay had dried, and left his tracks. Had he lived, that dog might now be 3,500 years old!

Damascus! The house of Ananias; the Street Called Straight; the tomb of Fatima; the ass and spice markets; excited shouts in the criminal courts; the open-air cafes beside the running brooks, where we ate green almonds, rented a water pipe for Pot Rash, and startled the dancing girls when we made a flashlight picture! Damascus *is* Paradise, as its people say.

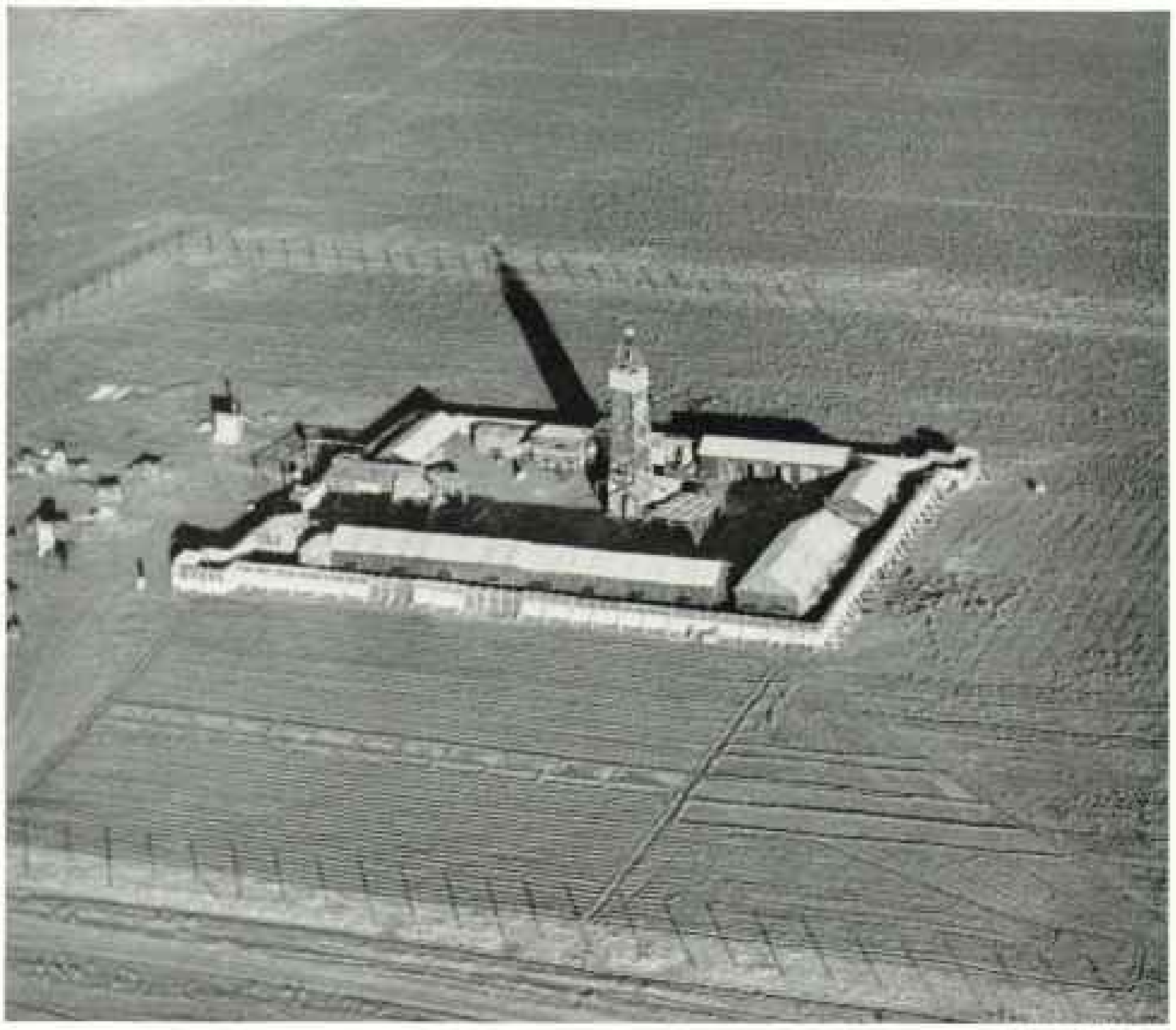
Past a mill that makes the world's stickiest glue from goat horns, mule hoofs, and camel feet, we rode away for Baalbek, in the valley of the Litani.

Nobody knows who built Baalbek, or when. Cain built it, one Arab legend says, after Jehovah cursed him. In such myths its earlier annals are obscured.

That Greeks came later and named it Heliopolis, and that then Romans arrived and raised their temples to Jupiter, Venus, and Bacchus, is recorded history. When yet far off we could see enormous columns piercing the evening sky. Hawks chased flying flocks of sparrows in giddy turns about the crumbling Temple of Bacchus as we came up.

Downtown in modern Baalbek, its coy maidens flash dark eyes at trim French soldier boys of the local garrison, while their papas talk Syrian politics and are more interested in how much today's travel parties spent on tips and antiques than in "How old is Baalbek?"

From the near-by flying field, French planes glistened in the morning sky as Pot



© Orient by Kluarr

VIVIDLY THIS FORTIFIED FARM, WITH WATCHTOWER AND SEARCHLIGHT, SHOWS HOW JEWISH SETTLERS MUST GUARD AGAINST ARAB RAIDS

First, the farmhouse itself and all its barns, machine sheds, grain bins, chicken coops, and other outbuildings are set facing a plaza, like a military post. All about runs a wall or stockade of double planks between which stone, sand, and concrete are packed to stop bullets. Outside this stockade a barbed-wire entanglement is erected to prevent hostile Arabs from suddenly rushing the fort, jumping over the barricade, and attacking the people inside. The high tower is the farm's "eye." A watchman is always on duty here, and all night a searchlight plays on the country about; in case of trouble it can be used for signaling adjacent Jewish farms. This one lies in the rich Valley of Jezreel, near the Syrian border.

Rash put on his fez and headed us for Aleppo. The vast plains we crossed were thick with camels—thick as cattle in west Texas. As we neared a road repair crew, busy with boiling asphalt and a steam roller, a camel driver with his belled animals tied head to tail had just passed.

"There's a good picture to show changing Bible lands," said Whiting. "But keep the camera out of sight."

Overtaking the camel driver, we said: "Turn around. Go back and lead your camels past that road machine again and we will pay you two piasters."

"But I've already passed it," he replied.

"How mad you speak. Why to back?"

"For two piasters!"

"All men are born of women, even fools!" he growled, as he turned around, uneasy with suspicion, and went back. But the last camel on his string, the one that always wears the biggest bell so the driver will know his string is unbroken, this time took fright at the puffing road roller, jerked loose from the tail of the animal in front, and bolted into the barley fields. Angry now, the driver caught the runaway and reorganized his camel parade.

Sullenly he took his two piasters, and said: "I knew you spoke as fools, right

© British Royal Air Force

BABYLON, ONCE A WORLD CENTER OF POWER AND GLORY, IS NOW A PILE OF DUST AND BROKEN WALLS

Daniel knew this wicked city, and so did Abraham. Here proud Nebuchadnezzar built his palace—before he was humbled to eat grass with the wild asses. Here came Alexander the Great, to die. Here Belshazzar held that famous feast where "they drank from golden vessels, as the Book of Truth records," when the Hand came and wrote on the wall. Now the trains for Basra whistle past on the track in the foreground, but there seems little to stop for. The Bible prophecies of its utter ruin have all come true.

from the first. I should never have turned back!"

At smoky, whistling Homs, surrounded by grainfields, Syrian railroads converge.

HOMS IS LIKE A KANSAS RAILROAD TOWN

Lunching at Homs Union Station, in what our Southwest would call a "Harvey House," we chatted with French railway men and watched the switching. Wagon-lits here, with familiar blue-china dishes and uniformed waiters, handle through passengers for Paris, via Istanbul.

Going on to Hama and Aleppo, we passed those odd villages of windowless beehive huts that stand like giant apiaries over this part of Syria. Hama is old "Hamath" of the Second Book of Kings, which tells of its conquest by Assyrians. Through it flows the Orontes, along which the French now build reclamation works. Strange growling sounds, not unlike a distant lion cage at dawn, came to my ears as we neared town.

"What's that, Whiting?" I asked.

"Water wheels," he said. "There's one now. On a still morning you can hear them a mile away. They lift water from the Orontes River for Hama's houses and gardens" (Color Plate I).

Naked Arab boys swimming about one turning wheel—it was 64 feet in diameter—would grab a paddle, ride high up in air, and dive off. One foolhardy youth, for two

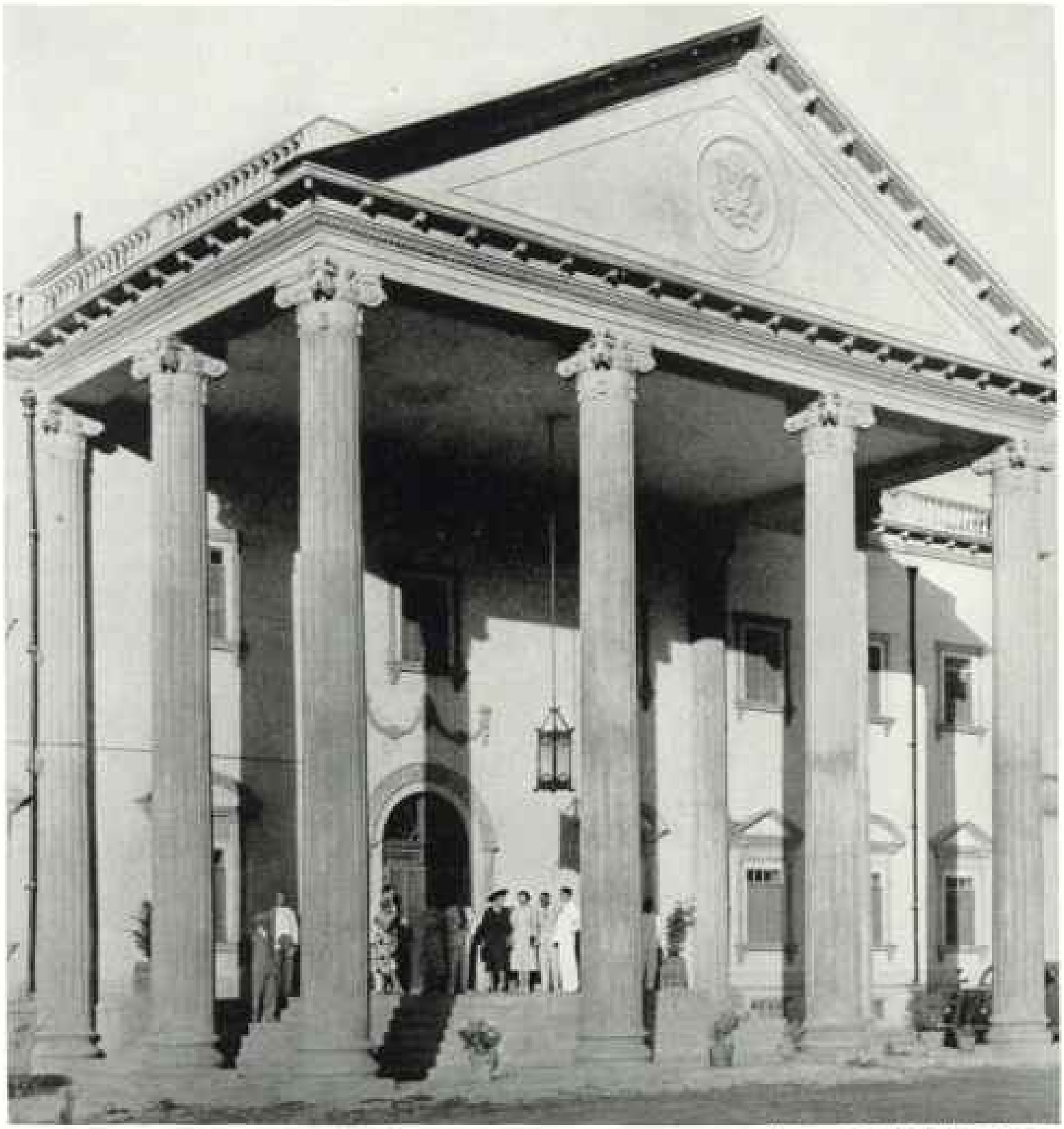
BENEATH HIGH-TENSION POWER LINES BEDOUINS PITCH A GOAT-HAIR TENT OF A TYPE UNCHANGED SINCE THE DAYS OF ABRAHAM

In the background is seen a railroad grade and one of the airplane hangars of Haifa. Such are the contrasts of life in the swiftly changing Near East; and last to yield is the nomad.

Photographs by W. Robert Moore

THIS DESERT-GOING BAGHDAD-DAMASCUS BUS IS AIR-COOLED AND WAS "MADE IN U.S.A."

Temperature was 111 degrees Fahrenheit when the picture was taken at Baghdad's airport, but inside the stainless-steel bus, operated by the Nairn Transport Company, it was only 76. Now, in a few hours, these huge high-speed cars make the trip that once took camels many days.



Photograph by W. Robert Moore

BAGHDAD'S NEW AMERICAN LEGATION IS A BABY WHITE HOUSE

Designed by the present United States Minister, Mr. Paul Knabenshue, as a miniature reproduction of the President's residence in Washington, D. C., this edifice was also the first in the Iraq capital to be air-conditioned. Adjacent to the Legation stands another official structure, built for the use of American consuls, diplomatic secretaries, and their staffs. This property is not owned outright by the United States Government, as legations are in many lands, but is under long lease to it.

piasters, rode the great wheel completely around!

When a muezzin's call to prayers sounded, many boys left the river for devotions. How loud would an American Sunday School bell have to ring, I wondered, thus to lure our youngsters from a swimming hole! A fanatical spot, Hama; no French or Hebrew is spoken here! Of this region, again in the Second Book of Kings, it is written: "Speak, I pray thee, to thy servants in the Syrian language; for we understand it: and talk not with us in the Jews' language."

Sunset painted Aleppo's towering citadel as we came near; from its ancient ramparts, used now by French troops, floated the sundown bugle call. We climbed up for the incomparable view, and smiled with masculine understanding at French soldiers using field glasses to watch Syrian maidens strolling far below.

Rapidly, these days, after forty centuries of Oriental life, Aleppo becomes European-

ized. Till after midnight, crowds pack its open-air cafes and stroll its wide sidewalks. On the regular Near East circuit, Hungarian and Polish theatrical troupers say Aleppo is a good show town.

"It even has its stage-door Johnnies," said a consul. "I know of cases where badly smitten youths have followed these road-show queens from here to Tel Aviv and on to Cairo."

Permanent-waved Syrian women and their smartly gowned daughters formed fully half the audience in one vaudeville theater we attended, showing how customs change.

Even in the 27 miles of arch-shaded bazaars, the trade tide has turned. Now they sell mostly European wares. Some vast khans, where vanished camel caravans from the East used to unload, are used now to store goods of the Western World.

Many old industries survive, of course, including that of silk. I had pure silk shirts made to measure for $1.50 each. Match that on Fifth Avenue!

CROSS SECTIONS OF OLD AND NEW SYRIA

North of Syria lies the stout young Turkish Republic, all that's left to the Turks of their former vast empire.* Singularly progressive, vastly changed since the Sultans passed, new Turkey has had a profound effect on daily life in the Arab lands that once were part of the Ottoman realm.

Good roads and rails link Syria with Turkey. From Aleppo we rode west, reaching the sea at Latakia, once a seaport for Antioch; Ras Shamra, where archeologists found the world's earliest-known alphabet, lies just to its north.† But there's little to hold you in Latakia itself, except a Roman arch and a primitive pottery shop which turns out handmade jars big enough to pickle a cow.

Past groves of sacred oaks, those thick oaks or places of sacrifice mentioned in the Bible, we cruised slowly down that ancient road that runs around the Mediterranean, all the way to Egypt. For at least 2,000 years this was the world's busiest and best-known road. It was the land link between the only two civilizations the world then knew, those on the Nile and the Euphrates. On roadside cliffs near Beyrouth many armies, from ancient Babylonian to modern British, have set up tablets commemorating their passing.

Crusader forts and castles crown almost every hilltop you pass. Today French army officers drill their Senegalese where Crusaders tramped in coats of mail.

Flocks of silvery storage tanks flank the road at Tripoli, oil flowing here through a north fork of the pipe line from Iraq. No good harbor exists; so an undersea pipe carries oil out to a float where tankers load, as they load from a similar subterranean hose off Kettleman Hills fields in California.

Since British cavalry took this port in October, 1918, it has come to life. Of the original Tripoli, whose great Arab library was burned by Raymond of St. Giles (also known as Raymond of Toulouse) in Crusader times, little remains.

Through tunnels that pierce high seaside cliffs, the motor road winds on to Beyrouth, Syria's richest and busiest port. Basking in sunshine beside a great bay named for St. George, who, legend says, slew the dragon here, Beyrouth for 2,500 years has figured in Mediterranean traffic (Plate X).

STUDENTS FROM 45 COUNTRIES

Today, as when it was a powerful Roman stronghold, the city is noted for its seats of learning. Conspicuous is the American University of Beyrouth. Of the part it plays in the changing East, its president, Dr. Bayard Dodge, said:

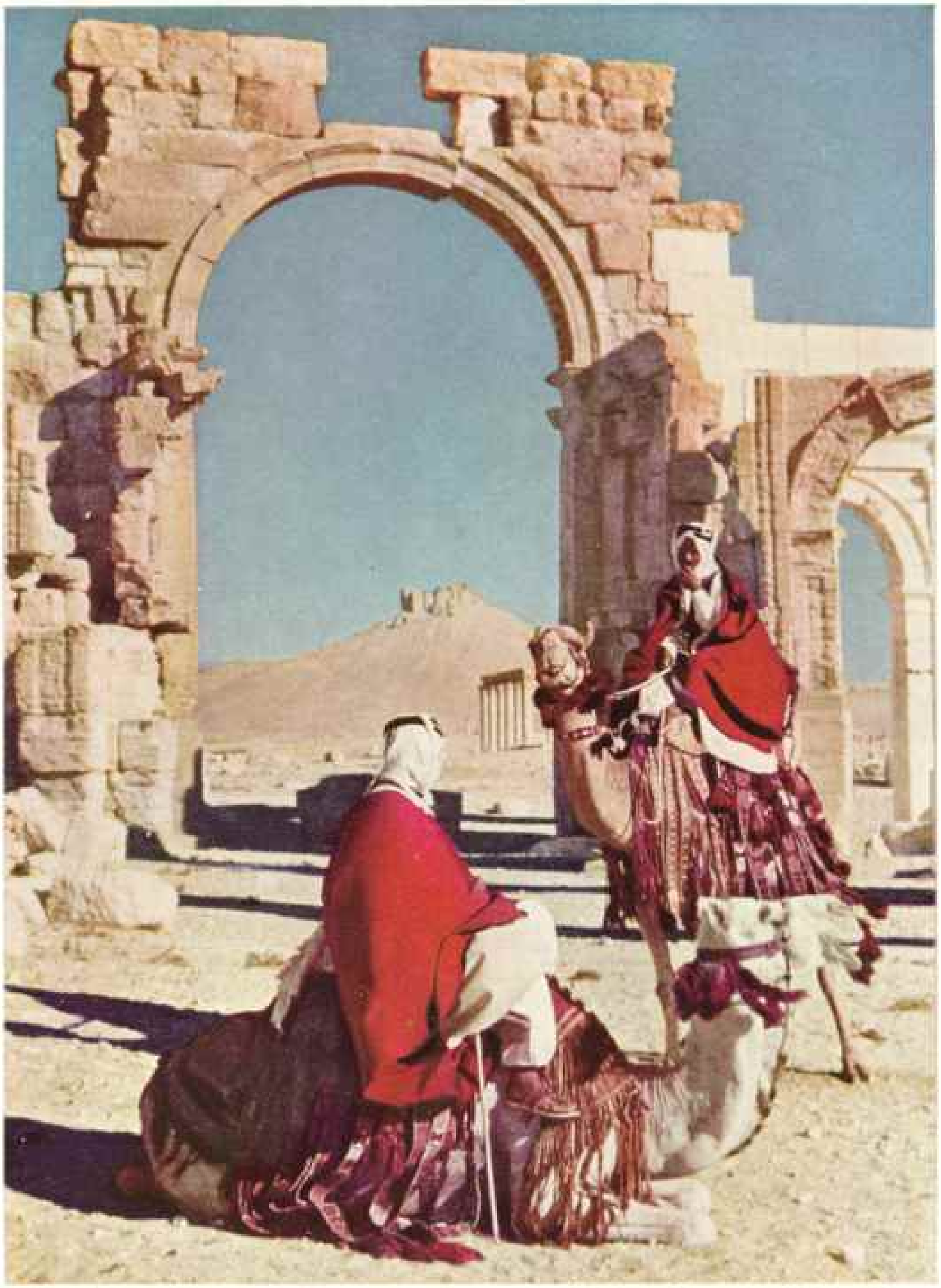
"We have students from 45 different countries. Some look like figures from Assyrian monuments; some are descended from Kurds and Arabs. At El Kerak high school in Trans-Jordan, I saw many boys who were direct descendants of French Crusaders who settled near there.

"One must remember that for centuries invasions have passed through this land, leaving behind the remnants of many racial groups.

"The southern Near East reminds me of the neck of an hourglass, connecting the Orient with the Occident. Sometimes the Orient has been on top, with a stream of cultural influence flowing into the Occident. Today the Occident is up, with social, political, and scientific ideas pouring into the Orient.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Looking in on the Everyday Life of New Turkey," April, 1932; "East of Constantinople," by Melville Chater, May, 1923; and "Summer Holidays on the Bosporus" and "Turkey Goes to School," both by Maynard Owen Williams, October, 1929, and January, 1929, respectively.

† See "New Alphabet of the Ancients is Unearthed at Ras Shamra" and "Secrets from Syrian Hills," both by Claude F. A. Schaeffer, in the NATIONAL GEOGRAPHIC MAGAZINE, October, 1930, and July, 1933, respectively.



 Kodachrome Photograph by W. Robert Moore

SOLDIERS OF THE FRENCH-TRAINED ARAB CAMEL CORPS HALT AT PALMYRA

Used for desert patrol work, 300 such troopers are stationed here, and a similar force is at Deir-ez-Zor, important military post on the Euphrates (Plates VII and XV). Should nomad outlaws rob a bus or truck convoy on the Iraq-Syrian highway, the camel corps would soon be after them. These ruins mark the site of the splendid capital of Queen Zenobia, the heroine who defied the Roman Empire. Emperor Aurelian advanced with his legions, defeated Zenobia's army, destroyed her capital, and carried her off to Rome.

Kodachrome Photograph by W. Robert Moore

BUSIEST SEAPORT OF THE SYRIAN COAST, BEYROUTH IS ALSO A CENTER OF FRENCH COLONIAL LIFE

Once a Crusader stronghold, and now capital of the Lebanese Republic and home of the French High Commissioner, Beyrouth stands on a vast promontory, facing north. It enjoys excellent ocean, rail, and motor-road connections, and, since Roman days, has been known as a seat of learning. Conspicuous among its schools and colleges is the American University, which draws pupils from 45 different countries.

TODAY IN HISTORIC NAZARETH SUCH COSTUMES ARE RARE

Modern sport dresses and high-heeled shoes have become increasingly popular among the womenfolk of the town where Jesus lived as a boy and learned the carpenter's trade.

Kodachrome Photographs by W. Robert Moore

WANT MEAT? LOOK FOR THE MAN IN THE RED COAT

Deftly this butcher wields his knife on the carcass of a freshly killed fat-tailed sheep. Slowly, but steadily, fly screens and iceboxes are coming into use, to give the Near East cleaner and safer food.

BETWEEN HIS TOES THIS RIDER HOLDS A CAMEL STICK

Behind his saddle rests the rifle which, as a fighter in the French-trained Syrian camel corps, is part of his equipment. Bright-colored trappings are the delight of every camel driver.

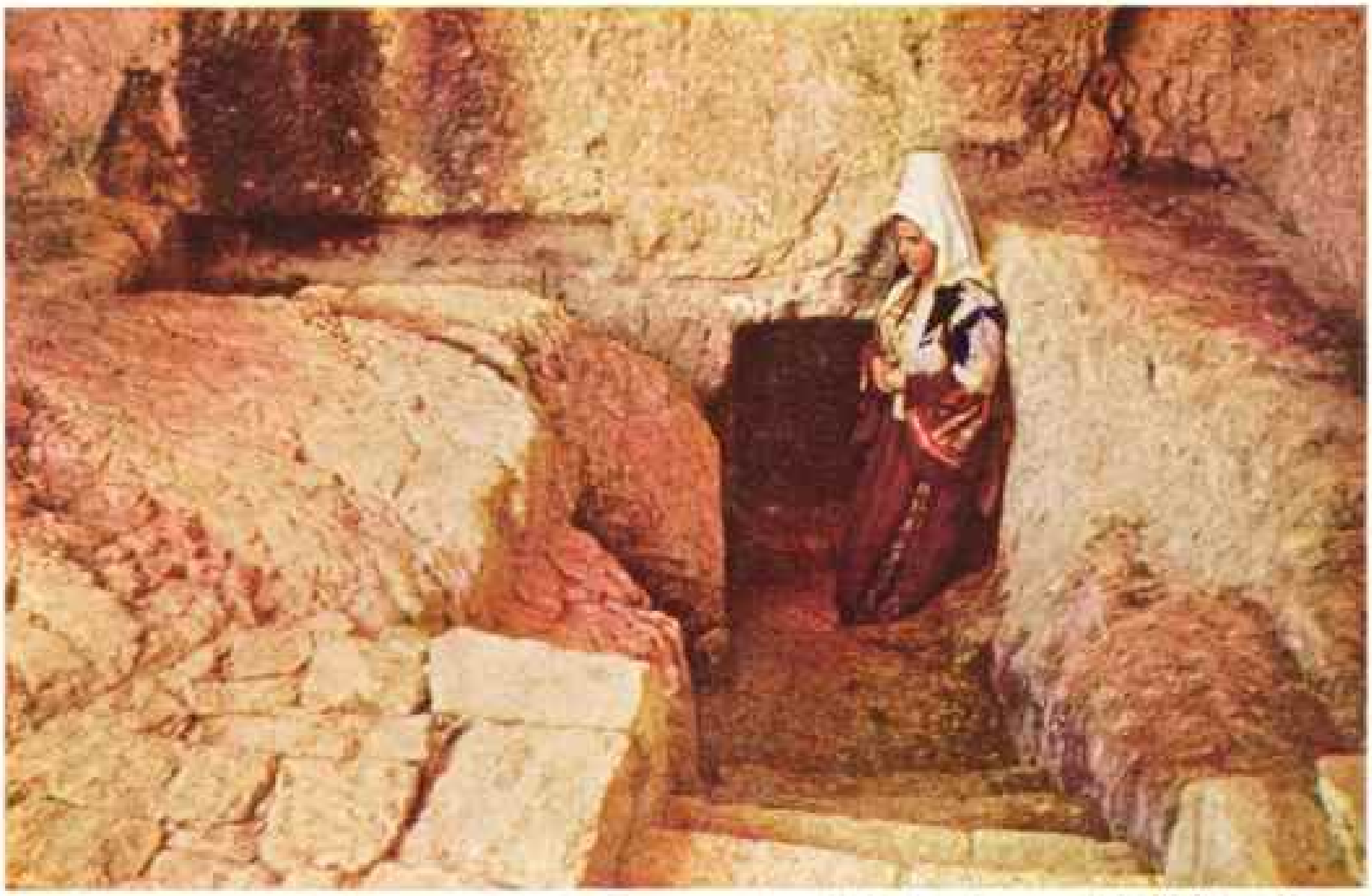
© National Geographic Society Kodachrome Photographs by W. Robert Moore

DIGNIFIED, IMPORTANT-LOOKING, DESPITE HIS RAGS AND LOWLY ASS

Over and over again, as when meeting such country Arabs as this old Antioch peasant, the stranger from the Occident is impressed by the poise, the self-reliance, and the philosophy of life inherent in rural folk of the Near East.

IN HIS YOUTH JESUS MAY HAVE KNOWN THIS WELL

Though sheltered now by modern masonry, the fountain near Nazareth has been in use for centuries. Every Holy Land visitor is struck by the spectacle of women carrying water (Plate VIII).



 Kodachrome Photographs by W. Robert Moore

THIS DARK DOOR OPENS INTO JERUSALEM'S "TOMB OF THE KINGS"

To shut the door, a huge stone wheel rolls in a groove. Similar to this may have been the stone which was "rolled away" from the tomb of Christ. In reality these are the tombs of Queen Helena and her descendants; the name originated in a tradition that the Kings of Judaea rested here.

Kodachrome Photograph by W. Robert Moore

MOST IMPOSING AND BEST PRESERVED OF ALL NEAR EAST CRUSADER CASTLES IS THE KRAK DES CHEVALIERS IN THE HILLS OF LATAKIA

Guarding the mountain passes to Tripoli on the coast, forts of a kind have occupied this strategic site probably since the days when Egyptians held the land. About the year 1110, the Crusaders began the present stronghold, large enough to shelter thousands of men and horses. They used it, and many other castles and forts whose ruins stretch down the historic coasts of Syria and Palestine, in their campaigns against the Infidels, the prize being the possession of Jerusalem and the Holy Places.

© National Geographic Society

DEIR-EZ-ZOR'S NEW BRIDGE SPANS THE EUPHRATES

With some 22,000 population, this is the largest city on the Biblical river. Roads lead east to Mosul and to Baghdad. Here the French maintain a strong military post, an air force, hospitals, and desert police.

Kodachrome Photographs by W. Robert Moore

SHEPHERDS SINCE KING SOLOMON'S TIME

Most of Palestine and the Levant States is rocky and semiarid. Good crops grow only in valleys, or on benches reclaimed by irrigation. Camels, goats, and sheep still provide a livelihood for thousands of dwellers in tents and towns.

THERE'S ALWAYS ROOM FOR ONE MORE ON ANY SYRIAN VEHICLE

Passengers clamber aboard at Antioch, ancient Roman stronghold on the road from Aleppo to the Mediterranean. Built of stone blocks, some sections of these highways are still as solid as when laid nearly 2,000 years ago.

Kodachrome Photographs by W. Robert Moore

SHOUTING THEIR KORAN TEXTS, BAGHDAD BOYS PROVE THEY'RE STUDYING

In a mosque the pupils sway back and forth while chanting aloud from Islam's Holy Writ. Many Iraq schools use textbooks in science or history originally written in English, French, or German, and translated into Arabic for local use.

"Before the war the Ottoman Caliph ruled the Near East with a system that was handed down from the Middle Ages. When the British and French established their mandates, they introduced modern forms of government, as well as automobiles, radios, movies, newspapers, cabarets, foreign business companies, and scientific thought.

"The motorcar in particular is working miracles. I once asked a sheik from Iraq how far it was from Baghdad to An Najaf. He replied, 'Five hours by car; five days by camel.'

"With the advent of the motorcar few places are still isolated. Newspapers reach the villages and Bedouin encampments. Every bright boy wishes to learn how to read and longs to go to the city, to seek his fortune.

"Science is upsetting traditional ideas of religion. Nationalism and the supremacy of the state are taking the place of allegiance to a chief and loyalty to the Caliphate.

"Feudal landlords cannot compete with modern business companies. Australian flour is as cheap as grain from the local estates. Foreign capital controls most of the tobacco and date business. Canned fruit from abroad is almost as cheap as fruit preserved locally, and Japanese silk is cheaper than silk grown in the country.

"Education is imperative if Near Eastern peoples are to succeed in the competition of modern life. Feudal families are degenerating as technically trained men and women introduce scientific methods of agriculture and industry. The old 'noblesse' of birth is being supplanted by a new aristocracy of brains.

"The future is full of danger, but it is also pregnant with opportunity, for a great renaissance is sweeping over Asia."

MAIN STREET THROUGH TYRE AND SIDON

Down the coast, in the steps of Jesus and the Disciples, we rode into the Bible town of Sidon.

A poster read: "Tonight, Pop-Eye the Sailor." At the Paradise Bar a Dodge truck unloaded beer. On the saloon's walls visiting sailors were scribbling rhymes; on a chair near the bar perched the biggest black rooster I ever saw.

"What for?" I asked.

"We like to have a chicken about," they said. "It's lucky."

There was a cage of bulbul birds, too. On it were stuck blue beads against the evil eye, green beads for fertility, and under it hung a chunk of alum.

"What for?"

"To warn us. If an envious man covets the birds, the alum lump will burst."

"THE LAST PHOENICIAN"

At the customs house Whiting found a Missouri mule, left here by British soldiers twenty years ago, and "the last Phoenician." This magnificent old man, with turban, long white mustache, and single gold earring, had all the dignity of a sultan; but his Turkish-style pants bagged at the seat like a worn-out hammock!

"My ancestors built boats for centuries," he said. "I'm the last of my line." He wouldn't pose for a picture until a good-natured policeman pretended to arrest him for refusing, which horseplay much amused the street loafers.

Wooden mousetraps, exactly like those once common in our Midwest, are sold in Sidon's bazaar; so are wooden slippers, pick handles, cart wheels, kitchenware, and furniture—and apples from the State of Washington! One man was making drums. Another was making mule shoes, from an old American cookstove he had melted down!

Down the road to Tyre, you pass the reputed Zarephath of Bible days, where the widow's meal in her barrel "wasted not." Somewhere hereabouts Joshua's host chased their enemies, "houghed their horses and burnt their chariots."

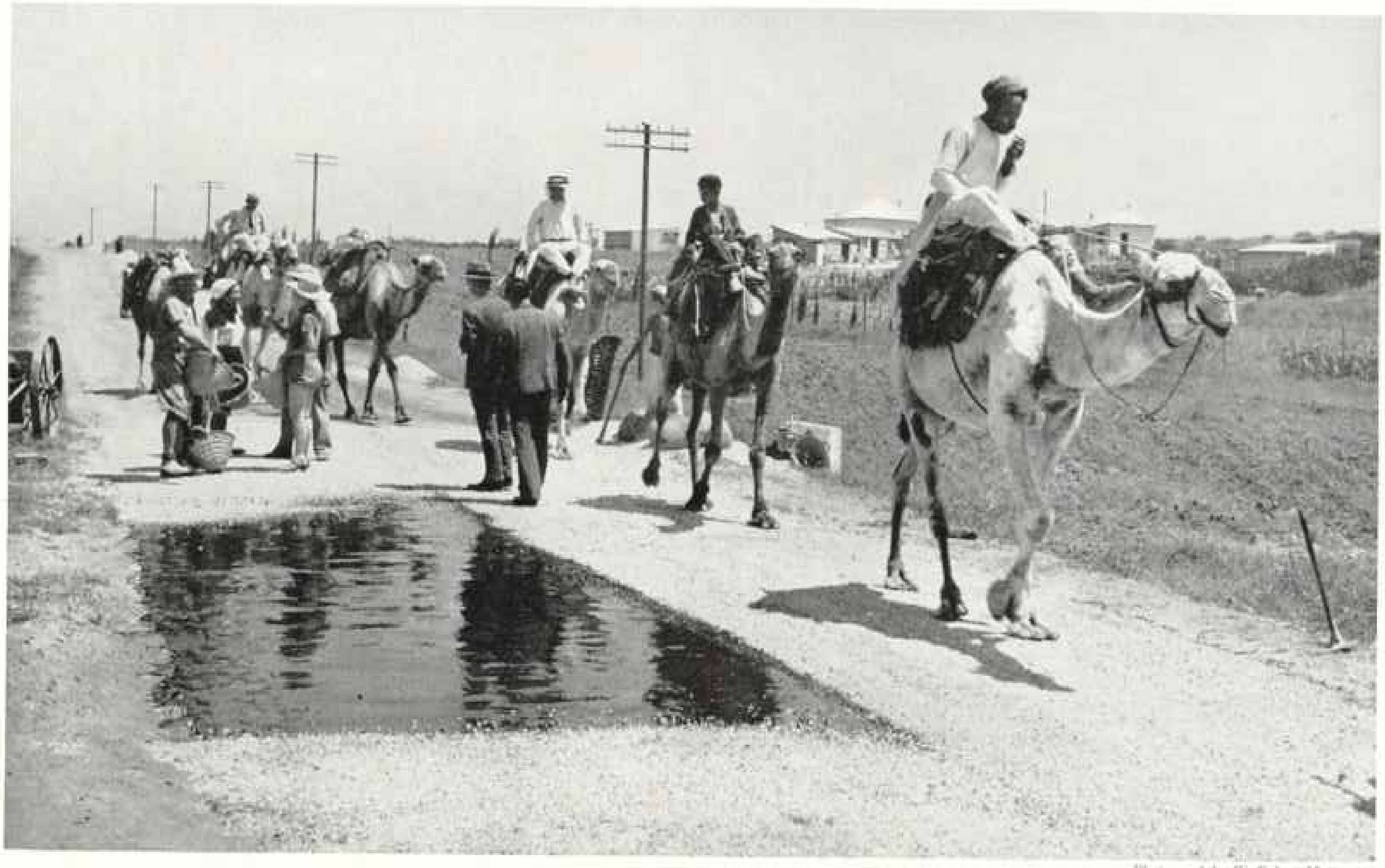
A modern miracle to roadside natives was the radio in our car. An old camel, whose owner was bathing its saddle galls with olive oil and sulphur, leaped up at the sound and fled.

Tyre was the London of long ago. Merchants of Tyre ruled the sea trade of their time. They built palaces of granite brought from Egypt; now the sea claims their ruins.

Walking along what was the beach drive of this once-proud city, I saw masonry and giant stone pillars strewn thick where Mediterranean waves break over them. Sitting on one ornate old cornice was an Arab boy, painting red marks on a pet sheep.

A mere village now, nothing in modern Tyre hinted at its ancient kinship with the sea except one old man, busy with palm and needle mending a dirty sail.

Through a frontier control shed, a few miles below Tyre, where border officials ask the usual questions, you ride again into



Photograph by W. Robert Moore

PASSING CAMELS CAST THEIR SHADOWS INTO FRESH ASPHALT BEING LAID ON THE OLD ROAD INTO GAZA

In ancient days, when Gaza was a princely Philistine city of palaces and race tracks, this was a busy road. Over it came caravans from Syria and Arabia, trading with Egypt, and for centuries it echoed the march of armies, the last being the British in the World War. Today, near the city whose gates Samson carried away, men and girls wearing shorts remake the roads for automobile traffic (page 700).

Photograph by W. Robert Moore

DAMASCUS' BUSINESS CENTER GIVES NO HINT OF THE RARE CHARM AND INTEREST OF THIS "WORLD'S OLDEST CITY"

The rattling taxis, the bouncing street cars, the monument to railroad builders at the right, might be anywhere. Beyond these are miles of fascinating bazaars, unchanged since Saladin—dark, narrow passages given over to spice, sugar, swords, shoes, copper work, silver, guns, pipes, books, carpets, camel trappings, each in its own street. And, all unsuspected, behind some plain wooden door may lie a garden with flowers and fountains and songbirds, and a home of wealth and oriental culture, whose library walls are panels of carved ebony, inlaid with silver and mother-of-pearl, and stocked with rare old manuscripts (page 722).

Photograph from International Harvester Export Co.

4,000 OR MORE YEARS AGO ASSYRIANS, BABYLONIANS, AND EGYPTIANS USED THIS SAME ROAD THAT NOW FORMS HAIFA'S "KINGSWAY"

Modernistic shops with glass fronts, concrete marquees, and center parking flank this section of the ancient highway that once stretched from Seleucia along the Mediterranean coast all the way to Egypt. Haifa, Palestine's chief industrial city, skipped generations in its business growth; almost overnight it jumped from a sleepy Arab coastal town to a beehive of oil tanks, banks, cement mills, machine shops, and cigarette factories.

PROPELLERS CHURNING, A SHIP TOWS OUT THE HAIFA END OF THE IRAQ PIPE LINE TO MAKE A "FILLING STATION" FOR TANKERS

© John D. Whiting

MORE THAN 150 TIMES, IN THE LAST YEAR, LAWLESS ARABS HAVE BROKEN AND FIRED THE IRAQ OIL LINE

Two police, seen here with a dog, are about to seek the culprits who in this case cut the pipe line on the Great Plain of Esdraelon and fired the oil. Dogs, trained to trail men by scent, are sometimes used in Palestine to run down criminals.

Palestine. Then you come to Jewish colonies, to more oil tanks, and into Haifa.

Sprawling at the foot of Mount Carmel, swiftly growing Haifa is Palestine's modern industrial miracle. Tearing at ancient hills like hungry behemoths, steam shovels eat their way into the rocks, to feed vast, smoking cement mills whose product pours into new construction (page 746).

Here comes the 618-mile pipe line from Iraq oil fields. Cut 152 times in 12 months by vandals, but patrolled now by airplanes and always quickly repaired, it feeds the fleet of tankers that crowd Haifa's new harbor (747, 749).

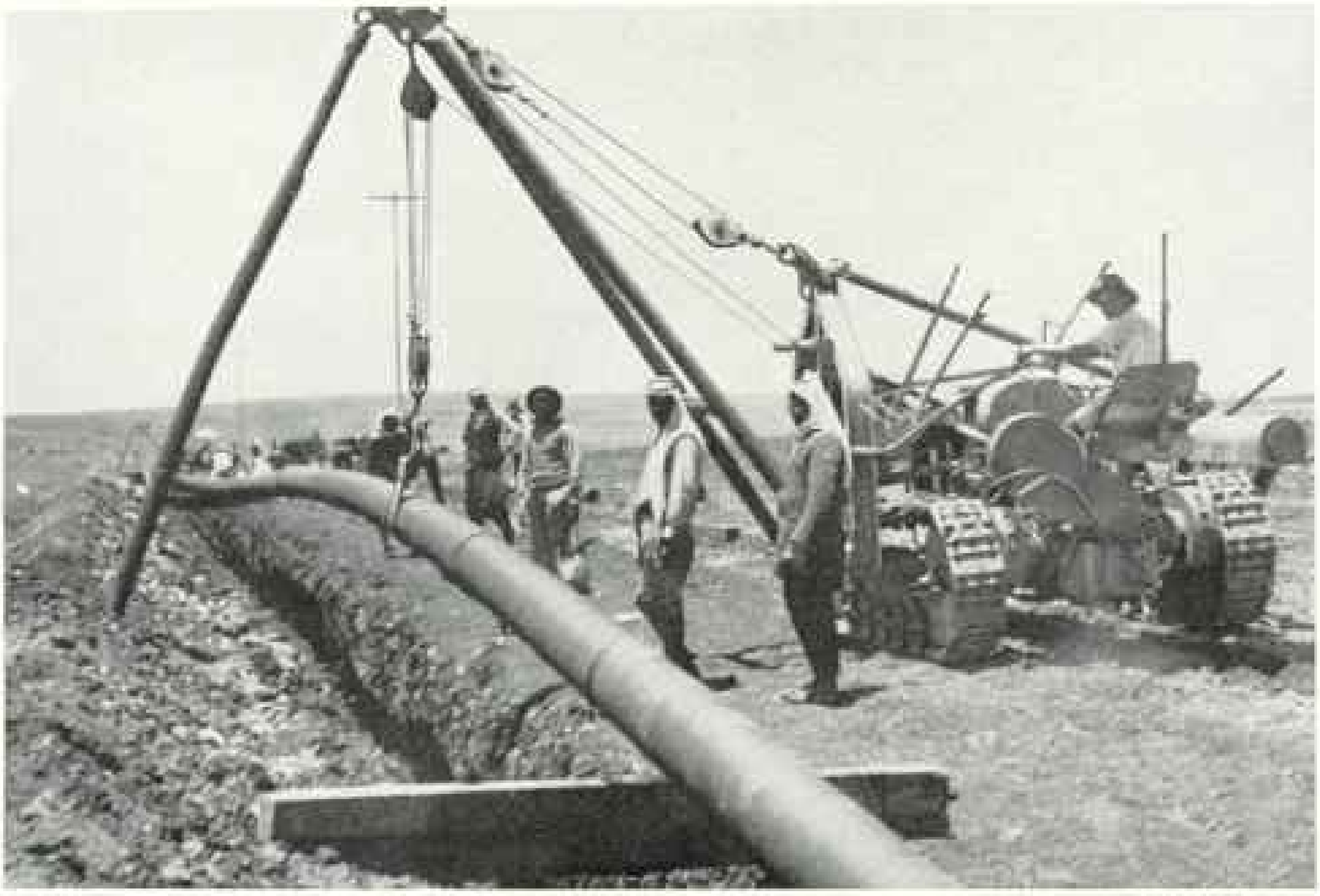
Great flour mills, new cigarette factories, metalworks, power plants, all add their roaring activity to a town which for centuries grew not at all.

Again, postwar events sped up the forces of transition. In 1917 British Foreign Minister Balfour had promised Jews a national home in Palestine. The Balfour Declaration and Europe's anti-Semitic waves brought thousands of new settlers, especially from Germany.

When the influx of Jews from all over the world aroused the hostility of the Arabs and rioting became serious, a British Commission, in 1936, was sent to Palestine. It recommended dividing the country between Jews and Arabs. This plan would give Jews most of the rich coastal plain. It would give the rest, including Trans-Jordan, to the Arabs, and reserve to Britain a mandated corridor from Jerusalem to Jaffa, including the Holy Places, and also seaplane bases on the Sea of Galilee and control of the Gulf of Aqaba.

Neither Jew nor Arab, as this is written, favors such a partition. Arabs object to sharing the country. Jews, in turn, say they've been dreaming for 2,000 years of repossessing Jerusalem and that under the partition they would have to make Tel Aviv the capital of their new national homeland, and not Jerusalem.

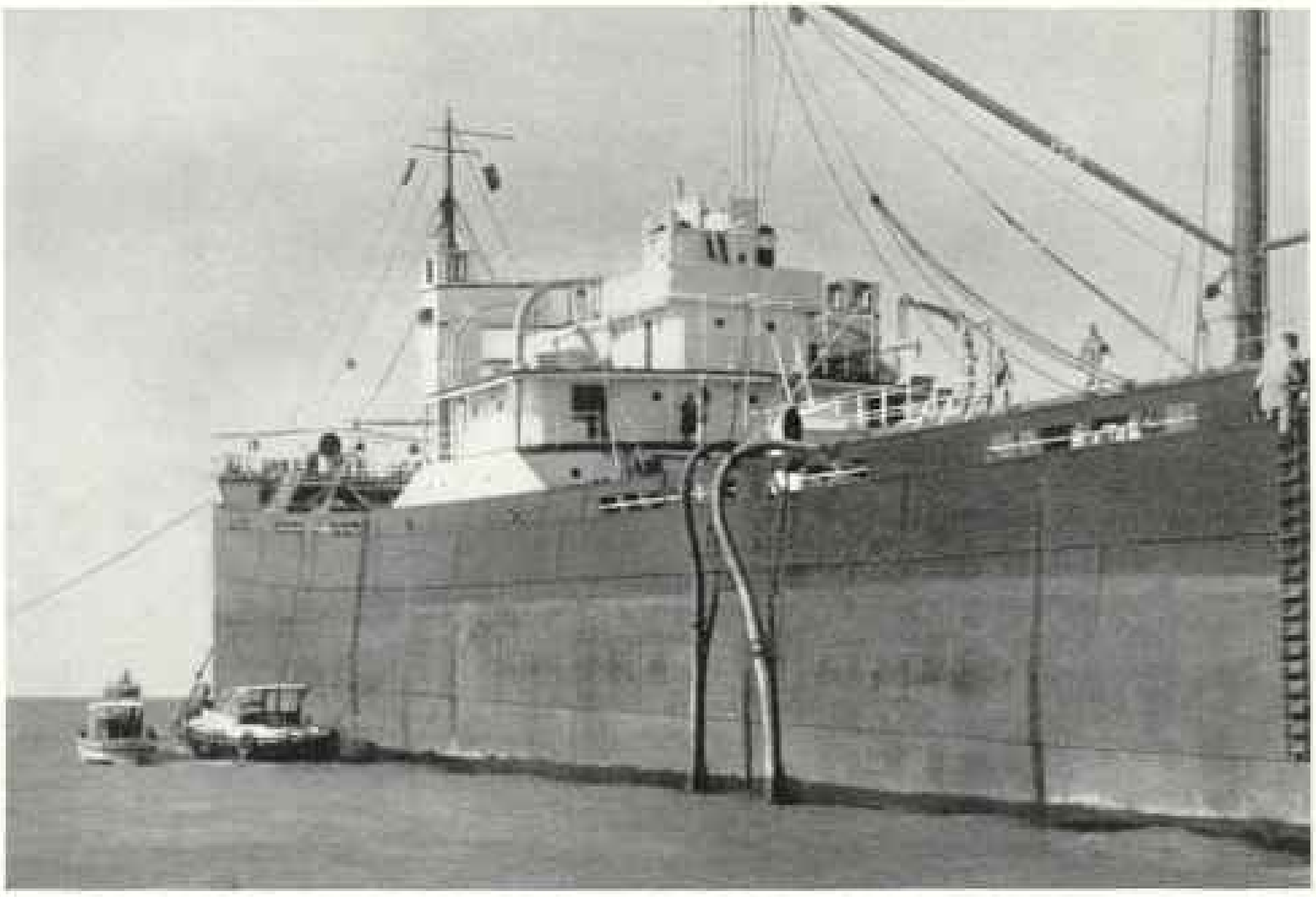
High up on Mount Carmel, serene through centuries, some of Haifa's new-



© G. Eric Matson

THIS 618-MILE OIL PIPE LINE WAS LAID FROM IRAQ TO THE MEDITERRANEAN

Though most workers visible here are Arabs, this dangerous, back-breaking job wherein men were exposed to terrific desert heat and the constant danger of warlike nomads was accomplished by experienced oil-field crews from the American Southwest (page 719). The pipe is being dropped into a trench on Palestine's Great Plain of Esdraelon.



PUMPING UP AN OIL CARGO FROM HAIFA'S FLEXIBLE UNDERSEA HOSE

As the rapidly growing seaport has no deep-water harbor, the rigid oil pipe ends on the beach and connects with a flexible submarine hose which lies on the bottom of the bay, its sea end secured to a float (page 747). Here tankers anchor, pick up the nozzle, and fill their tanks.

© Orient by Kluger

EXCITED CITIZENS CROWD THE CURBS AS BRITISH TROOPS AND ARMORED CARS MOVE THROUGH TEL AVIV

Searchlights on these battle cars, for night work, can be directed by gunners who ride inside the steel turrets with the driver. To preserve order and stop terrorists from hurling bombs from windows, walls, or house tops, exploding mines beneath the street, and firing on soldiers and civilians from ambush, thousands of fresh troops have been pouring into Palestine. Alert behind a swivel gun in each truck stands a sharpshooter ready to start firing should an attack occur.

rich raise their sumptuous homes. There, long ago, the Carmelite Fathers founded their order; there they built their lighthouse, useful now to the ever-lengthening line of ships that seek Haifa's new harbor. In his classic tomb on the ancient mountain side sleeps the Bab, prophet of a strange religion that has made converts from Teheran to London, even to California.

But in time, if not in space, today's Haifa is a thousand years from Mount Carmel with its traditions of Elijah and the wicked priests of Baal. In its stride, this magic city skipped decades of normal development: from a sleepy Arab seaport, it leaped almost overnight to power and importance.

Passing ruined Caesarea, where Paul was tried before Agrippa, we went to the airport at Lydda. Good-by now to Whiting and to faithful Pot Rash!

From high in air I could see, off to my left, the Valley of Ajalon, with Arabs using gasoline tractors where in that battle of long ago Joshua commanded the sun and moon to stand still.

As we gained altitude, I looked down on a Jerusalem passenger train passing near Ekron, where the plague struck death when the Ark of God fell to the Philistines. Following a highway came the ever-vigilant British soldiers, riding their armored cars, their rapid-fire guns at ready.

Then out over the sea we flew for Athens, Rome, London, over the sea lanes of the retreating Crusaders, away from the changing East.

THE SOCIETY'S MAP OF BIBLE LANDS

BETHLEHEM, Nazareth, Lebanon, the River Jordan, Sinai, the Sea of Galilee—these place names are hallowed words on every continent and myriad islands of the sea. Men revere them who never have heard of Chicago, Singapore, or Buenos Aires.

Scores of such names which are universal language, weighted with meaning alike to scholar and child at mother's knee, are shown on the timely ten-color Map of Bible Lands and the Cradle of Western Civilization, supplement to this issue of the NATIONAL GEOGRAPHIC MAGAZINE.*

In the area here charted are holy places of three major religions of the Western World—Christianity, Judaism, and Mohammedanism. Here, too, is the birthplace of international commerce, literature, and many of our most cherished institutions.

Reading this map, you hark back from ocean liner to precarious Phoenician galleys that cruised the Mediterranean. Board a streamline train and recall the clumsy camel caravan that freighted goods to seaside Tyre, Sidon, and Tripoli from dusty desert "ports" of Petra, Amman, Damascus, Aleppo, and Palmyra. Buy a modern novel to read as you ride and you are indebted to Baghdad for the pioneer *Arabian Nights* fiction, and to Byblos for substituting paper for clay tablets. Mail home a letter and remember the pigeon post which was special delivery between Aleppo and Baghdad.

ALGEBRA, SUNDAY, IRRIGATION, POETRY—ALL BEGAN HERE

When you rest on Sundays, play bridge evenings, or attend a lodge meeting, help your child with algebra or engage an engineer to compute the stresses on a bridge, read a poem or study ancient history, eat fresh fruit for breakfast or irrigate vast farm acres, you are perpetuating customs or refining sciences that had their beginnings here.

Rosetta, magic name of northern Egypt, is on this map, but the entire chart, covering an area about the size of our Mississippi River drainage basin, is a Rosetta stone of our countless daily activities.

With spade and basket, explorers are laying bare strata beneath strata of early civilizations, buried in the preservative sands of time; yet live history is being made here today. While this map was on the presses headlines were appearing—these are literal copies from daily papers—proclaiming "Britain's Troops Occupy Bethlehem," "Tribes Set Up Courts in Holy Land," "60 Arabs Slain in Palestine Raid," "Jerusalem Besieged," and "Guns Surround Manger Where Christ Was Born."

On October 14, 1938, *The New York Times* reported:

> "There are shepherds about Bethlehem yet, far-off descendants of those to whom the Angel of the Lord said: 'For behold I bring you good tidings of great joy which shall be to all people.'
>
> "Bethlehem today is held by troops. Trucks and armored cars stand in the courtyard of the Church of the Nativity. In Nazareth the other day the assistant manager of Barclays Bank was shot. In Jerusalem bombing is a common occurrence."

When the Sanjak of Alexandretta became the Hatay Republic in September, its new name went on the map while W. Robert Moore was completing his photographic survey of Antioch, Soueidlé, and Musa Dagh.

NEW ROAD TO ARMAGEDDON

This unique map will go to more than a million members of the National Geographic Society resident in every political domain in the entire world. Yet few copies will stray beyond the continuing influence of Egypt and Babylonia, Crete and Phoenicia, Persia, Palestine, Byzantium, and classic Greece.

Headlines and datelines of grade-school history, of newspapers and radio news flashes, bring to United States living rooms names of this map which long have seemed figures of speech.

Armored cars rumble along the road across the miry field of Armageddon. Along this road are new Jewish colonies with steel plows, fatted cattle, and young trees. Between them are ancient Arab settlements with adobe houses camouflaged against rocky slopes.

Above the watery grave of Icarus, near Crete, whose wings dropped off because he approached too close to the sun god, airplanes make routine flights, unheeded by sponge fisherman or Bedouin sheik.

Turkey, which once ruled much of this area, now raises revenue from Smyrna figs, Samsun tobacco, and hazelnuts from Gire-

* Members wishing additional copies of the "Map of Bible Lands and the Cradle of Western Civilization" may obtain them by writing the National Geographic Society, Washington, D. C. Prices, in United States and Possessions, 50¢ on paper (unfolded); 75¢ mounted on linen; index, 25¢. Outside of U. S. and Possessions, 75¢ on paper; $1 on linen; index, 50¢. Postage prepaid.

Photograph by W. Robert Moore

WANTED: ARMY MULE SKINNER WITH WARTIME VOCABULARY!

Balking on the narrow one-way Euphrates bridge at Deir-ez-Zor, the stubborn little mule whirled about the next minute and actually sat down on the car's running board. Even the muleteer laughed. This is the only bridge across the Euphrates in this part of Syria.

sun. Kasaba melons have carried the name of an obscure town near Smyrna to American tables. Basra dates, Persian carpets from Tabriz and Hamadan, the muslins of Mosul, and the dimity of Damietta were known before Ferdinand de Lesseps severed the continents at Suez.

Present-day Turkey, frowning on muezzin call and whirling dervish, builds a Pittsburgh at Karabük, here first shown on a U. S. map, and a Manchester at Kayseri. Egypt's modern queen bares her face and poses for photographers in a Moslem land.

THE BEGINNINGS OF BLACKSTONE

From the site of a fiery furnace at Baba Gurgur into which three young vegetarians —Shadrach, Meshach, and Abednego—were thrown because they would not bow down to a golden image, a stream of oil surges through pipe lines to help fuel fleets of modern merchantmen and navies.

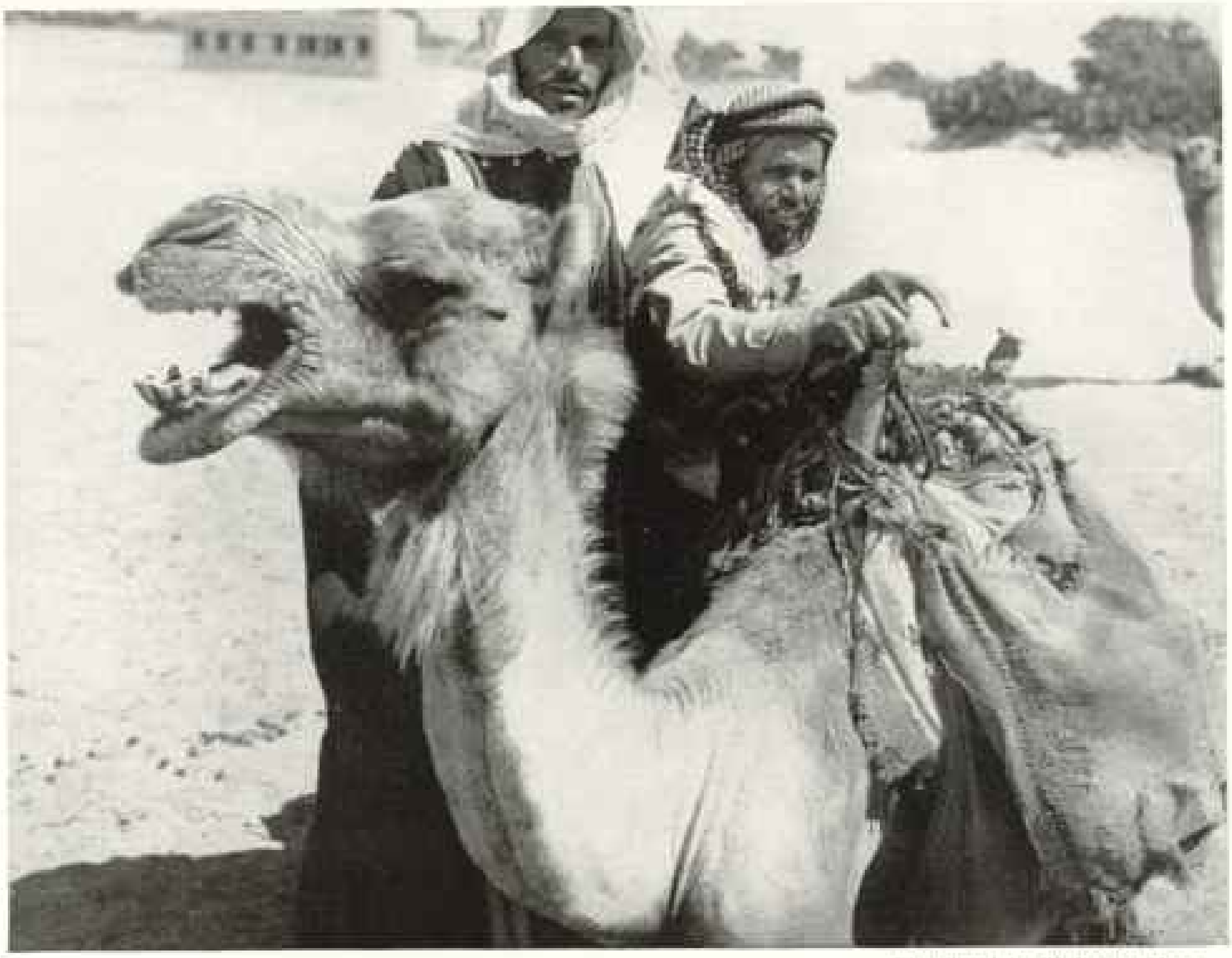
By 1938 Before Christ, Hammurabi, ruler of Babylon, had codified the "common law" of preceding centuries. On Mount Sinai Moses summarized the law of an earlier time in Ten Commandments still binding to Jew and Christian.

OUR GODDESS OF LIBERTY WEARS A PHRYGIAN CAP

The Goddess of Liberty on our coins wears a cap which originated in Phrygia. The eagle as a symbol dates back to Hittite art at Bogazköy and Alaca Hüyük, both east of Ankara.

Our week started in Babylonia with seven holidays, in honor of the sun, moon, Mercury, Venus, Mars, Jupiter, and Saturn.

The Sumerians, fifty centuries ago, made the 60-minute, 60-second divisions on the watch you may receive for a Christmas present. The date upon the gift commemorates the world's most famous nativity—at Bethlehem. Sundial, water clock, hourglass, pendulum, balance wheel, even the electric eye, indicate time according to Sumerian standards.



Photograph by W. Robert Moore

GUESS WHETHER HE'S LAUGHING OR CRYING!

Anyway, he was very vocal as the camera clicked. From Dan to Beersheba, where this camel was being loaded, thousands are still in use in the Holy Land. Though they must have been common in the Near East since remote antiquity, their images are not often found carved on stone walls, as are figures of kings, hunters, horses, lions, deer, birds, and fish.

Since the Sumerians first measured time, silt from Kurdistan has pushed back the Persian Gulf some 150 miles, as shown by comparing the main map with the inset "Alexander the Great."

Shrewd oracles along the Aegean coast used ventriloquism, literally "belly speaking," but kept their Charlie McCarthys out of sight to give supernatural semblance to their utterances.

From Ishtar, Babylonian goddess, through Astarte of Phoenicia, Aphrodite of Greece, and the Roman Venus descends the ideal of feminine beauty perpetuated in "Miss America," Atlantic City "bathing beauty Venus of 1938."

Six of the Seven Wonders of the Ancient World are on this map: the Hanging Gardens of Babylon, precursors of step-back buildings and the modern penthouse; the Pyramids of Egypt, mammoth monuments of applied geometry; the Pharos of Alexandria, most famous lighthouse; the Colossus, which was Rhodes' Statue of Liberty; the Mausoleum at Halicarnassus, which gives the name to modern tombs, and the Temple of Diana at Ephesus.

WRITING ON CLAY—FROM CUNEIFORM TO THE GEOGRAPHIC

In Mesopotamia men inscribed wedge-shaped characters by pressing a stylus into soft clay. Photographs in your NATIONAL GEOGRAPHIC MAGAZINE have added luster because clay from England and Georgia helps the paper take a clearer imprint from the modern mechanical stylus, the mammoth printing press.

Trace on this map the "Fertile Crescent," sweeping from the Persian Gulf northward through Mesopotamia (the land between the Tigris and Euphrates Rivers) up to the Kurdistan mountains; then southward through Syria, the Holy Land, and into Egypt along the Nile.

Here literally is the hemicycle of our

Photograph by W. Robert Moore

ARAB MILKMAIDS TAKE THE EASIEST WAY WITH A GOAT

No pure food law puts this milk into nice clean bottles—it comes hot and dusty, as is. But out on the desert, with nothing else to eat but meat, barley cakes, and perhaps a few musty dried dates, a cup of fresh goat's milk or curdled camel's milk is a big help.

modern civilization, the horseshoe area where nomadic man first settled down to tend crops and expanded his constricted world by setting out to sea for new goods and new ideas.

An inset shows the route of the Israelite Exodus from Egypt into the Promised Land. Some scholars estimate there were then only 100,000 Jews. Now there are more than 42 times that many in the United States alone, and some 16,000,000 in all the world.

ST. PAUL'S TRAVELS AND LETTERS

Another inset traces the travels of St. Paul, and shows the places to which he wrote some of the most famous letters of all time, incorporated in the New Testament as Epistles. St. John addressed the Book of Revelation "unto Ephesus, and unto Smyrna, and unto Pergamos, and unto Thyatira, and unto Sardis, and unto Philadelphia, and unto Laodicea"—the seven churches of the Apocalypse.

The conquests of Alexander the Great and of the Crusaders, the Holy Land from Dan to Beersheba in large-scale detail, a street map of Jerusalem, and the economic development of the whole area of the map are shown in other insets.

The ten-color map, 25 by 35 inches, is a composite of four drawings, printed in blue, gray, black, and red. The blue and gray show the natural features, such as mountains, rivers, and shoreline.

The other two drawings, superimposed with hairline precision in printing, show what man has done in this environment, and how he has added to it. By months of research and correspondence, James M. Darley and Wellman Chamberlin compiled the vital facts recorded in black and red.

The legibility of the names is accentuated by use of hand-drawn letters and reproduced by a photographic process invented by The Society's chief cartographer, Albert H. Bumstead.

Students of the Bible and secular history, newspaper readers, teachers in Sunday schools and week-day classes, clergymen, and men in all walks of life will welcome this compilation of the sources of their religion, literature, architecture, laws, trade, and the arts.

THE GARDEN ISLES OF SCILLY

Geologists May Throw Stones at Legend of Lost Lyonnesse, But Natives Grow Flowers in Glass Houses for London

By W. Robert Moore

BEFORE the first song thrush has voiced the approach of spring to England, the Scilly Isles have already said it with flowers. While the hub of the British Empire is still in the chilling grasp of bleak January weather and penetrating, fog-filled winds sweep along the Thames and eddy up and down the city's thoroughfares, boxes brimming with fragrant springtime come to Covent Garden. Gray days become gayer days with delicate narcissus blooms.

What manner of garden place, then, is the Scilly Isles, where flowers bloom out-of-doors all the year round at a latitude 650 miles north of New York? Curiosity led me to go and see (map, page 757).

At a decidedly uninspiring hour, well past midnight, my taxi burrowed through the fog from Piccadilly Circus to Paddington Station and dropped me there, with just time enough to allow a sleepy-eyed porter to bundle my cases into the train leaving London for Penzance, near the tip of Cornwall.

40 MILES OF ROUGH WEATHER

The voyage westward into the Atlantic from Penzance to Scilly is only 40 miles, but what a 40-mile trip it can be! Probably no small reach of ocean has a more evil reputation for roughness. Many times, when Atlantic winds have lashed the sea and cross currents have swirled between Land's End and the islands, the stout little Scillonian packet boat has had to seek the quiet refuge of a harbor. On the morning of my arrival, however, it sailed, carrying the mail, groceries, a horse, and half a dozen passengers.

History and romantic legend are strewn along this trail to Scilly. As we edged out of Penzance Harbour, quaint old St. Michael's Mount, crowned by the picturesque castellated mansion of St. Aubyns, dropped astern. To this ancient mount, which bears such striking resemblance to the Abbey of Mont St. Michel on the Normandy coast, came cruising Phoenicians to barter with the Celts for tin (page 770).

Roman coins, recently dug up, speak of the days when the empire-expanding Romans swaggered up and down its steep pathways. Around this rocky eminence, too, are centered many stories of monks, nuns, beautiful queens, and much grim fighting.

In the old Cornish tongue, St. Michael's was called "hoar rock in the wood," but the woods which once surrounded it have long since slipped beneath the waters and now lie at a depth of more than five fathoms. Today, this historic pile stands like a stranded ship in the bay, with a stone causeway, bared at low tide, serving as its gangway.

CLIFFS AND COVES OF LAND'S END

The little steamer skirted close to the rugged cliffs and coves of Land's End and then breasted the waves toward Scilly, passing on the way Wolf Lighthouse, perched on a rock that rises sheer out of thirty-five fathoms of sea. Waves and wind once rushed through an aperture in these rocks, emitting a wolfish roar, until fishermen, so we are told, stopped up the hole "because the noise scared the fish away."

A fleet of islands anchored in the Atlantic—such is Scilly. Some 140 islands and isolated rocks, occupying less than 50 square miles, form this secluded archipelago. Were one able to lift this area or lower the water by 10 fathoms, practically all of it would then form but a single island. Now it is almost like splitting hairs to say which can be dignified by the name "island" and which are only granite reefs.

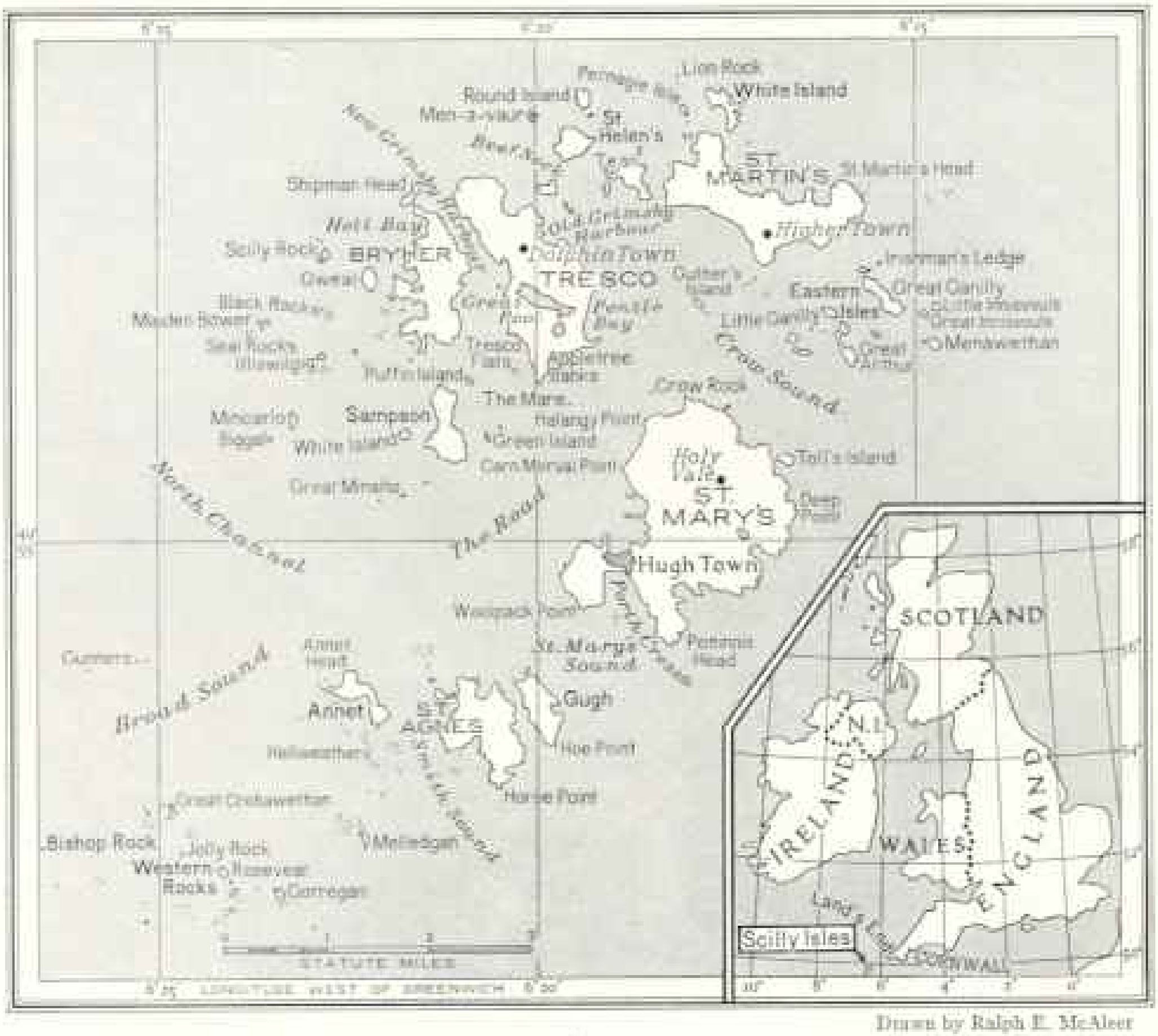
Fewer than 25 are capable of growing grass, and only five—St. Mary's, St. Agnes, St. Martin's, Tresco, and Bryher—are inhabited. Formerly, a few families lived on Samson, the scene of Sir Walter Besant's *Armorel of Lyonesse*.

Yet here is a Lilliputian land, with hills and valleys and downs of toylike size. St. Mary's, the largest of the group, is only a little more than two miles long and some-

© Fox

GOING DOWN BY BREECHES BUOY! A LIGHTKEEPER QUITS BISHOP ROCK

Lowered by winch and rope over churning foam, he ends a three-month vigil on this famous landmark at the southwestern edge of the Scilly Islands. Angry seas prevented removal of the crew of three at the close of their regular eight-week stretch of duty (page 773). Seldom does the Atlantic permit a man to land on the rock directly from the boat. Usually the tender ties up to a buoy and a rope is tossed from the tower. Waves sometimes dash so high that they break the top windows of the 160-foot structure, the third to be erected at this point to warn transatlantic ships.



Drawn by Ralph E. McAleer

SOUTHWESTERN OUTPOST OF ENGLAND'S ROCKY RAMPARTS—THE SCILLY ISLES

Because of the mild climate, early spring flowers flourish, providing a livelihood for the islanders. Shipwrecks on the rocky shores and ledges were frequent in the days of sail, when there were no radio beacons and few lighthouses to warn mariners. About 140 islets comprise the group, all contained within a circle about 30 miles in circumference. Only the five largest islands are inhabited.

what less than two miles wide. Hugh Town, the capital, on St. Mary's, boasts but 200 homes. In all the islands together there are only about 1,750 people.

When our ship warped alongside the Hugh Town pier, half of the village population castellated its high stone wall to enjoy the most exciting event in Scilly, the arrival of week-end mail and return of friends (Color Plate I).

FAR FROM TRAMS AND NEWSBOYS

Climbing up the gangway, I stepped into a place apart from the modern bustling world. Here were no trains, no tramcars, no buses, no newsboys, and no hawkers. No conventionalized promenades or ubiquitous pleasure pavilions, such as are seen at many English resort towns, border its shores. Here the police "force" must be spoken of in the singular (p. 772). Scilly has stayed her unspoiled self. Even my baggage was transferred to one of the comfortable little hotels in a two-wheeled donkey cart!

"I've just had an exciting day," said one Scillonian woman with a twinkle in her eyes. "This morning the cat jumped up on the piano; there was a dog fight in the yard; and this afternoon there was a funeral!"

Scillonians possess a saving sense of humor and are delightfully hospitable.

"I did not know that there was anything near England so wonderful and so lovely," Besant made Roland say in *Armorel of Lyonesse*. And that seems to express the feelings of all who have discovered the

natural charm of the rock-strewn, pool-edged islands.

Who could not find interest in a place which has a Holy Vale, Hell Bay, Jolly Rock, Maiden Bower, Appletree Banks, and an Irishman's Ledge, as well as a Lion Rock, Mare, Crow Rock, Beef Neck, Horse Point, and a Dolphin Town?

KING ARTHUR AND LOST LYONNESSE

Climb to the top of one of St. Mary's hills and you can see the entire compass of Scilly, with the larger islands grouped around a little inland sea of purest blue. Outward from these extend clusters of jagged rocks, girded white with the spume of Atlantic breakers. The granite crags and islands are the summits of the same bold ridge that forms the backbone of Cornwall.

Were they once joined to the mainland? Legend's answer is affirmative. Tradition of a lost land link, called Lyonnesse, hangs over the sea like a mist. Where restless waters now roll, we are told, once stood prosperous towns and no less than 140 churches.

Like the Israelites of old, who walked dry-shod across the sea bed and saw the waters swallow up Pharaoh's hosts, the followers of King Arthur, of Round Table fame, were supposed to have hurried across the land span of lost Lyonnesse, pursued by the traitor Mordred and his men.

Having left the body of Arthur where he fell, they rode onward toward the setting sun. Then, as the day dawned, they reached the spot which now is St. Martin's Head, and, looking back, saw an unaccountable inrush of the sea, burying the land and sweeping away the pursuers!

Tennyson has embodied the tale in his *Idylls of the King*.

Was there a land of Lyonnesse? Or is it only vivid Celtic imagination that has seen tops of houses through the clear water?

GEOLOGISTS SHATTER LAND-LINK LEGEND

Geologists refuse to be convinced that such a land existed as late as the eleventh century, or that there was such a sudden inundation, even though the western coast of England has seen considerable submergence. In confirmation, however, is an old Saxon chronicle, dated 1099, which bears this entry: "This year on Martinmas Day, November 11, sprung up so much sea flood and so mickle harm did as no man has minded ever afore."

Then, too, what about those sunken forests, where hazelnuts still hang on the sand-and-peat-mired branches? Lost Lyonnesse is a delightful story to contemplate.

But Scilly has a more tangible heritage from the misty past. Beneath patches of gorse and bracken and on her open downs are many prehistoric cairns and stone sepulchers (Color Plate III). In fact, in these small islands there are more than three times as many ancient burial mounds as can be found in all Cornwall. It is probable that these are the historic Isles of the Blest, where the Romans said the Britons took their dead for burial.

From stone hammers, flint arrowheads, crude pottery, mortars and pestles, and saddle querns used for grinding corn, archeologists are piecing together the story of the people who dwelt in Scilly some 4,000 years ago.

Breaking cliffs from time to time reveal circular beehive homes in which these prehistoric villagers lived.

From the early days when the Romans made St. Mary's a penal colony and the seafaring Danes used the islands as headquarters for their raids on the Bristol Channel, to the immediate yesterday when the British built an aircraft station on Tresco and used the archipelago as a base for patrol boats working against German submarine raids, the Scilly Isles have had an interesting history.

Around them cling memories of Benedictine monks, of fleeing princes during civil wars, of pirates, smugglers, and just plain "hard times" under greedy island stewards.

DAFFODILS NOW SCILLY'S GOLD

Steamships, replacing sailing craft, put Scilly on the ocean byways and ruined her shipbuilding trade, leaving the people to eke out a precarious existence by burning kelp and salvaging wrecks until they found silver and gold in the white narcissi and smiling daffodils.

Today practically all of the cultivated area on the five main islands is devoted to the growing of flowers. During the main season, from December to June, everything is sacrificed to their care. During these months fields nod with bursting blooms of narcissi, arum lilies, wallflowers, and other plants. In daffodil time Scilly is a fairyland (Color Plates IV, V, VII, and VIII).

Finlay Photograph by Maynard Owen Williams

BOATS LIE SNUG IN HUGH TOWN'S QUIET HARBOR

An old proverb tells that for every man who dies a natural death on the flower-covered Scilly Islands, the sea takes nine. Twenty-five miles southwest of Cornwall, England, beyond Land's End, lies this group of rocky islands, surrounded by treacherous reefs and shoals.

Finlay Photograph by B. Anthony Stewart

SHIPS' FIGUREHEADS, CAST UP ON TRESCO, TELL MUTE TALES OF TRAGEDY AT SEA

A German World War mine, washed ashore unexploded, and an encrusted anchor keep company at Abbey Gardenhouse with two dozen carved emblems which once rode the bows of merchantmen.

Finlay Photograph by W. Robert Moore

STONE WALLS AND HEDGES PEN ST. MARTIN'S FLOWERS, SCREENING DELICATE SHOOTS FROM THE WIND

Florists of Higher Town look down from their homes and greenhouses upon a checkerboard of small fields. Here, in September and October, the first plants of the season are set out. Later, as they begin to bud, they are removed to glasshouses, where the blooms are forced. At Christmas time and early in January daffodils (Henry Irving, Emperor, Golden Spur) and narcissi (Soleil d'Or) are shipped to London—the first to reach market.

Finlay Photograph by R. Anthony Stewart

GIRLS OF ST MARY'S KNIT AND PURL UPON A PREHISTORIC SEPULCHER, FRINGED WITH YELLOW GORSE AND THISTLES

Hugh Town and its quay supply a backdrop. From January to June, in the flower season, the harbor pier is the scene of a floral parade on steamer mornings, every other weekday. Trucks, pushcarts, donkey carts, wheelbarrows, and even perambulators carry the precious boxes of blooms to the boat. Prolonged stormy weather may bring ruin to shippers. High seas sometimes hold the ship filled with its fragrant cargo in port so long that the flowers wither before they can reach London, Paris, or other markets.

Finlay Photograph by R. Anthony Stewart

ONCE ISLANDERS TENDED KELP KILNS; NOW THEY PICK DAFFODILS

Acrid fumes of burning seaweed, from which soda ash and iodine were obtained, spread over the Scillies during summer months. Today nearly all inhabitants grow flowers.

Finlay Photograph by Maynard Owen Williams

SOME ISLAND GIRLS BUNCH AND TIE 72,000 FLOWERS IN ONE WEEK

Men pick the daffodils and narcissi in the fields and carry them into the greenhouses, where bunches of twelve blooms are made up by the women and children for boxing.

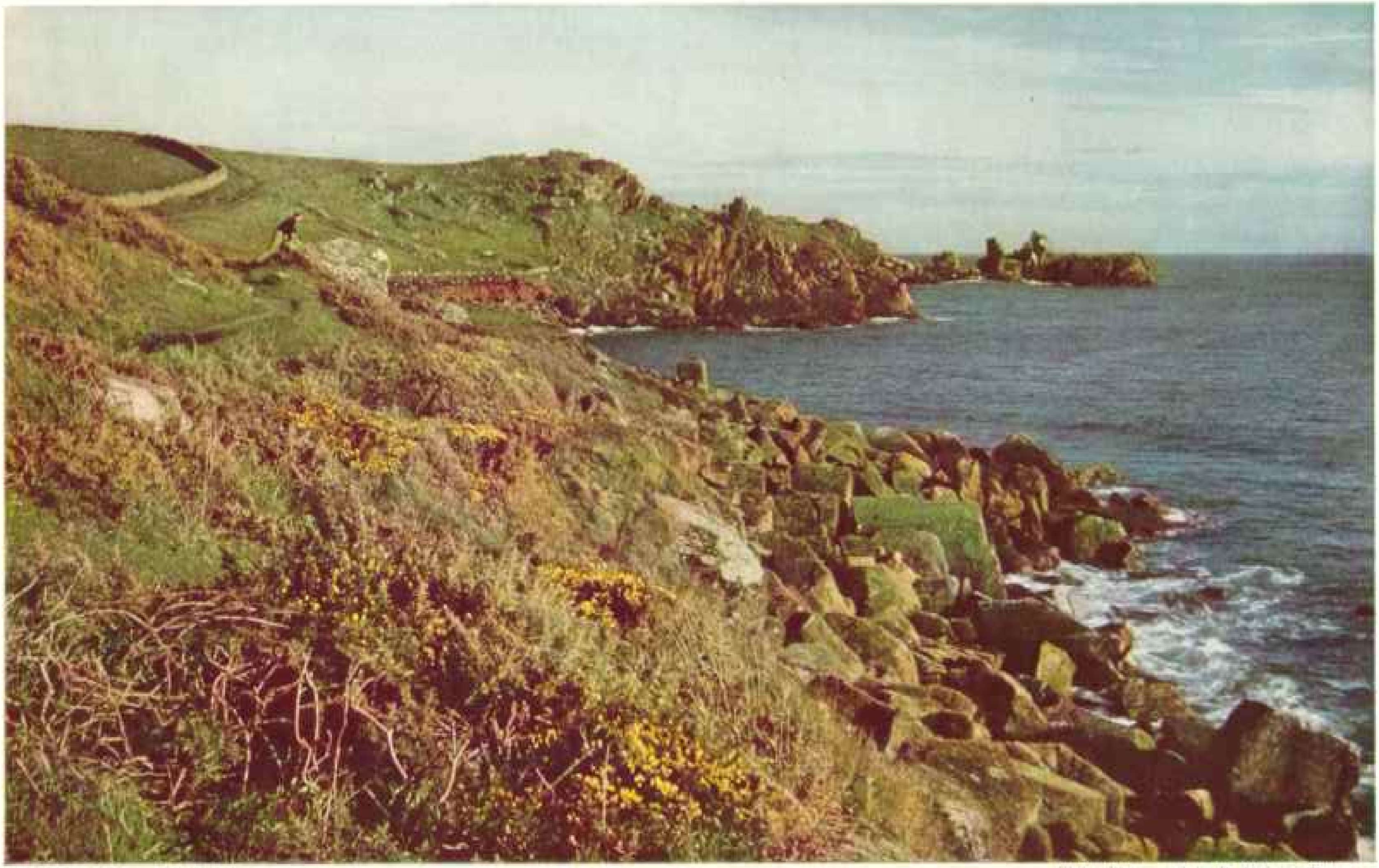
DAFFODILS AND NARCISSI, PICKED IN BUD, BLOOM UNDER GLASS

During a storm salt spray sweeps across the islands, spotting and blackening the blossoms. To lessen the danger of loss, growers remove half-blown plants from the fields, putting them in water to open.

 Finlay Photographs by B. Anthony Stewart

ARTISTIC PACKING OF NARCISSI INCREASES PROFITS FOR SCILLY GROWERS

Calendulas (left) also are given a "final touch" before the lid is nailed on the box. The first lot of blooms sent to London some 60 years ago was packed in a blue hatbox.



Finlay Photograph by R. Anthony Stewart

SAILING SKIPPERS, NEARING ST. MARY'S, DREAD PORTH CRESSA'S REEFS AND THE JAGGED ROCKS OF PENINNIS HEAD

During fogs, the booming roar heard here every five minutes above the surf comes from the lighthouse on Bishop Rock, six miles out to sea. Keepers on this familiar landmark to transatlantic travelers explode charges of tonite to warn off mist-blinded ships. Largest vessel ever wrecked on the islands was the 660-foot *Minnehaha*, bound from New York to London, which crashed in a fog, April, 1910. Ships' boats and craft from Bryher saved passengers and crew. The greatest tragedy occurred in 1707 when four ships of the British fleet were wrecked and some 2,000 sailors drowned.

HE KNOWS THE HAUNTS OF SEA BIRDS AND LOBSTERS

Far from shore the seaman of St. Mary's ventures, often touching at the remote isles of the group. On the isolated crags thousands of gulls, puffins, terns, murres, and other ocean rovers nest. Only five of the islands, St. Mary's, Tresco, St. Martin's, St. Agnes, and Bryher, are habitable.

Finlay Photographs by R. Anthony Stewart

PICKERS PREFER KNEE BOOTS FOR WET FIELDS

Not trees, but high hedges tower in the background to shelter calendulas from gales. Veronica, Euonymus, and Escallonia (Plate II) often form barriers 15 feet high. Fuchsias, geraniums, and myrtles also grow large on the Scillies, where horticulture is the principal industry.

Finlay Photograph by B. Anthony Stewart

FROM THE SCILLIES MAY COME 1,000 TONS OF FLOWERS IN A SEASON

In bountiful years, plants sometimes grow so rapidly that the buds burst into bloom before they all can be removed to the greenhouses. Then fields become waving sheets of silver and gold.

Finlay Photograph by Maynard Owen Williams

TO THE CHURCH IN HUGH TOWN GO THE FINEST BLOOMS ON EASTER DAY

Virtually every worshiper has something to do with flowers. Even fishermen take time off from their lobster pots to produce a few varieties on small patches of ground.

Polyanthus narcissi have long grown wild and are believed to be indigenous to the isles. Some varieties, however, were probably brought from southern France by monks who, ten centuries ago, came to live in the quiet confines of these secluded lands.

Lying in the track of the warm Gulf Stream, the islands have an equable temperature, ranging from 46 to 58 degrees Fahrenheit, which has made it possible for them to become the flower garden of London. Because of their exposed position, however, gales frequently sweep across the fields in mad confusion, and the tender narcissi have to be protected by tall hedges. The island farms, therefore, have the appearance of a network of pens, set off by walls of purple-flowering veronica, elms, Euonymus, and Escallonia (Color Plate II).

The first flowers of the season are started outdoors in September and October and then forced into bloom in glass houses, so that they can be marketed late in December or early in January.

Picking, bunching, packing, and shipping—flower cultivation is an exacting taskmaster. The land may be a bed of flowers, but the labor of handling certainly is not. Men and boys work long hours in the chilly wet fields plucking the bursting blossoms and transferring them into the glass houses where gales cannot break the fragile petals. To the women and children falls the task of bunching and tying the flowers into dozen lots for boxing (Plates IV and V).

A FLORAL PARADE—IN BOXES

St. Mary's pier on steamer morning is a floral parade. Unlike the flowers in the pageants of the Riviera, however, the blooms are all in boxes. Trucks, pushcarts, donkey carts, wheelbarrows, and even baby carriages are requisitioned to carry these precious boxes of fragrance to the steamer side.

If the holds are filled to overflowing, stacks of boxes are packed into the saloon. Everything else is of minor importance compared to this cargo during the rush season. Flowers rule supreme.

In normal seasons, from 700 to more than 1,000 tons of flowers go out from Scilly. That means from 55,000,000 to 85,000,000 individual blooms!

"Yes, the industry has progressed far since we sent out the first lot in a single hatbox about sixty years ago," said St. Mary's oldest resident.

Yet all is not fair every year in the Scilly flower trade. There are gluts in the market which force prices so low that it does not pay to pick the blooms. There are seasons when the weather retards the maturing of the flowers so long that all the different varieties start blooming at nearly the same time and so rapidly that they cannot be taken care of. At such times the sloping hillsides are waving masses of white and gold.

One of the saddest experiences of all, however, is to have a cargo packed in the steamer's hold, and then have heavy weather delay the sailing until the flowers have perished before they reach Covent Garden. Not only is the labor of gathering them lost, but the shipper has to pay the shipping and railway charges on the worthless, withered cargo! Little wonder that the Scillonians sometimes complain that in March, their busiest month, there are at least six weeks of bad weather!

IMPROVING THE BREED OF BLOOMS

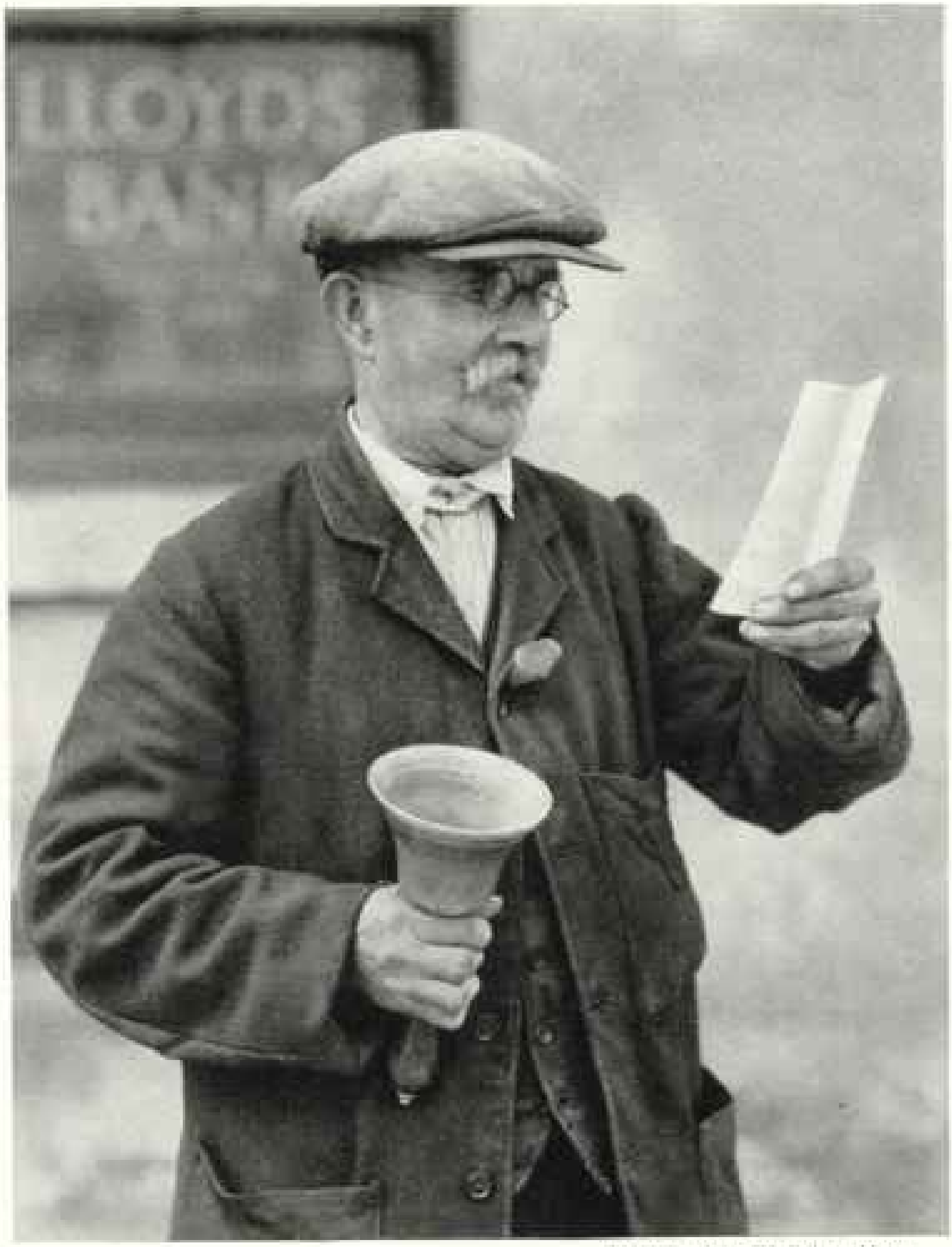
During the years of rapid advancement of the industry many new varieties of bulbs have been introduced in the Scilly gardens to satisfy the widening market demands. Considerable trade is also being built up now in the export of bulbs to other countries. While there is keen competition from the Channel Islands and from Italian and French gardeners, Scilly has been able successfully to hold her position in the flower industry.

The Duchy of Cornwall, to which the islands belong, has taken considerable interest in the improvement of the trade and now maintains an experimental farm on St. Mary's.

All of the floral glory of the islands, however, is not confined to formal commercial gardens. During the summer months masses of gorse flaunt their golden flower mantles, purple heather carpets the uncultivated downs, and the grassy slopes blush pink with sea thrifts.

Over on Tresco are the finest subtropical gardens in the British Isles, created by the former Lords Proprietors of Scilly.

Plants, shrubs, and trees from all over the world luxuriate around the ivy-clad arches of the ruins of St. Nicholas' Abbey, reputed to date from the tenth century. To walk through the paths of these magnificent gardens is to touch the West Indies, Australia, New Zealand, Africa, and other warm corners of the earth.



Photograph by W. Robert Moore

HE IS HUGH TOWN'S RADIO, NEWSPAPER, AND BULLETIN BOARD

When the town crier rings his bell, Scillonians gather round to hear the news. Once the village had a crier who could not read and his wife had to tell him what was written on the sheet. Making the rounds, he would sometimes forget what she had said and would ask a boy to read it to him. On occasions the lad would purposely misinform him and the result would be a public joke at the expense of a townsman.

In the Tresco Abbey gardens is one spot, however, that shows not the flower-entwined obverse of the Scilly pendant, but its stern, grim side.

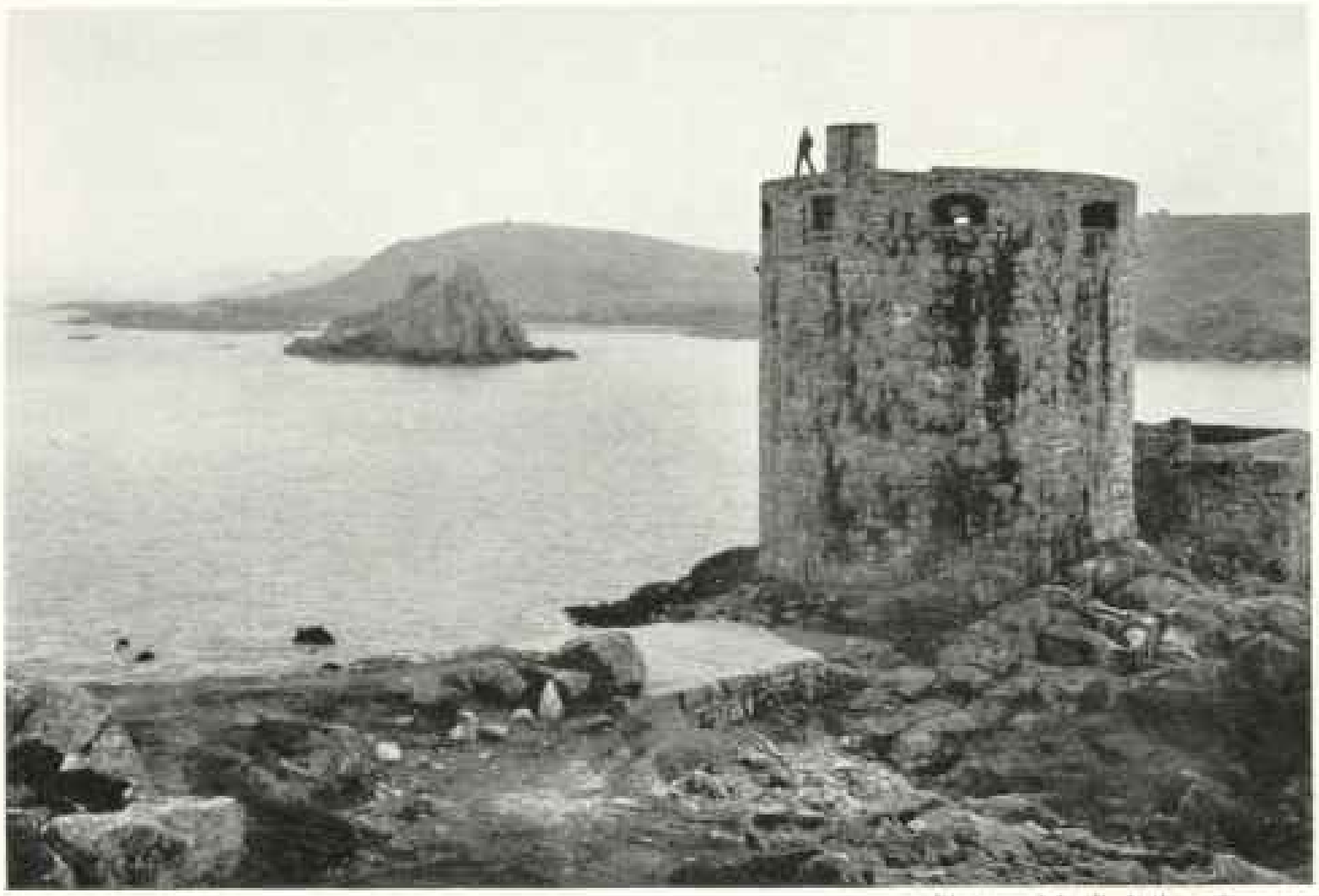
A FRIEZE OF FIGUREHEADS

Supporting the roof and lining the back walls of the garden house are a full two dozen figureheads of vessels that have been wrecked on the islands. Here are Kings and Queens, Sailors and Nymphs, Friar Tuck, The Spanish Girl, Prima Donna, The Admiral, The Indian Prince, Dolphin, and other relics of valiant ships that have sailed the seas, only to come to an untimely end on the rocks of Scilly (Color Plate I).

Could these figureheads but speak, they could tell dramatic stories of bravery and misfortune on the high seas. One incident connected with the *Prima Donna* is probably the best known. She was a Spanish bark, laden with sugar, en route from Habana to Falmouth. When she struck the Seven Stones and broke up, all hands were lost except the mate, who succeeded in keeping afloat on the figurehead until he was washed up on the shores of Tresco.

Practically every rock and island has some grim association with wrecks. In truth, one would have to search far to find a place where there have been more shipwrecks than on the Scilly Isles. Salvaging once was the chief industry of the island population, and many stories are told of how these maritime accidents were sometimes encouraged by letting the coal fires, which once lighted the St. Agnes tower, burn so low that they could not be seen.

The announcement of a wreck always brought feverish excitement. If one occurred on Sunday when the people were at church, it was the custom to announce it from the pulpit. Scillonians tell the tale



Photograph by R. Anthony Stewart

CROMWELL'S TOWER AWED THE PEOPLE OF SCILLY, LOYAL TO THE KING

Erected on Tresco Island by Parliament troops in the middle of the 17th century, the stone fortress was equipped with a battery of nine-pounders. Placed low down on the shore, the guns could sweep the surface of the water. Peace has reigned on the islands ever since Cromwell's era.

that one new minister did this, and immediately saw his congregation vanish. The next time when he had occasion to report a wreck he calmly walked to the church door, removed his surplice, and then turned to his parishioners with this terse remark:

"My Christian friends, there's a boat aground. Now we'll all start even!"

THOUSANDS OF LIVES LOST HERE

Several powerful lighthouses now encircle the islands, so there is comparatively little danger to navigation except during continued foggy weather. Fog caused the great disaster in 1707, in which the commander-in-chief of the British Navy, Sir Cloudesley Shovel, and 2,000 others lost their lives when four ships of the fleet were wrecked on the Western Rocks.

Fog, again, was responsible for the loss of the German mail steamer *Schiller*, in 1875, which took a toll of 310 lives. A room of the hotel where I stayed was heated with a stove that had been salvaged from that ship.

I also heard first-hand tales of the wreck of the Atlantic liner *Minnehaha*, which went aground because of fog in 1910.

"We had pianos, typewriters, cows, and cigarettes galore around everywhere," said one islander.

"And fine cigarettes they were, too," chimed in another.

"We didn't dare keep the typewriters, for the insurance agents had the numbers of all of them," added the third.

Jessie Mothersole, in her book *Isles of Scilly*, tells how one woman, writing during the days when they were still working to refloat the *Minnehaha*, commented:

"Wrecking is delightful work. I feel quite capable now of tying a lantern to a cow's horn.

"There is indignation among the men, as they have only been offered £2 a head for the cattle they saved, and last time they had £5; and they say these are larger and were more difficult to save."

CHANGING GUARDS AT BISHOP ROCK

Last outpost of life on the Scilly group is the Bishop Rock Lighthouse. More than half a million dollars have been expended on this isolated rock to make navigation safer on the ocean lane between the United States and the Channel ports.

Photograph by Maynard Owen Williams

ONLY WHEN THE TIDE IS OUT CAN KELP GATHERERS WORK AT THE FOOT OF ST. MICHAEL'S MOUNT

As the boat steams out of Penzance Harbour, bound for Scilly, she passes the old mansion of St. Aubyns, atop the peak (page 753). A causeway (right) connects the promontory with the mainland, but at high tide it is inundated and strollers to the island must return to Penzance by boat. Seaweed, no longer used to any extent in the manufacture of chemicals, is collected for fertilizer.

Photograph by W. Robert Moore

TRESCO'S DOLPHIN TOWN, NEAR OLD GRIMSBY HARBOUR, ONCE WAS A THRIVING HAUNT OF SMUGGLERS

In the 18th century, Scillonians rowed the 120 miles of ocean to the shores of France in open six-oared gigs, and returned laden to the gunwales with liquors and tobacco. Their cargo was secreted until a favorable time for reshipment. Nearly every old stone house on Tresco and the five other small islands that rim this bay had a private hide-out for contraband goods.

Photograph by W. Robert Moore

GRIZZLED ISLANDERS FLANK ST. MARY'S ONE-MAN POLICE FORCE

Tales of wrecks and rescues at sea come to the lips of these vigorous inhabitants when they are in reminiscent mood. The veteran with the cane is more than 80 years old. The police officer has little to do; crime in Scilly is virtually nonexistent and motor traffic is not a problem.

Photograph by Maynard Owen Williams

BY BOAT, TRUCK, AND TRAIN, A FRAGRANT CARGO GOES TO LONDON

Carried safely across 40 miles of turbulent seas, flowers from Scilly are loaded into a truck in Penzance Harbour, to be hauled to the railroad station where they will start on the last lap of their journey to Covent Garden. Although the freight sheds are on the opposite side of the harbor (background), the *Scillonian* cannot berth there to make a direct transfer of the crates.

Photograph by Maynard Owen Williams

DOWN TO THE SEA IN TWO-WHEELED CARTS GO BLOOMS FROM THE ISLE OF BRYHER

By rowboat the flowers will be transported to St. Mary's, there to be added to the cargoes bound from Scilly to London. With the exception of the homes and lanes in the background, Bryher's 353 acres consist of rock outcroppings, downs, and flower gardens.

Several times on Atlantic crossings I had seen its friendly beam flashing across the water, so when I found that a boat was going out to change guards, I eagerly availed myself of the opportunity to go along.

Although it was Armistice Day, the two outgoing guards included Christmas and New Year greetings in their farewells, for the shifts on Bishop are two months on and one month off duty.

LIGHTKEEPERS ON BISHOP ROCK USUALLY LAND BY BREECHES BUOY

If the sea is rough, as it frequently is, duty periods may stretch on for days and weeks more, before relief is possible. Even our visit was a week overdue, and, had it not been made just when it was, many more days would have passed before the transfer could have been made, because another storm broke just as we were returning.

Seldom is the sea smooth enough to land on the rock directly from the boat. Normally, the launch is anchored to a near-by buoy, and then both men and supplies are hoisted up by rope and winch (page 756).

This massive tower, the third that has been constructed on the rock, is about 160 feet high and has a light of 622,500 candle-power which is visible 18 miles out at sea. When fogs hang heavy over the sea, rendering the light almost useless, charges of tonite are exploded at intervals as a warning signal.

During violent gales, when angry seas have crashed against it, the stone tower has swayed enough to spill the mercury out of the basin in which is floated the 9-ton revolving lens. Mountainous waves

Photograph by B. Anthony Stewart

HOW DID HE GET THOSE SHIPS IN THE BOTTLES? HERE'S THE ANSWER

He carves the hull so that it will pass through the neck easily. Masts and spars are collapsible and are placed lengthwise along the top of the hull, which is slipped into the bottle. Then the builder pulls them into erect position by a string and fastens them firmly with small, handmade wire hooks attached to sticks. A century ago many trim craft were turned out in Scillonian shipyards, but the industry declined with the coming of steam and the passing of the windjammer.

have also surged up and broken the windows at the top.

Between Bishop Rock and the larger islands lie the Western Rocks and Annet Island. On these and some of the other more remote rocks nest countless thousands of black-backed gulls, guillemots, cormorants, puffins, and other seafowl. Around the rocks, too, one can find many gray seals.

PUFFINS ONCE PAID THE RENT

The cheeky little puffins once served a more tangible purpose than now. In the 14th century, one Ranulph de Blanchminster held the Scilly Islands for the nominal rental of six shillings and eightpence, or 300 puffins.

Only a little more than a century later the rent was still six and eightpence, or only 50 puffins. Apparently the birds had become very wary or their numbers seriously limited.

These islands are also noted for the part they played during the days when smuggling was a popular industry among the islanders.

During the 18th century many boats, under cover of darkness, sneaked back to Scilly from France, heavily laden with contraband liquors and tobacco. On a number of the islands were caves and cellars where these illicit cargoes were concealed, until such time as they could be shipped elsewhere.

On Tresco, especially, a large number of the houses around Old Grimsby Harbour had their private hide-outs. When the "revenuers" would make the trail too warm for the incoming boats, loads of contraband would go overboard, their positions marked by floats.

There are times, no doubt, when the Scillonians look back on the days of smuggling and salvaging wrecks and sigh a little for the excitement of "the good old times." But all are glad that many of the early hardships are no more and that the fragrance of flowers fills the air instead of the acrid fumes from burning kelp.

CANARIES AND OTHER CAGE-BIRD FRIENDS*

By Alexander Wetmore

Assistant Secretary, Smithsonian Institution

HUMAN pleasure in song, sprightly movement, and color—these are the basic reasons for the hundreds of thousands of small cage birds that are found in homes and aviaries throughout the world.

The canary, most universally loved of these songsters, has been transported from its place of origin in the Canary Islands to every country in the world, and the vast number now found in captivity must certainly exceed those living in the original wild state, proof of the success of their domestication.

A Mid-Pacific Isle of Song

Years ago canaries are said to have been introduced by accident on the island of Elba and to have established themselves there until bird trappers caught, caged, and sold them all.

Now the only wild colony of canaries that I know of on earth outside of their native islands is found on one of the isles of the Midway group of the Hawaiian chain. Midway has recently become well known as a stop on the route of the transpacific Clipper planes.†

Landing at Midway from a naval mine sweeper on an April afternoon in 1923, I followed a tree-lined walk from a little wharf to the buildings of the cable station.

To my delight I found a pleasant grass-grown plaza backed by a windbreak of casuarina trees and ornamented with shrubs and flowers. Here was a man-made oasis of green built on an island of barren sand with fertile earth brought out as ships' ballast from Honolulu.

Earth, grass, trees, shrubs, and flowers—even the weeds in the vegetable garden—were introductions, and with them had come other things.

As I looked about I saw many small yellow birds flying here and there—canaries living wild!

But not until I heard their chorus of song at dawn the following morning did I fully appreciate that here was a true colony of these birds living in a state of nature. Dozens of them flew about in the shrubbery and over the lawns, and their sweet voices came from every side.

All are believed to be the offspring of one or more pairs of yellow canaries released on the island by Mr. D. Morrison of the cable company in 1909. As they moved about, they appeared small and weak in comparison with the robust Laysan finches brought here from Laysan Island, but they seemed thoroughly established and had no enemies. All that I saw were clear yellow in color.

Canaries Take Singing Lessons

German canary fanciers have long been noted for the attention that they give to the production of beautiful songsters and have developed the roller canary, famous for its notes.

The true roller canary is a bird of small size that is predominantly green or mixed in color, varying from this to clear yellow. The song is a series of soft trills, so sweet and pleasing in tone as to be beyond description. Outstanding singers are highly prized and command good prices.

Young male roller canaries are caged separately as soon as they have completed the first molt, and are kept in a quiet room in subdued light. An adult male of perfect song is kept with them and sings steadily. With his constant example the young ones practice their notes.

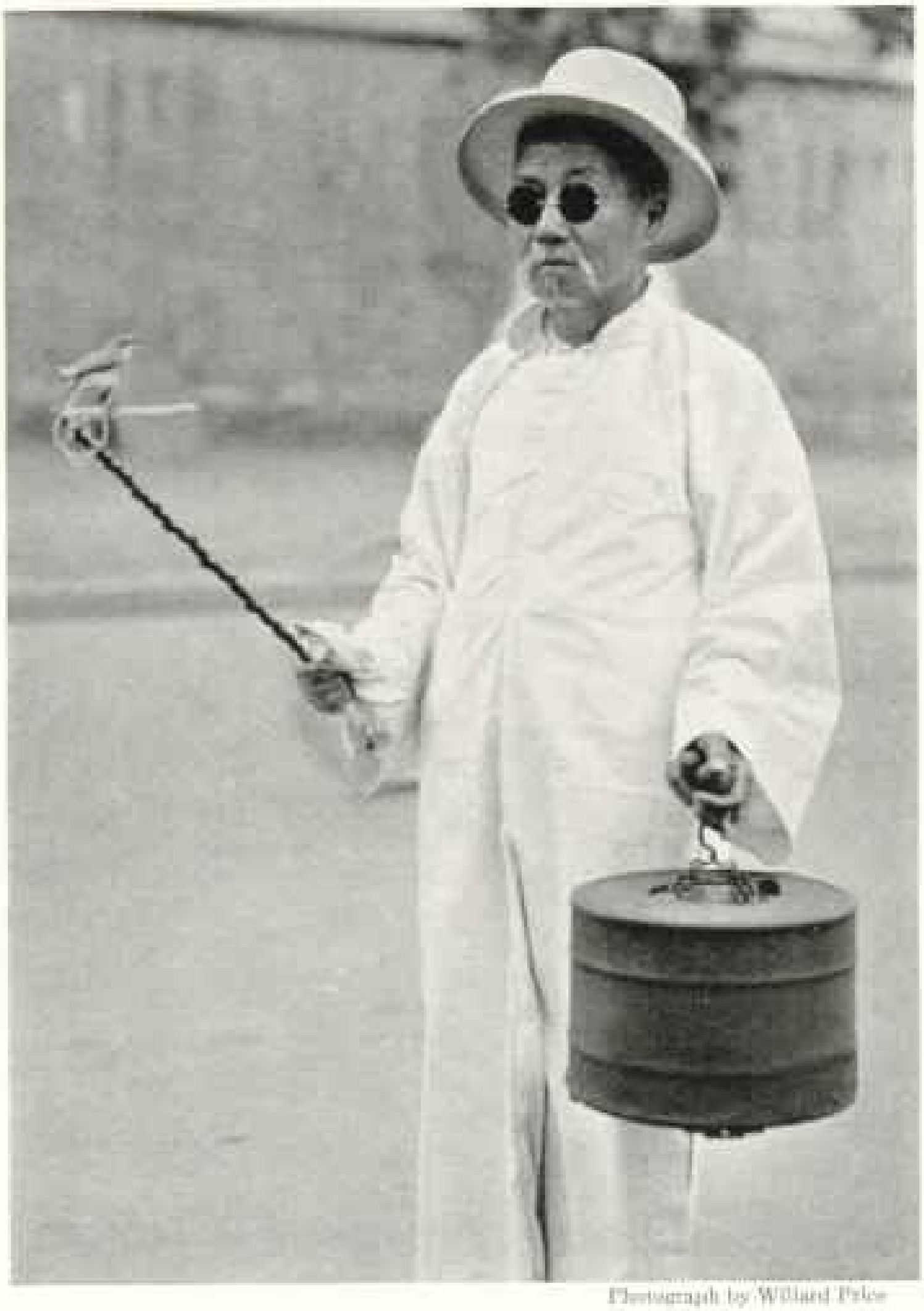
Bad Singers "Get the Gong"

The birds are under close observation, and should one develop harsh notes or undesirable calls, he is removed immediately so that he may not be copied by his imitative companions. Frequently a bird organ, arranged to play soft rolling trills indefinitely, is used in this training.

Under such conditions the young rollers develop their notes, called technically "tours," the different trills being characterized as bell rolls, water rolls, and so on, until finally the finished songster is pro-

* This is the eighteenth article, with paintings by Major Allan Brooks, in the important National Geographic Magazine series on birds. Previous articles by outstanding authorities on the bird families of the United States and Canada are available in the National Geographic Society's two-volume *Book of Birds*, together with other notable articles, portraits of 950 birds in full color, 633 "bird biographies," and more than 230 photographs and bird migration maps; $5 postpaid in United States and Possessions, $5.50 elsewhere.

† See "The Chronicle of a Scientific Expedition to Little-Known Islands of Hawaii," by Alexander Wetmore, National Geographic Magazine, July, 1925.



Photograph by Willard Price

A CHINESE GENTLEMAN TAKES HIS BIRD FOR AN AIRING

Attached to the end of a knobby stick, the pet may flutter, preen, or sing. If street commotion frightens him, he is popped into the dim privacy of the cloth-covered cage in his master's left hand. The dignified stroller's large round "specs" are a sign of learning. Chinese cage birds include Java sparrows, titmice, bulbuls, native thrushes, doves, and starlings.

duced. St. Andreasberg, in the Harz Mountains of Germany, has long been the center for breeding roller canaries, though now they are produced in other countries, too (pages 777, 778, and 780).

The ordinary roller canary has a repertoire of from five to ten of the various trills recognized by the expert. A larger number is unusual.

Although roller canaries are thus carefully trained in the finer points of their profession, the sweet song of this variety is inherited. That fact has been proved by experiments in which young birds were reared in soundproof cages completely isolated from the songs of other birds. In time the males developed the type of song of the roller canary.

"COLOR FEEDING" TURNS CANARIES ORANGE

About seventy years ago lovers of canaries were astonished to see in the hands of a few breeders birds of a beautiful deep-orange color. They were products of a process called "color feeding." For years those who had this secret guarded it carefully, but finally it became known that the intensified color was the result of adding red pepper to the diet during the period of molt.

Color feeding is simple. Birds of good natural hue are selected and, at the very beginning of the molt, in addition to the regular diet of seed and greens, they are given a food prepared by mixing one part of finely ground sweet red pepper to two parts of egg food (made from equal parts of hard-boiled egg, chopped fine or grated, and dry bread crumbs, unsalted cracker crumbs, or ground zwieback). Some fanciers add to this a drop or two of olive oil and a little sugar.

A teaspoonful of the color food is fed each day through the entire period of molt until all the body feathers are fully grown, and then it is gradually discontinued. Care is taken to feed only freshly prepared food in which the egg is not stale.

As the new feathers come in, they are noticeably deeper and richer in color than

the old ones. The enhanced color is due to an element taken from the pepper and remains until the next change of feathers.

Most birds eat the color food greedily and those that do not seem to care for it at first are usually quick to acquire a taste for it if the ordinary food supply is cut down for a day or two.

PET BIRDS SHARE CAMPS OF SAVAGES

Although the canary is the most popular, thousands of persons delight in the companionship of many other kinds of small birds.

Birds as pets are found with the most primitive of people. Around any aboriginal hunter's camp one may see live birds of various kinds, ordinarily young ones that have been picked up in the wild after the parent birds have been killed or on chance encounters.

Often these birds live in a state of complete freedom, wandering in and out of tents or huts at will and securing much of their own food. Eventually some may be eaten, some may return presently to the wild, while others live content with the companionship of man.

It is such circumstances, without question, that led, hundreds of years ago, to the domestication of the fowl, turkey, duck, goose, and pigeon, which now have such great value in the life of man.*

Photograph from Ewing Galloway

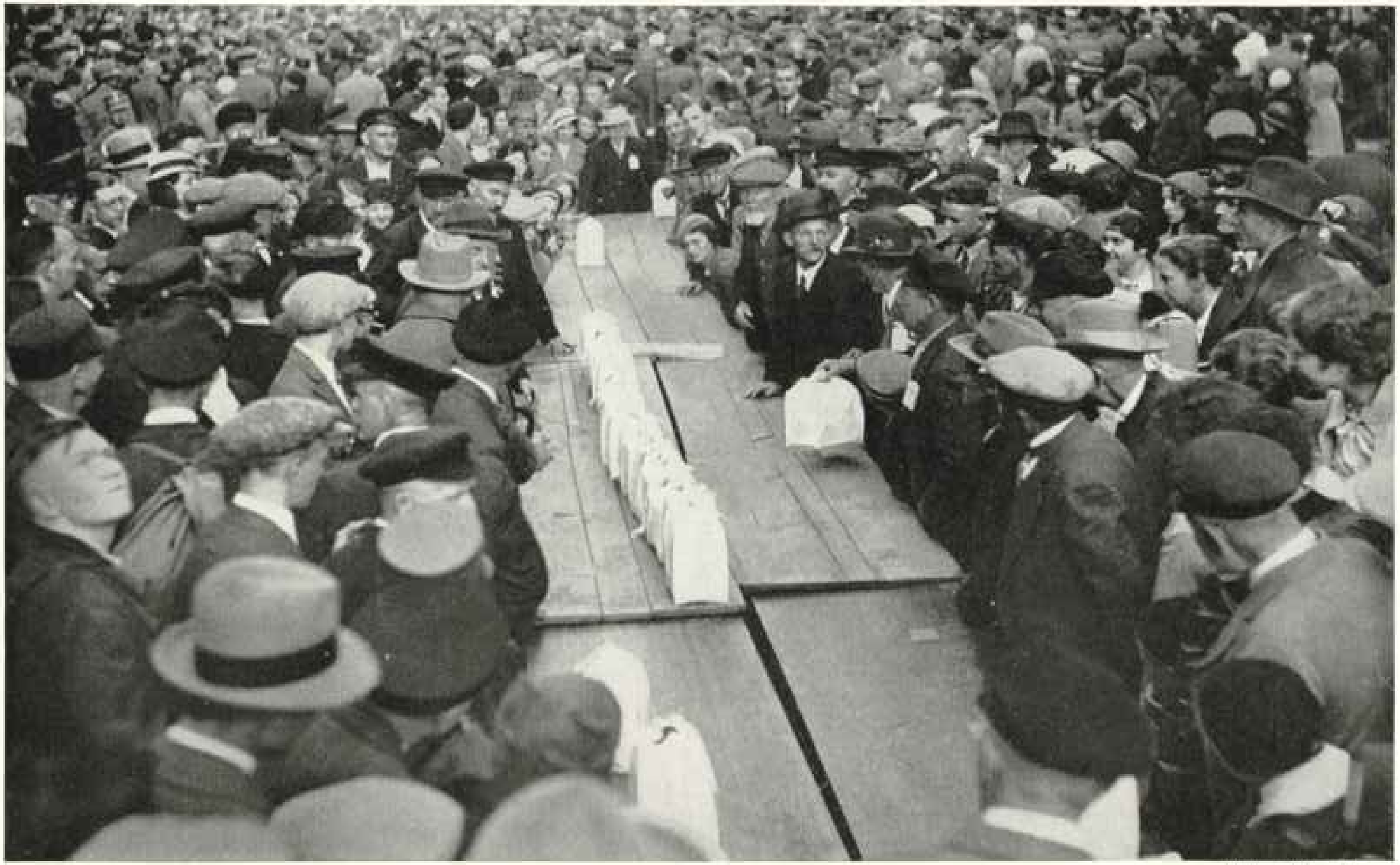
TIERS OF CANARIES DRINK WATER BY THE TUBFUL

From the tin tub an attendant fills the bottle, then thrusts the nozzle into a water dish within one of the wicker cages in which the birds travel. Hundreds of canaries, one to a "compartment" and almost all males, are stacked in a German warehouse awaiting shipment to markets throughout the world. "Sticks" of six or seven cages are held together by a flat strip of wood run through the tops of the barred cells and fastened at each end with wooden pins.

A FEW FEATHERED PERSONALITIES

Captive birds in primitive regions include many that are not suited for more settled sections. In the Gran Chaco of South America a baby rhea brought to me by an Anguetè Indian immediately adopted me and was so intent on being close beside me that I never succeeded in getting a good photograph of it because it was always too near

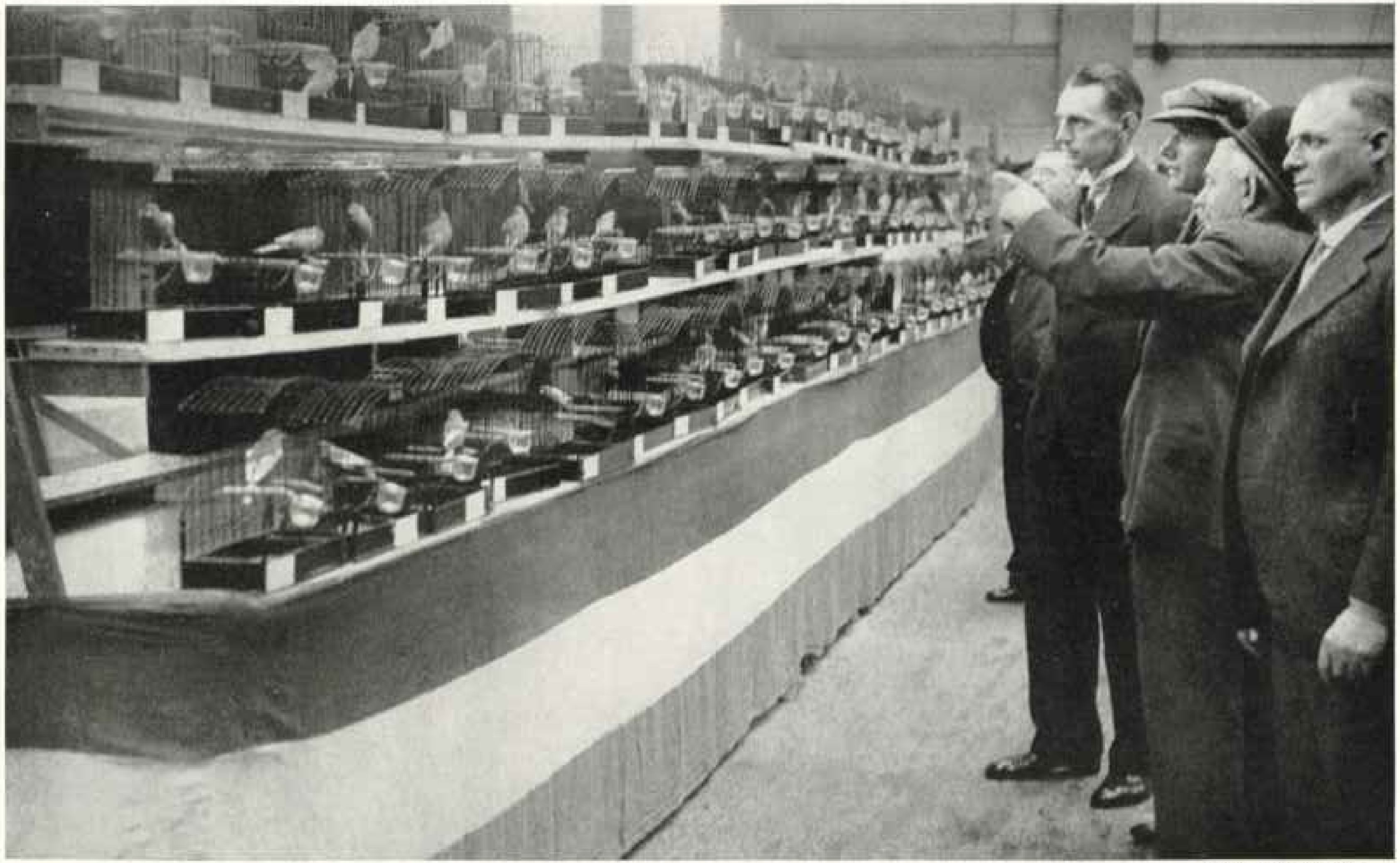
*See, in the National Geographic Magazine, "Fowls of Forest and Stream Tamed by Man," and "Races of Domestic Fowl," both by Morley A. Jull, March, 1930, and April, 1927, respectively; and "Man's Feathered Friends of Longest Standing," by Elisha Hanson, January, 1926.



Photograph from Ufa

WHICH WILL PROVE TO BE THE PRIZE PACKAGE?—THRONGS OF GERMAN CANARY FANS AWAIT THE JUDGES' VERDICT

Inferior feathered virtuosos are quickly eliminated from the singing contest at Benneckenstein, in Germany's Harz Mountains. The entries, in their cloth-covered cages, are lined up on the tables. Judges pass along the line, appraising with trained ears the sweetness and variety of the warblings from within. Among these people, few honors can match that of having a bird place first in the festival (page 780). The finest canaries trill and pipe several different recognized songs, or "tours." In both Europe and America the birds are trained with the aid of feathered singing teachers or mechanical music (page 775).



Photograph from Globe

JUDGES CAST A CRITICAL EYE OVER THE FIELD AT ENGLAND'S WESTERN COUNTIES CAGE-BIRD SHOW

Bird fanciers take just as serious an interest in developing individual pets with perfect "points" as do owners of highly bred cattle, horses, cats, or dogs. Judges select winners on such features as wingspread, color of feathers, shape of legs, neck, and back. This contest took place at Plymouth's Corn Exchange in November, 1933. Aviculture is especially popular in England and France (pages 780-782).

Photograph from Fls

NO LAUGHING MATTER IS THE JUDGING OF CANARY CARUSOS

This is a tense moment in the annual Tournament of Song at Benneckenstein, in the Harz Mountains of northern Germany, a region renowned for the breeding of sweet-voiced canaries. A holiday is declared and families from near and far bring their finest pet vocalists, picnic out of doors, and crowd around the judging tables. Cages are cloth-covered (left foreground) to keep the temperamental performers quiet and undisturbed by the excitement (page 778).

the camera lens. On cool mornings it lay across my slippered feet for warmth, and as I wrote and worked it leaned contentedly against my legs.

In various tropical countries I have seen many semidomesticated birds—parakeets that flew or climbed in and out of native houses; strange, large-headed plovers known as "thick-knees," kept in patios to eat the cockroaches; and little native sparrows that skipped in and out of doorways to search for crumbs.

I recall also the scores of wild birds that I kept for study and as pets around a little field laboratory on the Bear River Marshes in Utah. A California gull that I cured of a sickness became as tame as any domestic fowl, though it lived at freedom. A young great blue heron that grew enormously came at evening to rest on my knee and to poke curiously with its long bill at my glasses. A Canada goose with deformed wing feathers accepted me as an equal three days after its capture and followed me constantly like a dog. With these were hundreds of wild ducks of a variety of kinds, some of which fed from my hand and then returned voluntarily to their pens.

A PRIVATE AVIARY AND ITS BIRDS

Aviculture, the practice of keeping and rearing birds in captivity, has many devotees, from the housewife who raises a few canaries in her living room to the landowner with broad estates who delights in exotic species of birds brought from distant countries. Some of these collections rival zoological gardens in their extent.

The country home of my friend Jean Delacour is found at Clères in the north of France. The château, located in a little valley, is surrounded by broad lawns. Beyond are spacious meadows through which meanders a little stream, and behind the

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HERE, LITERALLY, THE GREEKS ARE BRINGING GIFTS

Pertinent are phrases from Vergil's *Aeneid* when jovial sailors of the Greek steamer *Koumoundouros*, berthed at Walsh Bay, Sydney, Australia, flaunt caged birds purchased in South America and prohibited in the continent "down under." If any of the pets escaped, their owners would be subject to a heavy fine. Australia, still battling the pest of immigrant rabbits, has passed strict regulations against the introduction, without special permit, of exotic birds and animals.

house are the vine-clad ruins of an older building dating back hundreds of years.

Several conservatories, crowded with tropical plants grown in moist atmosphere under glass, form the homes of scores of little birds of kinds seldom seen in captivity because of the difficulty of keeping them without special provision for their maintenance.

A dozen kinds of brilliant hummingbirds dart back and forth through open windows from the shaded greenhouses to outdoor flights enclosed by wire where they enjoy the sun. With them are even more brilliant sunbirds from the Orient, tropical orioles, bright-colored pittas, and dozens of other small birds, all living in evident health and happiness.

As I walked through, one afternoon last May, I heard constant outbursts of song from birds familiar as museum specimens, but whose songs and calls were entirely new to me.

On a slope beyond, I found a row of gaudy, long-tailed macaws living in the open air, chained to poles in such a way that they could climb about with ease. A pair or two flew about completely free.

Among the trees covering the hill above the house are extensive aviaries filled with birds of many kinds. Here I saw lories and other strange and curious parrots from various tropical lands, an unusual jay from the Ryukyu Islands of Japan, flycatchers from South America, yellow-billed magpies and mountain bluebirds from California, and scores of unusual birds from other parts of the world, living here in spacious, shrub-grown quarters side by side. Many were nesting and rearing young.

As we strolled about, viewing strange birds at every turn, a white mother gibbon came down from the trees to walk along the top wire of a high fence, with arms extended to maintain her balance. Her two

black babies, less sure of themselves, scampered along the wire mesh beneath her.

Other gibbons lived in the tall trees of two islands in a little lake, where their antics as they swung through the branches were most amusing. Formerly all had ranged at freedom, but this had to be checked when the band began visiting the church in the village to ring the bell at inopportune times.

The lake, the stream, and the meadows were filled with waterfowl. Geese of a dozen kinds, a screamer from Argentina, long-legged cranes, and curve-billed ibises stalked about in the grass. Dozens of ducks of many varieties, including such difficult species as eiders and shovellers, swam in the water, and flocks of flamingos waded in the shallows. Across a road were sheltered, fenced pools for other waterfowl. The entire collection was one to equal that of any zoo.

AVICULTURE IS POPULAR IN BIRD-LOVING ENGLAND

While aviculture is rapidly spreading in America, it probably has more devotees in England than elsewhere in the world at present (page 779). In any home in London it is common to see a large aviary cage or two, with from one to a dozen birds, and in country establishments aviaries of varying size are the regular accompaniment of the other interests that pertain to life.

Such aviaries may range from a flight or two to extensive parks like that of my friend Mr. Alfred Ezra at Foxwarren Park, in Surrey, where last May, among scores of smaller birds, I saw such rare species as the pink-headed duck from India, a pair of Stanley cranes with a nest and young, and great sarus cranes at freedom flying with trumpet calls over the meadows.

"SOFT-BILLS" NEED EXTRA CARE

There are two principal categories of birds in the vocabulary of those interested in species suited for cage and aviary—the "hard-bills," including those that feed on seeds, and the "soft-bills," which normally eat insects and fruits. The seed-eating species are those most common in captivity, as their food is easily obtained and their care entails a minimum of labor. These include the common canary and a host of sparrows, weaver birds, and others.

The soft-bills are found in the hands of those who have more leisure and who often become highly expert in the handling and care of difficult and unusual species.

A common food palatable to many soft-bills is manufactured from bread crumbs to which grated hard-boiled egg, dried beef heart, grated carrot, cottage cheese, dried insect preparations, and various other ingredients are added according to the needs of the birds concerned. Many soft-billed species subsist largely on fruits.

These statements are not a formula for the preparation of a standard food for aviary use, but are merely an indication of the types required for different kinds of birds. The details of the proper preparation of soft foods are available in standard treatises on aviculture, which contain also information regarding the care of cages, the handling and breeding of birds, diseases, and the many other details that confront the bird keeper.

Bird and pet stores, with their interesting displays, are familiar to most of us, and some may have seen the larger establishments of wholesale dealers, where hundreds of canaries sing happily in little individual wicker cages (page 777), or scores of weaver birds and other small species live in fluttering confusion in larger quarters. A more unusual sight is one of the bird markets of tropical America (page 802).

BRILLIANT TROPICAL BIRDS FOR SALE

One day last winter as I passed the great central market in Caracas, capital of Venezuela, I came to an outdoor section where row on row of wicker and wire cages, each with its captive birds, were ranged on the pavement or on low benches elevated above the ground. The air was warm and the owners of this display rested in the shade in endless conversation with friends and possible customers.

In the cages were brilliant little tanagers dressed in yellow, gold, green, and blue, blue honey creepers, others with yellow breasts, an occasional cardinal from the desert area about Barquisimeto, native meadowlarks from the fields near Maracay, red siskins, others dressed in yellow and black, troupials, large light-gray mockingbirds, euphonias, saffron finches, a few hummingbirds, and, of course, canaries, all feeding, preening, and fluttering about, calling and even singing amid all the busy confusion of the city.

Residents and visitors paused frequently to admire the birds or to inquire a price.

CANARIES THRIVE ON SEEDS, CRUSHED EASILY IN STOUT BILLS

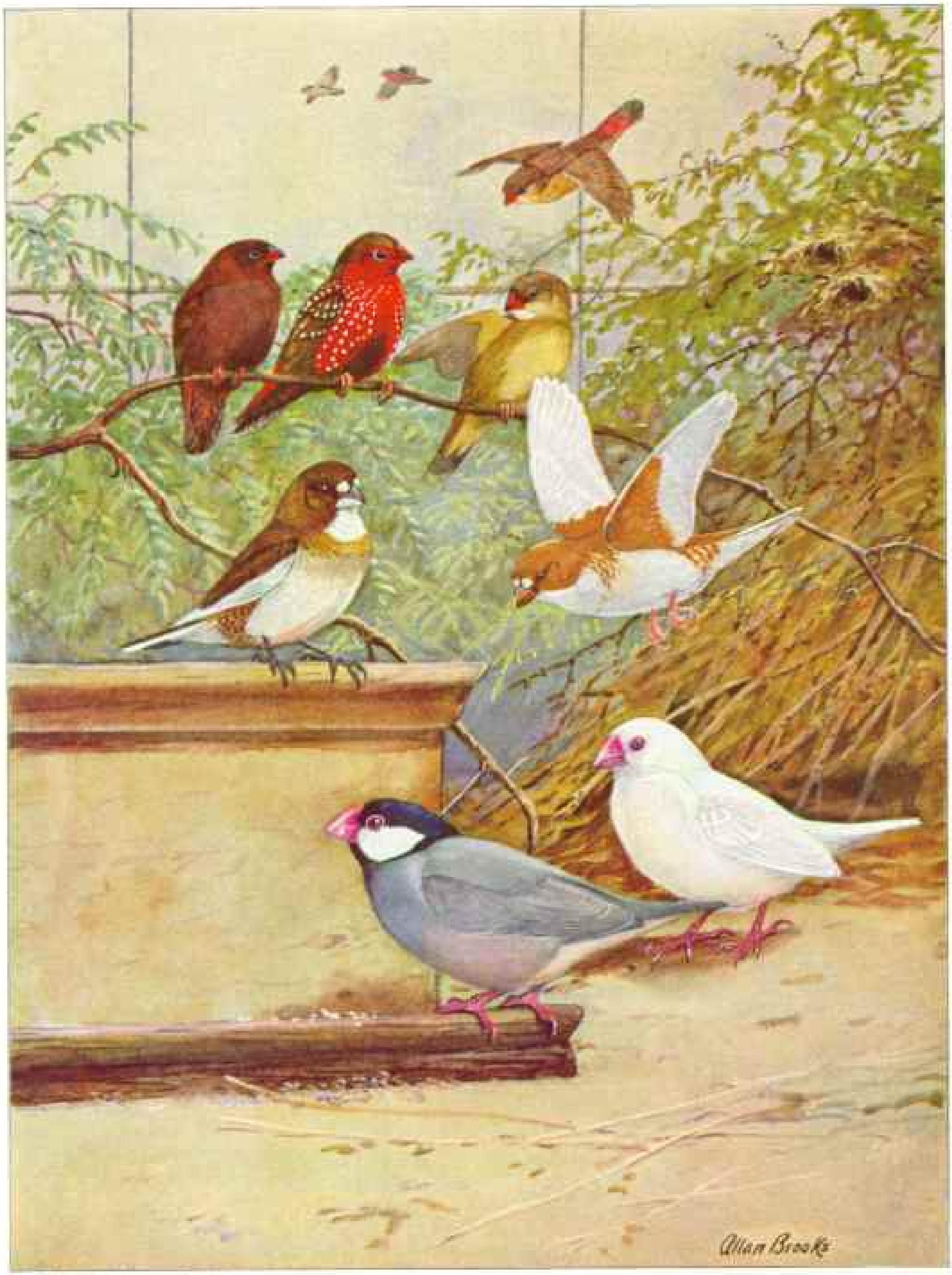
They need no fancy mixed foods; hence their popularity with amateur bird keepers. The WILD SERIN (upper left) is a common European cousin of the wild canary of the Azores, Madeiras, and Canary Islands, from which has been developed the hardy domestic pet. The NORWICH YELLOW (bottom center) and the NORWICH GREEN (lower right) are two color phases of one of the most abundant types of canary in captivity. Of spotless plumage, the WHITE CANARY (upper right) perches diagonally above the handsome CINNAMON, distinguished by pink or reddish-brown eyes. The GOLD LIZARD (lower left) is bred for perfection of color pattern.

FANCIES CRANE THEIR NECKS AS IF SUSPICIOUS OF ODD RELATIVES BELOW

Gripping the upper perch, in positions assumed in display, are the BELGIAN FANCY (left), with head and neck extended at a sharp angle from the body, and the SCOTCH FANCY, with a smoothly arched exhibition posture. A "nun" of large, flat feathers adorns the crown of the CRESTED CANARY (lower left). Unusually long, wavy, and recurved plumage gives the FRILLED CANARY (lower right) the appearance of having been stroked the wrong way. Dandy of the English canaries, the YORKSHIRE (right center) should be slim, long, and straight as a soldier.

A PLUMP BULLFINCH COUPLE CHAPERONS THREE PERKY, CHEERFUL CAGE MATES

Though in the wild state it is no mimic, the engaging BULLFINCH (upper pair, male left) in captivity may easily be taught while young to whistle simple tunes. The LINNET, pleasing vocalist of the European finches, bobs on a twig (right), awaiting its turn at the bath. Eating out of the hand quickly becomes a habit with the pert little EUROPEAN SISKIN (lower left). The gay, sweet-voiced EUROPEAN GOLDFINCH (center, below) is far more brilliantly colored than the familiar American species. These four birds, like most of our smaller feathered pets, come from the Old World.



FAR FROM ASIAN LANDS OF ORIGIN, THEY BRIGHTEN HOMES AND ZOOS

The tiny male STRAWBERRY FINCH, natty in red vest with white polka dots, seasonally assumes a drab garb (bird at extreme left, above) resembling, though darker than, the plumage of the female (perched, right wing extended, and flying). The domesticated BENGALEE, of uncertain origin, has been bred in three forms—dark brown and white, fawn and white, and pure white. The first two are shown here (center, perched and flying). A native of the Netherlands Indies and the Malay Peninsula, the JAVA SPARROW (lowest pair, normal and white forms) is a large and hardy breed.

IN WHYDAH SOCIETY, IT'S THE MALE THAT WEARS THE "TRAIN"

With a body no bigger than a sparrow's, the graceful PARADISE WHYDAH (upper right, above its modest mate) tows a flowing tail that may reach a foot in length. On the ground rests the COMBASSOU, a feathered Jekyll-and-Hyde whose winter suit (left) is as plain as that of the female (right), while in summer it is clad in dressy bluish black (middle). In the center are the brilliant RED-BILLED WEAVER (left) and the ORANGE WEAVER, both of the family whose name derives from their elaborately interwoven nests.

A MOTLEY GATHERING FROM BELOW THE EQUATOR

Of these four Australian beauties, the commonest is the hardy, well-mannered ZEBRA FINCH (upper pair, male right). Rarer in America is the DIAMOND FINCH (center). The showy RED-FACED GOULDIAN FINCH (male and female, left-hand pair) and the BLACK-FACED GOULDIAN (female below male, lower right), long considered distinct, are now known to be merely color varieties of one species. They are not easily acclimated in colder places. Paler purple on the breast distinguishes the females from their mates.

THEIR GAY GARB MORE THAN MAKES UP FOR FEEBLE SONG

Fluttering against the cage bars is a WHITE-HEADED NUN from the Netherlands Indies and the Malay Peninsula. Perched on the upper branches are the BROWN-BREASTED NUN (left) and the BLACK-HEADED NUN. To the lower branches cling the THREE-COLORED NUN (full face) from India and Ceylon, the CUTTHROAT FINCH (left center), and the lovely CORDON BLEU (blue underparts). In the water splash the tiny ZEBRA WAXBILL (above) and the COMMON WAXBILL (left). The long-lived BRONZE NUN rests on the pool's brink.

MYNA, THE MIMIC, PERFORMS FOR A SELECT AUDIENCE

An excellent talker, the WATTLED MYNA (lower left) can learn to enunciate as clearly as the best of the parrots. One of these birds on exhibit at a meeting in Washington, D. C., astonished a former director of the Budget Bureau by greeting him with the words: "How about the appropriation?" The lively, engaging RED-CRESTED CARDINAL (top bird) comes from southern South America. A splendid singer, the sprightly SHAMA THRUSH (white-edged tail) is also something of a mimic. The lowest perched bird is the active, noisy WHITE-EARED BULBUL. "Japanese robin" is one of several misnomers for the warbling RED-BILLED HILL TIT (on ground), a native of China.

Every home that I entered in the city had little aviaries standing in the patio, or small cages with birds hung in a window. And I was continually attracted by strange bird notes, to find that they came from a captive of some species rare in zoological gardens in the north, or one that I had not seen in life before.

From such sources in foreign countries dealers obtain the birds that become established in our homes and zoos.

Serin Finch

The wild serin finch *(Serinus canaria serinus)*, found from the Atlas Mountains in Africa north in southern Europe through Spain to Greece and Palestine, is a close relative of the wild canary, but is slightly smaller and somewhat darker, with heavy blackish streakings on back and sides (Color Plate I). It is kept commonly in aviaries, breeds in captivity, and frequently crosses with the European goldfinch, the canary, and other small finches.

Because of the widespread range of the serin in the regions where canary culture was first developed, it has been supposed to have furnished part of the parent stock of the domesticated canary, but it appears now that this indefinite belief is unfounded. The closely related form of the Canary Islands and near-by areas is considered to be the one that alone has produced our domestic bird.

Canary

The canary, found today in every country on the globe, occupies a remarkable place, since among our common domestic birds it alone is kept and reared solely for the pleasure and companionship that it brings into our homes. As it does not produce flesh, feathers, or other product of commercial value, its contribution to our well-being comes entirely in the form of pleasing songs and interesting mannerisms. It joins cultivated flowers in making attractive the background for our lives.

In a wild state the canary *(Serinus canaria canaria)* is native to three groups of islands in the eastern part of the Atlantic Ocean—the Canary Islands (from which it takes its name), Madeira, and the Azores. In the Canary group it is found on all of the islands except Fuerteventura and Lanzarote, and is one of the most common wild birds from sea level to the highest ridges.

The true wild canary is grayish above, streaked rather heavily with blackish, and marked with yellow on the rump and crown. The breast is dull yellow and the sides grayish, indistinctly streaked. This is the stock from which all our domestic canaries have come.

In many parts of the world there are other kinds of small yellowish birds known as "wild canaries," but they have nothing to do with our domesticated bird. In the United States the name is given to such different species as the goldfinch *(Spinus tristis)* and the yellow warbler *(Dendroica aestiva)*, representatives of two distinct families. In Latin America the term "canario" is applied to many kinds of small tanagers, warblers, and sparrows.

How the canary came into captivity is not recorded at this late day. Seemingly this must have been because of pleasing song, since the coloration of the wild canary is nothing remarkable. Sailors brought captive canaries home from voyages, demand arose for them, and from the end of the 15th into the 16th century Spaniards imported the wild-taken birds into Europe in numbers, selling them for good prices.

Even at this early time it was found that canaries could be reared in captivity. And at the beginning of the 16th century the area where they were extensively produced spread from northern Italy north to center around Innsbruck, Nürnberg, and Augsburg.

Turner in 1544 is the earliest writer known to me to mention the canary. Conrad Gesner, in the third book of his *Historia Animalium*, published in 1555, said that he had not seen one, but gave an account of the species from information furnished him by a friend in Augsburg. Canaries remained rare for a considerable period, and commanded such prices that for a long time they were kept only by the wealthy.

Accustomed as we are to the canary in captivity, it seems strange to consider them as living wholly at freedom. In their island homes they range commonly in gardens and orchards, and are also found in flocks in sterile, stony country where they may be tame and confiding, or wild and difficult to approach.

The nests are cups of grasses and weed stems lined with softer materials, placed in bushes or on low branches of trees. The three to five eggs are light green, spotted with reddish brown. The song is as attractive as in captive birds, though not so prolonged in utterance, nor is it given for so much of the year.

Under domestication, variation among canaries began at an early date. Dr. E. Stresemann has pointed out figures of canaries with white wings and much yellow on the body in paintings by Lazarus Roting of Nürnberg, who died in 1614, so that the change from the original color to the yellow phase apparently was under way at the close of the 16th century.

The yellow and the green types of canary, with every possible intergradation between, remain the common forms to the present. While the green canary is an approach to the parent stock, native birds from the Canary Islands are grayer on the back than most of those found in captivity.

The ordinary household canary, kept by those who merely love birds, is of moderate size, with the colors as indicated above. It will be of in-

Photograph by Wilhelm Tobien

CANARIES, CAT, ROOSTER, AND PARROT GREET CUSTOMERS ON A PET-SHOP DOORSTEP

Small monkeys, cats, and birds all live together in harmony at a store in Funchal, Madeira Islands. From its place of origin in Madeira, the Azores, and the Canary Islands, the canary has been transported to every country in the world (pages 775 and 791).

terest to examine some of the distinct strains kept mainly by canary fanciers, who breed pure stock and retain only those birds with the definite characters of the variety concerned.

White Canary

White canaries were recorded in 1677 as a variation from the ordinary yellow kind. They were much prized, so that males sold for 50 gulden each, but by 1702 they were produced in such numbers that they were valued at only 3 gulden.

These white birds are simply albinos, or individuals that have lost not only the original black streakings but also the other pigments, so that they appear without color (Plate I).

In the United States twenty years ago they were rare and commanded prices of from $35 to $50 or even more. But now they are found in some abundance and are valued more for their ability in song than for their color.

Cinnamon Canary

The cinnamon canary is also an albinistic variety, a tendency that is shown by its red or pink eyes. Its true color is a brown, mixed sometimes with yellow, with much white in the wings and tail (Color Plate I).

In breeding, the cinnamon inheritance is transmitted by the male, as young bred from a cinnamon mother and a male of some other color do not have the pink eyes or the brown color of the cinnamon breed.

Lizard Canary

The lizard canary is a most handsome variety in its bold, regular pattern and contrasting colors. The gold lizard has the body color yellow (Plate I), while in the silver lizard this is silvery gray. The crown in purebred birds is light in color, without spots, and the wings and tail are black.

Though so attractively marked, these birds long remained rare in the United States and are still rather difficult to obtain. They are among the higher priced varieties.

The young at first are plain with a yellow cap, becoming spangled at the first molt. They are at their best in their first year of life, as, when the feathers are renewed at the next molt, the pattern usually becomes less definite and the wing and tail feathers become tipped with white.

A relative is the London fancy canary, which when young is like the lizard, but at the first

molt becomes deep yellow or buff, as the case may be, in beautiful contrast to the black wings and tail.

Norwich Canary

The Norwich canary, which takes its name from the English city of that name, is a popular variety that is bred in either yellow or green (Color Plate I). It is a large bird of rich color with full body and small, rounded head.

Belgian Fancy and Scotch Fancy

Among the most curious of canary breeds are the Belgian fancy and the Scotch fancy, which are reared entirely for form without regard to song.

Both of these are long, slender-bodied birds with small heads, and are of a highly nervous temperament. In ordinary pose there is nothing about them to attract particular attention, but when excited they assume peculiar, almost grotesque attitudes (Color Plate II).

In the Belgian fancy the bird stands with the body fully erect on its long, slender legs, with the wings pressed tightly to the sides and the long neck extended almost at a right angle to the body. In full position the bill is pointed down.

The Scotch fancy exhibits a variation, in that the tip of the tail is thrust forward and the neck arched so that the line from the head to the end of the tail is a smoothly rounded curve. The bird appears to lean backward from its perch in attaining this peculiar position.

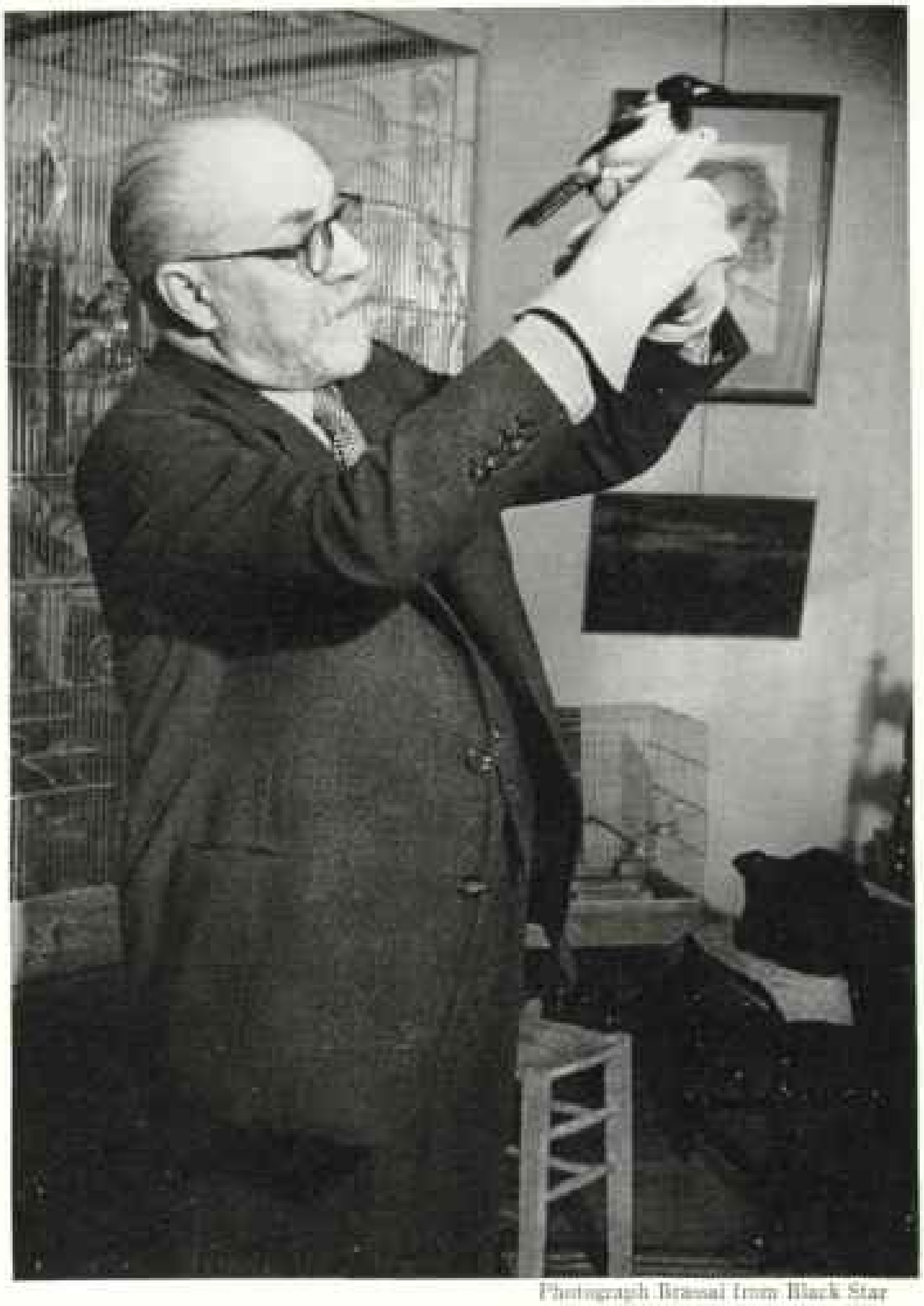
Crested Canary

Another peculiar type is the coppy, or crested canary, in which the feathers of the crown are long and flat, and extend out from the center to form a cap that almost, if not entirely, conceals the beak and the eyes.

In the most sought-for types the crown is black and the body nearly clear yellow. Crested birds are bred in several strains of canaries, the most popular kinds being those of good size. The crested bird illustrated (Color Plate II) is of the Lancashire breed.

Lancashire Canary

The Lancashire canary is the largest of all, being strong and robust and standing a head



Photograph Brassaï from Black Star

BIRDS' HUES TUNE UP AN ARTIST'S COLOR SENSE

At his studios in Paris and Nice, the contemporary French painter, Henri Matisse, keeps cages of feathered pets from many parts of the world. Comparing the fresh, vivid plumage of the birds with some of his paintings, the artist is able to judge the richness of his own chromatic efforts. Visitors to Matisse's studios are sometimes treated to exhibitions of tricks he has taught his charges. Here the painter admires a black-and-orange troupial from South America (page 802).

taller than any of the others. Its size may be appreciated from the painting (Plate II), in which the crested canary shown is of the Lancashire breed and is appreciably larger than its companions. The largest specimens are more than seven inches in length and are heavy in body, so that they appear as veritable giants when compared with ordinary canaries.

Frilled Canary

The frilled canary, seen perhaps most often in the Netherlands and France, has many of the body feathers long and slightly recurved at the tip, so that the plumage appears loose and fluffy, almost as if some of the feathers were growing upside down (Color Plate II).

This type usually has a clear-yellow color and shows considerable variation in the extent of the frilling.

Yorkshire Canary

The Yorkshire canary, said to be a comparatively modern variety, has a long, slender body and small head. It is bred in various colors, one of the common ones being clear yellow. Males may be nearly seven inches in length (Color Plate II).

Bullfinch

The finch, or sparrow, family has many species that are kept in cages or aviaries, since their small size, tameness, and trim, pleasing form give them definite attraction. Finches are distributed abundantly throughout regions where the keeping of small birds has long been an interest, and, as they are easily obtained, numerous kinds have become highly popular. Most of them thrive in captivity, as they are seed eaters whose care is not difficult.

Of the considerable variety only a few may be mentioned here, as there is not space to describe many common kinds, such as the greenfinch, brambling, chaffinch, yellow bunting, saffron finch, grassquits, red cardinals, and many others that are prized by bird keepers.

A prime favorite of this family is the bullfinch (*Pyrrhula pyrrhula*), which as a species ranges across Europe and northern Asia to Japan. Several varieties or subspecies are found through this vast region, differing slightly in color and size.

The most common one in captivity is the European bullfinch (*Pyrrhula pyrrhula europaea*). The male is beautifully colored in gray, black, soft red and white; the female is duller in hue (Color Plate III).

While wild trapped birds soon become tame, the most interesting are those that are taken from the nest and reared by hand, or those that are bred in aviaries, as they become entirely without fear and are easily handled.

The ordinary song is a low, warbling whistle, which, while pleasing, is not remarkable, but captive birds are often taught to whistle simple tunes, which they do most attractively. Often, too, they learn to perform little tricks, and become so tame that they may be allowed to go in and out of their cages at will.

Though bullfinches often are fed entirely on rape seed, it is better to give them a diet of mixed seeds, and they are very fond of berries and green food.

Linnet

Another favorite is the linnet (*Carduelis cannabina*), valued for its pleasing, varied, warbling song (Color Plate III). It is an excellent cage bird, and with proper handling becomes very tame.

While males in the wild state are marked with crimson on the breast, they often lose most of this color after the first molt in captivity. This species often breeds in well-kept aviaries, and frequently hybridizes with related birds.

European Siskin

The Old World siskin (*Spinus spinus*) is another species that usually becomes very tame when caged. The adult male is marked with bright yellow, with black on the head (Color Plate III), but females and immature males are soberly clad in streaked plumage like the pine siskin of America.

The European siskin nests in the north where there are spruces and other cone-bearing trees, ranging into Norway and the Archangel district in Russia and across Asia to Japan. In the Pyrenees, Bulgaria, and the Caucasus it is found locally. In winter it wanders in flocks wherever food is abundant.

As the song is merely a twittering warble, the bird is sought more for its friendly acceptance of captivity than for its notes.

European Goldfinch

The European goldfinch (*Carduelis carduelis*) is a handsome fellow of gay plumage, a prime favorite abroad, and is often brought to America (Color Plate III). It may be excitable when first captured, but with a little attention soon becomes tame.

In its native home it ranges through Europe and northern Africa to Palestine and western Asia, several geographic forms distinguished by slight differences in color being found in this region. The song is pleasing and, coupled with the bright plumage, makes the bird most attractive.

Common about gardens and cultivated lands, the European goldfinch often nests near houses. Its cup-shaped nest holds from three to six bluish-white eggs spotted with brown.

The bird is one that has been transported often to other lands, and now is established in Bermuda, New Zealand, and in various places in Australia. For a while there was a colony in and about New York City, but after a time

Photograph by Alfred T. Palmer

A SAMPAN'S DECK IS FOOK KEE'S BARGAIN COUNTER

"Birds to sing. If not sing can will be to change other. Dealer at moderate price." So reads a Chinese vender's shingle on his "houseboat" moored to a wharf at Kowloon, on the mainland opposite Hong Kong. Like water beetles, flotillas of junks and sampans crowd the shores of Cathay's rivers. They are floating homes for thousands of families who never sleep on land.

the birds did not thrive and their introduction there has been called a failure.

Strawberry Finch

Next to the canary, the weaver birds, or weaver finches (Family Ploceidae), are among the most popular of aviary birds, though here we deal with a great variety instead of a single kind. This is an Old World family of many species that are handled easily in captivity.

Weavers range in size from small to tiny, and are often of beautiful and striking plumage. Like the sparrow tribe, they live on seeds and so are easily maintained.

Enter the birdhouse in any extensive zoological garden, and soon you are certain to find an aviary with a swarm of little birds that fly continually from food trays to perches or from place to place about the enclosure in vivacious activity. These are weaver finches, the group ordinarily consisting of several kinds confined in company. In separate aviaries, where they are not too much disturbed, they often nest and rear young. The species in this group, in the wild state, are most abundant in Africa and in the Indian and Malayan regions.

Many years ago I saw in a bird store a pair of handsome but tiny birds that the dealer told me were strawberry finches (Color Plate IV). They so intrigued my fancy that they soon were mine.

The birds were sent home in the usual little wicker cage wrapped carefully in paper. A peep through the wrappings showed them resting quietly, and a spare canary cage was soon ready for their reception.

Photograph courtesy U. S. Bureau of Mines

COAL MINERS STAKE THEIR LIVES ON A CANARY'S DELICATE LUNGS

A rescue crew tests for the presence of poisonous carbon monoxide by lifting the caged bird close to the roof where the noxious but odorless gas accumulates. If the bird shows distress, immediate steps are taken to vacate and ventilate that section of the mine. Mechanical detectors also are widely used to show the presence of dangerous components in underground air. On their backs the men wear oxygen breathing apparatus.

Great was our consternation when the tiny strawberry finches in an instant darted into the cage and out between the wires on the other side, to take refuge like two little mice beneath a table.

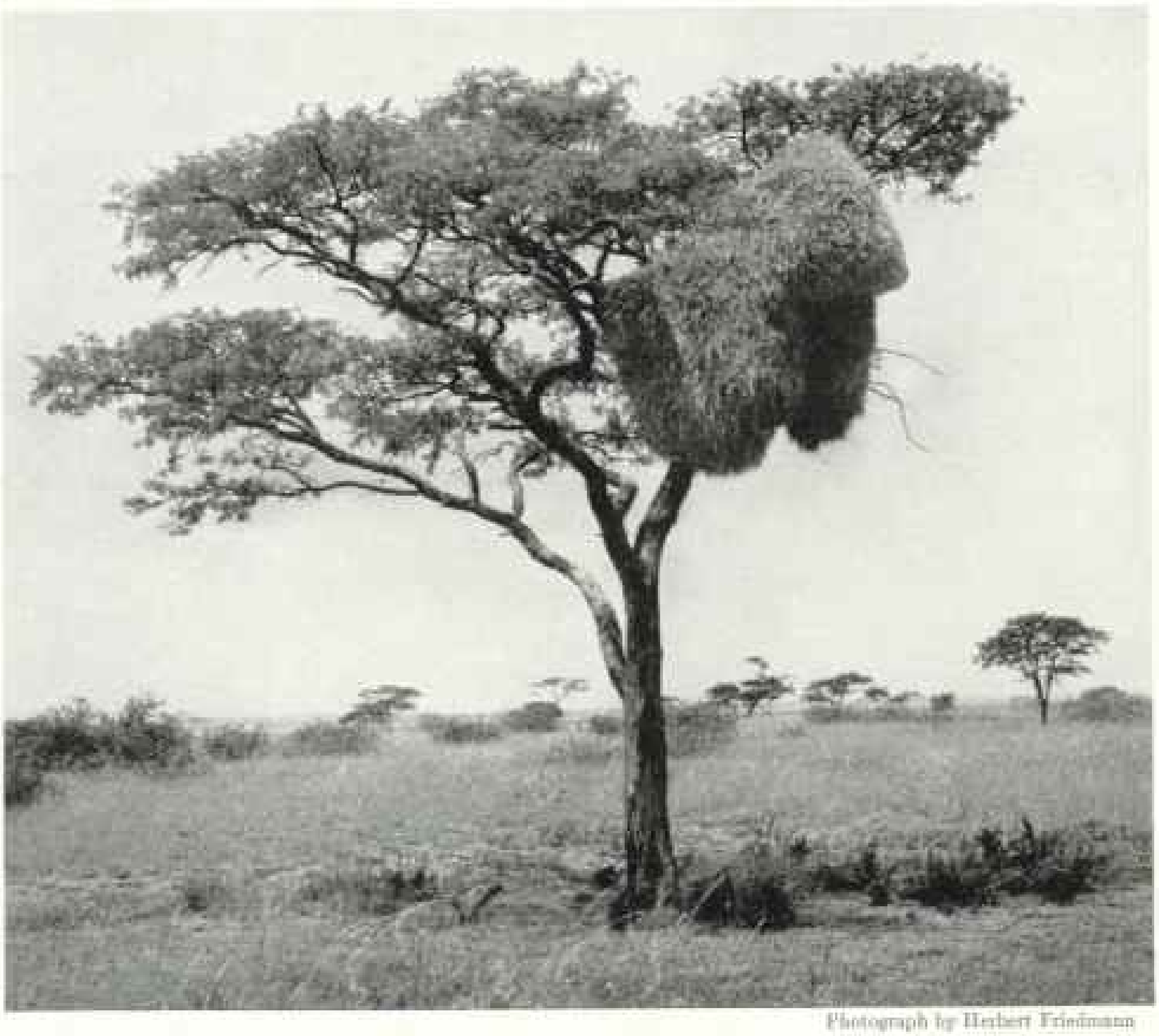
With some maneuvering they were captured and placed again in the cage more carefully, then left undisturbed for a time. Before long they adopted the new home and from then on made no attempt to leave. In fact, when startled, they usually took refuge in the bottom, where they seemed to feel secure in the shelter of the muslin screen around the lower section of the wires.

Until the death of the female from some obscure cause a few months later, the two were tractable but timid; from that time on the male seemed to enjoy human attention and remained a household pet for years. His beautiful warbling song, heard when all was still about him, was unusually attractive, the more so, perhaps, because it was not repeated constantly.

In aviaries scores of strawberry finches may live together, perching in pairs or little groups and nestling against one another contentedly. Sometimes they fill a foot or more of a branch or perch, chattering and preening, or resting quietly. Newcomers to the line often light on the backs of their companions and push and crowd their way down to the perch.

The females remain plain in color always, but the males change plumage twice a year, the white-spotted, red feathers of the nesting period being replaced for several months by a plain, dull dress much like that of the female.

In its native home, from India to Java, the strawberry finch, or amadavat (*Amandava amandava*), ranges in thickets and grasslands as well as about villages. The nests are small, neatly made balls of fine grass suspended in



Photograph by Herbert Friedmann

LIKE A MISPLACED HAYSTACK IS THE SOCIABLE WEAVERS' COMMUNAL HOME

Forty nests under one thatched roof burden the branches of a tree at Maquassi in the Transvaal, South Africa. "Penthouse" colonies have been found containing as many as 200 pairs of birds. When a nesting site has been selected, all the feathered colonists join forces to build a common roof. Individual nests are constructed close together against the underside of the general covering. Each year, at breeding time, fresh nests are added upon the lower surface of the previous season's "crop." In many cases the mass eventually grows so huge and heavy that the supporting branches break under the load. A pair of pygmy falcons often takes up contemporaneous residence in one of the sociable weavers' "sky cities."

grass and bushes. The families are surprisingly large, each nest containing from five to ten white eggs. The species is naturalized about Pearl Harbor on Oahu, in the Hawaiian Islands.

Bengalee

The Bengalee is a domesticated variety credited to the Japanese and developed from the crossing of small weavers of the genus *Urolonchа*, its history being so obscure that the exact ancestry is not known.

These are chunky little birds that handle as easily as canaries, since they are accustomed to live only in cages and would be completely at a loss if they found themselves at freedom.

There are three varieties—a dark-brown one and a light-brown one with extensive white markings, both shown in Color Plate IV, and a third, not illustrated, that is pure white throughout, except for the feet and bill.

Java Sparrow

The large-billed Java "sparrow" (*Padda oryzivora*) is the most common of the weaver-bird family in captivity, as it is sold in all bird stores and is kept without difficulty in ordinary cages. It is in all probability the best known of exotic cage birds (Color Plate IV). This heavy-bodied bird, about the size of an English sparrow, soon becomes tame. Its pleasant song is given rather infrequently, usually when everything about it is quiet, and the bird is prized mainly for its soft colors and rather curious appearance, as well as for the ease with which it is kept.

An albino variety that is pure white, or white

© Relang from Three Lions

BIRDS IN CAGES HANGING ON THE WALLS OF HOUSES BRING SPRINGTIME MELODY TO A PARIS SIDE STREET

On one side of the narrow alley of steps hangs a small and modest cage, while on the other is a veritable bird apartment house. Even the poorer people have their canaries and finches. In this corner of a street of small shops there are a *serrurerie* (locksmith), a *coiffeur* (hairdresser), and an *épicerie* (grocery).

with light gray mixed in the back, is found commonly. Some captive birds develop black cheeks and lose the pinkish wash on the under surface. Male and female are alike, both in size and in markings, so that pairs are known only when breeding. These birds do not change in color with the seasons.

Java sparrows are found wild in the Malay States, Sumatra, Borneo, Java, and Bali, as well as on some other islands in that region. They have been introduced and established in recent years in other sections, as in the coastlands of eastern Africa and adjacent islands, and elsewhere. According to some, the bird may have been native originally in Java and Bali and been brought from there into the other sections where it is now found wild.

The Java sparrow has long been known in captivity in Europe. Sir Hans Sloane had one in 1740, and I have seen them represented in paintings by Dutch artists of the same period.

In its native home the Java sparrow is called the "ricebird," and its large flocks are very destructive to rice before the harvest. To protect their fields natives erect little huts, elevated on posts, in which a guard may sit. Strings hung with rags, tin-can rattles, or wooden clappers lead out from this central place over the fields. As the flocks of ricebirds alight, the guard pulls the proper line and sets in motion the pendants, whereupon the rattling above the birds frightens them away.

Drawing by Hashime Murayama

A WEAVER BIRD DISPLAYS ITS LOOPS AND KNOTS

A sketch by a Geographic staff artist shows the craftsmanship with grass and pliant twigs which has given the weaver family its name. A live red-billed weaver in the National Zoological Park in Washington, D. C., "posed" for the drawing. In decorating their cages they sometimes undo their work and start over again until finally satisfied (Color Plate V and page 800).

Whydah

Among all the weaver finches the most curious in plumage are the whydahs, in which the tail of the male is greatly elongated (Plate V).

The name of this group is unusual and is subject to two interpretations. The ordinary spelling is that just given, and the name is said to come from that of the coast town of Ouidah in Dahomey, French West Africa. The Portuguese traders, however, called the birds "widows" from their long, dark trains, and they are known today as "veuve" in French, and are often called "widows" or "widow birds" in English.

Photograph by Maynard Owen Williams

A NATIVE BIRD FANCIERS' CLUB MEETS TO MATCH PETS

At Fort de Kock, Sumatra, in the Netherlands Indies, a quorum of tribesmen squat on their heels around oddly shaped cages of wood and split bamboo. While wives trade chickens, ricecakes, candy, or baskets in the open-air market, the men gossip about their bulbuls and doves—and doubtless about the people next door! In Sumatra the dove is an emblem of luck, and therefore common in captivity.

While whydahs are kept sometimes in cages, they are at their best in aviaries, where the handsomely decorated males can be seen to advantage.

Among the various species the paradise whydah *(Steganura paradisaea)*, shown in Plate V, is one of the best known. The tail in the male has two pairs of feathers with extraordinary development. The central pair has the base broad and the tips extended as slender filaments, while the second pair is much elongated. In both the feathers are turned until what would normally be the lower surfaces of each pair are applied to the adjacent plumes so that the tail is curiously flattened from side to side. The longer feathers may be a foot in length.

These decorations are confined to the males, as females and immature males are streaked, sparrowlike birds with the tail short, as in most species of this group. In a native state the paradise whydah has a wide distribution in Africa.

The giant whydah *(Diatropura progne)* of eastern and southern Africa is nearly as large in body as a red-winged blackbird, and the streaming tail feathers are eighteen inches in length. It is one of the most showy of aviary birds. Each male has favorite perches where he sings a sibilant song and flutters his wings in display, showing his red shoulders in brilliant contrast with his black wings and body.

Red-billed Weaver

The red-billed weaver *(Quelea quelea)*, sometimes called the "red-billed dioch," is a prime favorite in small aviaries and is one of the common species in captivity (Color Plate V).

These birds are those in which the habit of weaving, from which the family name is taken, can be observed with the greatest of ease. It is necessary only to supply them with suitable material, such as ordinary raffia, whereupon they will work with it long and industriously.

Each strand is held in place on twigs or wires with the feet, while the free end is looped and turned and finally knotted, the process being repeated until the straw is completely used.

The birds often seem highly critical of their work; they pull and twist at it, or even undo it and start over, until finally it suits them.

At freedom they weave globular nests of grass, but in captivity their energy is devoted ordinarily to ornamenting the wires of their

aviaries with a network of strands. If nests are started, they are usually not fully completed (page 799).

In the semiarid regions in Africa red-billed weavers gather in flocks that are enormous, as they may include tens of thousands of birds. The late Dr. Edgar A. Mearns often told me of watching such bands in Ethiopia come to drink at small streams. The birds poured in until the ground was covered, and at the water's edge they literally piled on top of one another in a fluttering, shifting mass. Often some unfortunate would be pinned down by the press of birds steadily alighting and held with its head under water until it drowned.

Orange Weaver

The orange weaver (*Euplectes franciscana*), known to aviculturists as the "orange bishop," is a native of northern tropical Africa. The male is a bird of handsome color and unusual plumage, as the upper and under tail coverts are nearly as long as the tail, and the elongated flank feathers form puffs that are thrown out in display on either side (Color Plate V). The female and the young male are streaked, sparrowlike little birds with no hint of the brilliant colors of the adult male.

These are birds kept primarily for color, and are found in many aviaries. Three distinct species are ordinarily grouped as "orange bishops" by bird dealers, the one described above being the smallest. The red bishop, or grenadier bishop (*Euplectes orix*), is the largest of the three, and has the head and throat black like the abdomen, and the wings and tail blackish. The fire-crowned, or crimson-crowned, bishop (*Euplectes hordeacea*) has the crown orange instead of black. Two related species, the Napoleon and the taha weavers, have the males colored vividly in yellow and black.

Photograph by Bernard F. Rogers

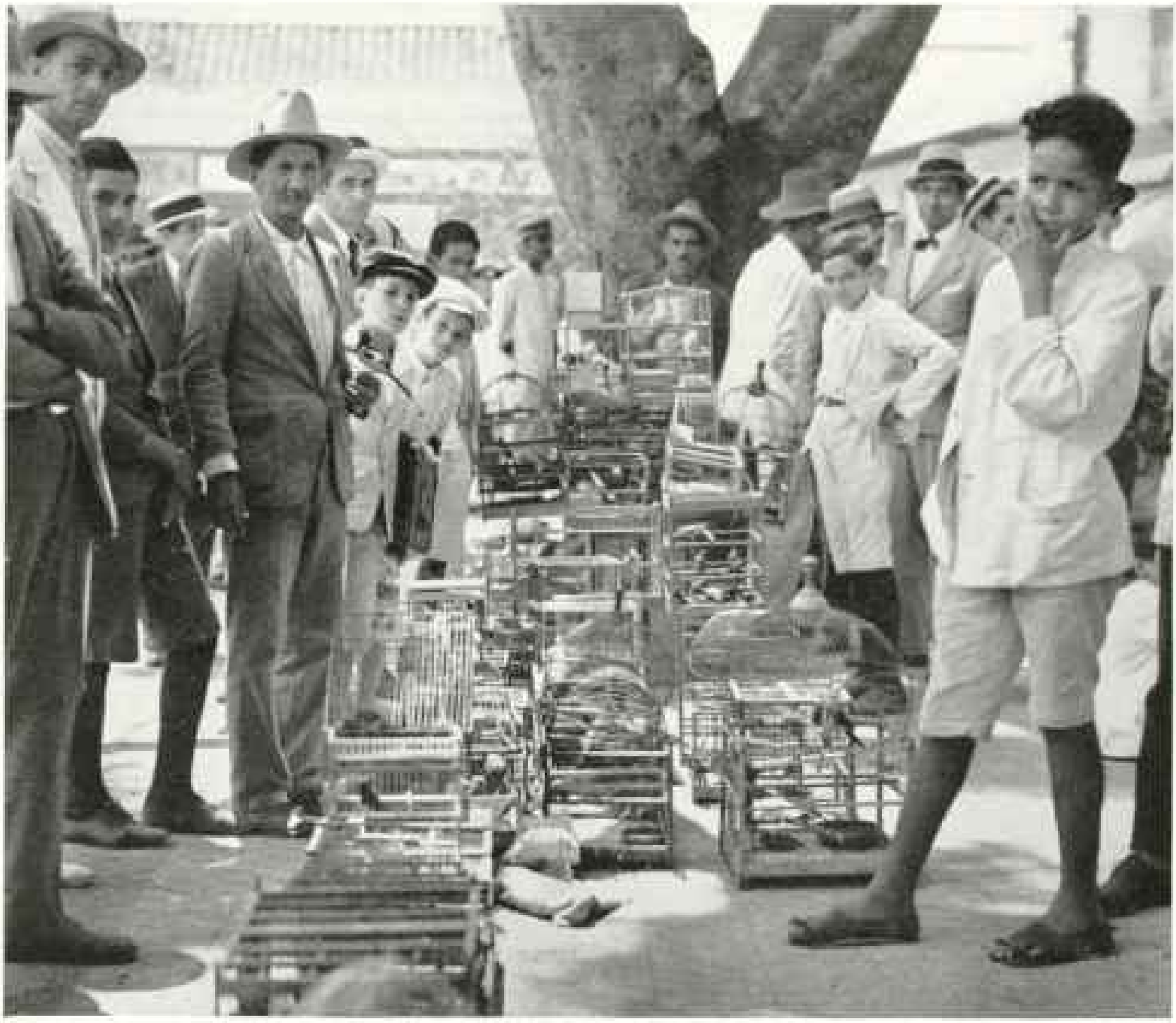
NO CAGE CONFINES THIS GUARDIAN GOLDFINCH; HE WEARS A HALTER HELD BY A SLACK "REIN"

A barber in the Azores has provided a novel perch with opportunity for his pet to stretch its wings in short flights to the chain's end.

Combasou

Occasionally, in an aviary or in some bird-store cage, one sees a tiny, black, sparrowlike bird with white bill and orange feet, whose plumage has a slight metallic sheen. This is the combasou (*Hypochera chalybeata*), another African species that is common in the wild, where it lives familiarly about settlements, but for some reason is not abundant in collections of living birds (Color Plate V).

The combasou makes an excellent pet for those who enjoy unusual birds, though it is not a showy species. One that I kept for years lived in great contentment in an ordinary canary cage where it had the protection of a muslin bag around the lower section. Behind this



Photograph by Alfred T. Palmer

FOR NOVELTY, WINGED WARES CAN'T MATCH THE "BIRDIE" IN THE CAMERA

With a troupial on his left hand, a veteran dealer (left center) in the outdoor bird market in Caracas, Venezuela, stands protectively beside his feathered stock in trade. Wicker and wire cages contain gaudy tanagers, honey creepers, native meadowlarks, siskins, mockingbirds, hummingbirds, and the ever-present canaries. "Every home that I entered in the city," the author says, "had little aviaries standing in the patio, or small cages with birds hung in a window" (page 791).

screen it seemed to feel secure, but was frightened when it was removed.

Its clear, warbling song was given only when the room was quiet. Its plumage changes were most interesting, as for several months it would be in clear black feather, then would molt into a plain, streaked dress, and change after a period to black again.

Zebra Finch

Australia, as well as Africa and Asia, has interesting species of weavers that for years have been reared in abundance in captivity, in addition to being trapped wild for the aviary trade. The zebra finch (*Taeniopygia castanotis*), named from the narrow black bands on the upper breast and throat of the male, is one of the best known of these, as it is easily handled both in cages and in aviaries (Color Plate VI). It is one of the species that nest readily in captivity if given a suitable cavity and some dried grass with which to line it.

At freedom zebra finches construct a small bottle-shaped or domed nest, with an entrance at one side, which is suspended in bushes or trees or may be placed beneath the large stick nest of a hawk or eagle. They also build in holes in trees. The eggs are white with a pale bluish tinge. Five or six is the usual number, but 16 or 18 eggs, probably laid by several females, may be found in a single nest.

The birds range in flocks that frequently contain hundreds of thousands. At watering tanks in dry seasons it is sometimes expedient to build little ladders on which birds that fall in may climb out; otherwise so many are drowned that their bodies pollute the water.

Diamond Finch

The diamond finch (*Stagonopleura guttata*) is less often found but is highly regarded and does well in captivity. It is decidedly heavier

Photograph by R. Anthony Stewart

"TAKE HOME A CANARY TO CAROL ON CHRISTMAS AND SING IN THE NEW YEAR"

At a limited-price variety store in Washington, D. C., imported roller and other canaries are offered for sale—as well as all the "fixin's," such as bird seed, bird medicines, perches, cage covers, and cages. In the last year this store alone sold 3,500 canaries.

in body than the zebra finch and is even more strikingly marked (Color Plate VI). It is native in eastern Australia.

In the bush, diamond finches make long bottle-shaped nests of grass in which to place their four to seven white eggs. Often from three to a dozen of their homes may be placed beneath the great stick nest of a brown hawk or a whistling eagle, these large neighbors seeming entirely indifferent to the little birds living beneath them.

Gouldian Finch

Of all the Australian weavers the most attractive are the Gouldian finches (*Poëphila gouldiae*), named by the English naturalist John Gould for his wife, in recognition of her long assistance to him in illustrating his books on birds.

Viewed in the abstract, a combination color pattern composed of brilliant yellow, purple, black, red, and green can only impress the color-conscious person as gaudy. That this may not necessarily be true is shown by the trim form of the Gouldian finch, which, dressed in these identical colors, is beautiful and pleasing (Color Plate VI).

These small birds, an attraction in any aviary, are natives of northern Australia. Their nests are the usual globular structures of grass, suspended in trees or bushes except when the birds elect to nest in holes of trees. The eggs are white.

Gouldian finches breed readily in captivity, and many are reared for sale. For years it was supposed that the birds with black faces and those with red were distinct, while a third kind with orange head was also recognized. Breeders find, however, that the three are merely color variations, and that all belong to the same species. Even the sexes cannot always be distinguished with certainty, as the breasts are lighter in young males, and some females are as bright as the brilliant males.

The young, when in the nest, have curious mouth tubercles, light in color, the reason for

Photograph by Edwin L. Wisherd

JAZZ TUNES INSPIRE A CANARY CHORUS

Rhythms hot from Tin Pan Alley set the pace for vocal outpourings of the dozens of canaries kept by a resident of Washington, D. C., in a one-room apartment. While a canary inherits the general character of its notes, it responds readily with lusty song to the music of many kinds of instruments. Fox trots, waltzes, tangos, and even popular "swing" tunes played on the phonograph, encourage the birds to greater (and better accented) efforts, according to this experimenter.

which is not entirely certain. However, as they show plainly in scanty light they may be of help in directing the parents toward the open mouths of the young in feeding.

As Gouldian finches live in nature in a mild climate, they are delicate in captivity and need protection from drafts and cold. In England they become acclimated so that they live outdoors in summer and under these conditions breed freely. It is difficult, however, to accustom them to any degree of cold.

Nuns (Munias)

The group of weavers known to dealers and aviculturists as "nuns" or "mannikins" comprises a hardy lot of species of small size with sturdy bodies, short tails, and strong, heavy bills. Ornithologists often call them "munias," *Munia* being the generic name applied to them in science.

Despite their small size, the birds of this group are sometimes shot by natives for food. For a nest they weave a rounded ball of grass with a concealed opening, hard to find, in the upper end. The various kinds are abundant in captivity and are easily handled. Four of the munias regularly kept as pets are shown in Color Plate VII:

The white-headed nun *(Munia maja)* is found native in the Malay Peninsula, Sumatra, Java, Nias, and Bali. Marked by the pure-white head that gives it its name, it has two shades of brown on the breast and sides, and the central undersurface is black.

The black-headed nun *(Munia atricapilla)*, with coal-black head and deeper colors throughout, ranges from India and western China to the East Indian islands as far as Celebes and the Philippines. Several geographic varieties are found, distinguished by slight differences of size and color.

The brown-breasted nun *(Munia castaneothorax)* comes from northern tropical Australia, and the three-colored nun *(Munia malacca)* from India. All feed on seeds, sometimes attacking the rice crops. There are several other related kinds that may be found in aviaries.

Bronze Nun

The bronze nun, or bronze mannikin *(Spermestes cucullatus)*, is a smaller species than its associates of the same general name, but has the same chunky form and heavy bill (Color Plate VII).

From its native home in Africa it has been taken abundantly into captivity, and though not a showy bird it is one that is common in aviaries and cages. Male and female are col-

ored alike, but the young are plain, dull brown.

Curiously enough, this little bird is common as a wild bird in the island of Puerto Rico in the West Indies. It was introduced and naturalized there many years ago, possibly during the time of the slave traders, when ships were bringing their human freight from West Africa. I have seen them in the hilly country of Puerto Rico in flocks of hundreds that fed on ripening grass seeds on the ground.

When startled they fly up to perch in the limbs of trees, where as soon as they alight they sidle along the limbs until they rest in twos or threes, nestling contentedly close together. Their nests are untidy, domed structures of dried grass stems with ends projecting all around. The eggs are white.

Cutthroat Finch

The name of the cutthroat finch *(Amadina fasciata)*—which, though called a finch, is a member of the weaver family—is taken from the crimson mark across the throat in the male (Color Plate VII). The female lacks this character but is otherwise similar. The bird is found wild in the drier sections of Africa, from Senegal to Somaliland and Rhodesia.

Cutthroat finches are easily handled in captivity, and are popular in aviaries. They often have a tendency to become darker in color when caged, caused sometimes, possibly, by eating hemp seed.

Cordon Bleu

The brightly colored, shiny bill gives the common name of "waxbill" to a group of small weavers found in Africa that are kept universally in aviaries.

Among the more pleasing species is the cordon bleu *(Uraeginthus bengalus)*, another bird of Africa that is a great favorite in aviaries (Color Plate VII). It is sometimes called the "red-cheeked," or "crimson-eared" waxbill, from the red cheek patch of the male, a mark that is absent in the female. There is a closely related species *(Uraeginthus angolensis)* of the southern half of Africa in which the male also lacks the red mark.

Zebra Waxbill

The zebra waxbill *(Sporaeginthus subflavus)*, found throughout much of Africa south of the true Sahara, takes its name from the bars on its sides that suggest the stripes of a zebra (Color Plate VII). It is marked also by the bright-red rump, the reddish under-parts being found only in the male. It differs from the other waxbills not only in color but in having a shorter tail.

Common Waxbill

The common waxbill *(Estrilda astrild)*, of plainer coloration, longer tail, and slightly larger size, is also a native of Africa (Plate VII). It varies somewhat in depth of color, there being several geographic forms, and also sometimes changes through conditions imposed by captivity.

There are several other kinds of waxbills, all of them rather difficult to handle until they are accustomed to aviary conditions. After that they are quite hardy.

Red-crested Cardinal

All through Argentina I found the red-crested cardinal *(Paroaria cristata)* a common cage bird, prized even in its native land. In the north, where it is often called "Brazilian cardinal," it is equally attractive. Its colors are striking, its form jaunty, and its actions sprightly, so that its rather ordinary song is overlooked (Color Plate VIII).

The birds are seed eaters that are regularly kept in single cages of sufficient size to allow freedom of movement. In aviaries care should be used not to put them with weaker species, as they are often aggressive and kill or injure smaller companions.

These birds are hardy and will stand considerable cold. I have known a bird escaped from captivity to live at freedom through the rigors of a severe winter in Washington, D. C.

Shama Thrush

The sweet-voiced shama *(Kittacincla malabarica)*, of handsome plumage, a member of the family of thrushes, is found from India and Ceylon to Yunnan, Borneo, and Java. The long tail varies considerably in length and often becomes frayed and worn unless the birds are kept in large enclosures (Color Plate VIII). The female is gray instead of black.

In captivity the shama is primarily an aviary bird, as it is of nervous temperament, but it can be handled in cages with a little attention and often becomes very tame. Ordinarily it is kept only by bird fanciers, as it requires soft food, meal worms, and other similar diet.

In its native home the shama lives in thickets and jungles. This accounts for its shyness when caged, as it is accustomed to cover and is ill at ease in the open when alarmed. Its beautiful song of rich notes is highly varied, and it is said to mimic the calls of other birds to some extent.

White-eared Bulbul

The white-eared, or red-whiskered, bulbul *(Otocompsa jocosa)* is found from India to the Malay Peninsula. It is an example of a common type of which several species and subspecies are found regularly in captivity (Color Plate VIII).

A closely allied bird from India lacks the white tips on the tail feathers. Another, from the same country, is minus the red spot on the cheeks, and there are still others in which the red of the under tail coverts is replaced by yellow. There are some with yellow breasts, some with streaked throats, and so on. All

Photograph from Wide World

LITTLE MISS AMERICA WELCOMES BIRDS FROM FOREIGN LANDS

At the third annual exhibition of the Bird Fanciers Association, held at the Waldorf-Astoria Hotel in New York City in November, 1937, pretty Miss Ursula Reimer was snapped at an aviary while feeding Java sparrows (top) and other exotic species. An albino Java sparrow (left center) is a prize in any collection (Color Plate IV).

agree in slender form and in jaunty, erect crest.

The bulbul of the poets is found in this family (the Pycnonotidae), a group of which some kinds are good songsters, while others are not so proficient. Bulbuls require soft food, but with proper care are hardy in captivity.

Myna

Talking parrots are universally known, but it is something of a surprise to most people to stop to examine a heavy-bodied, shiny black bird with curious yellow wattles on the sides of the head and have it suddenly remark in a sepulchral, croaking voice, "I'm hungry," or, less politely, "So's your old man!" But this is what may happen to visitors in the National Zoological Park any day.

The bird is the talking myna (*Gracula religiosa*) from the Malay region, a species of wide range that has been separated into a number of geographic races (Color Plate VIII).

These mynas are naturally imitative and learn words, phrases, and other bird calls, particularly loud, whistled sounds, with ease. I remember especially the survivor of a pair that often remarked to me (rather mournfully, it seemed), "The other one died," and followed this or any other imitation with cackling laughter learned from those who were amused at its talk. This same bird, when we first received it, jabbered phrases in some strange tongue, perhaps in Malay, taken from native handlers before it was shipped to us.

In talking, mynas usually check their restless jumping about to rest with body held stiffly, bill pointing out, and the pupil of the eye contracting and enlarging rapidly. Words are uttered with open bill and considerable movement of the throat.

Mynas are quarrelsome and aggressive, so they have to be confined alone. They require a good deal of cage room, and eat fruit and other soft food. Though most amusing in an aviary, they are not recommended for household pets, as they require considerable attention in keeping their cages clean. They readily learn to imitate from one another.

Red-billed Hill Tit

The sprightly little "Japanese robin" (*Leiothrix lutea*) is wrongly named, since it is found from southern China to northern India and Burma and does not occur wild in Japan. It is better called the "red-billed hill tit" (Plate VIII). It requires soft food, but is hardy and easily handled in cage or in aviary, and pays for its care in its alert, active movements and pleasant warbling songs.

MARVELS OF METAMORPHOSIS

A Scientific "G-man" Pursues Rare Trapdoor Spider Parasites for Three Years With a Spade and a Candid Camera

By George Elwood Jenks

With Illustrations from Photographs by the Author

"WHO ever heard of worms changing into butterflies? Why, that sounds like witchcraft!"

Thus reasoned the horrified city fathers of a town in Chile, only a century ago, when they discovered that a German scientist in their community was raising caterpillars which magically changed shape and sprouted wings. According to Charles Darwin, who relates the incident in his diary of the voyage of H. M. S. *Beagle*, the miracle-working biologist was actually arrested and charged with heresy!

Is it any wonder that provincial officials of that day saw something supernatural in the transformations conjured up by Nature's witchcraft? Since then, the four stages of insect life—egg, larva, pupa, and adult—have become familiar to laymen, and watching "caterpillars turn into butterflies" is a favorite schoolboy diversion.

Yet, even today, scientists themselves are still baffled by some of the deeper mysteries of insect metamorphosis.

THE JOY A MYSTERY HOLDS

A mystery of any kind holds a strong fascination for me. When the individual portions of universal human curiosity were handed out, I must have received an extra-large slice, for I have found real joy only in experimenting, investigating, and exploring. That explains why I eventually found myself back where I started in boyhood, "watching caterpillars turn into butterflies." Only in a figurative sense, however, for I had found that far too much of the butterfly's inner development was hidden behind caterpillar skins and chrysalids.

The very fact that it was hidden appealed to my "Peeping Tom" complex. So I passed up the disappointing butterflies, and hoped some day to find an insect that would not be so shy and secretive about its private life and magic transformations.

One insect trail led me on to another, out into the adobe hills of southern California, down through the tunnels of trapdoor spiders, and into a dim and little-known insect underworld.

There I found strange creatures and explored new trails as alluring to me as any unmapped waterway ever traversed by my canoe in a Canadian wilderness. And there I struck the trail of a mysterious parasite that promised to fulfill my dreams of finding an insect nudist that would reveal its larval and pupal forms, unconcealed by opaque skins and pupal mummy cases.

THE BLACK WIDOW TRAIL

Three black widow spiders were instrumental in starting me on the trail that led to the insect underworld. We had moved into a little cottage out near the Southwest Museum on the outskirts of Los Angeles, and it gave me a jolt when I discovered these venomous spiders and their families making themselves very much at home in the new garage. Somehow I did not quite like the idea of the black widows' children growing up as playmates for our two-year-old Danny.*

I grabbed an old broom and started a war of extermination, but could not resist pausing to take a last look at the third intended victim. Black as a coal, save for the red hourglass mark, she was beautiful in a slinky, sinister way.

Here was mystery again. Scientists disagreed about her, and no one seemed to know the cause of her alarming increase and spread during recent years. And there was her dainty silken egg sac. What was happening inside? Could that hidden life be photographed?

The old fever was upon me again—the lure of the unknown—and, as usual, it hit me hard. When I came back to earth, I found that I had a growing colony of black

* See "Afield with the Spiders," by Henry E. Ewing, in the National Geographic Magazine, August, 1933, and "Potent Personalities—Wasps and Hornets," by Austin H. Clark, July, 1937.

A SCIENTIFIC G-MAN MAKES A RAID ON THE INSECT UNDERWORLD

"Detective" Jenks, the author, in his search for parasites that murder trapdoor spiders in their subterranean nests, dug up many hundreds of these cave dwellers' tubes of clay. Danny bosses the job while daddy pries loose a small section of southern California. Several tubes are already in the box and pieces of paper mark two others still to be dug.

widow spiders in salad-dressing-jar breeding cages, in a homemade laboratory with apple-box cupboards, and that I had begun an extensive investigation of the black widow, and a search for a parasite that might be used to control her increase. That trail I am still following with a growing probability of ultimate success.

I became a sort of local institution. The neighbors dubbed me "The Spider Man," or "The Black Widower." They seemed to think that a man who put in about 14 hours a day collecting and studying spiders, when he was not being paid for it, must have something wrong with his head, and many a time along that rocky road I felt inclined to agree with them!

TRAPDOOR HUNTING IN ADOBE HILLS

All that is another story, but the connecting link is that I had collected about a hundred black widow "layers" to provide the egg sacs necessary for the parasite-propagation experiments. These "hens" had to be well and properly fed in order to lay eggs, and it was difficult to obtain large quantities of insect food during the rainy seasons. Trapdoor spiders proved to be an ideal food for them, and I knew that there were thousands in the surrounding hills.

So the strong-arm work began. During the fall and early winter of 1935 I dug up my first thousand nests; an additional thousand in 1936, and another thousand in 1937. Of course that was far more than I needed for feeding my black widow layers, but, early in my first thousand, I became intensely interested in an underground warfare between the trapdoor spiders and certain mysterious parasitic enemies of which I had found ample evidence in devastated nests. So I kept right on digging whenever I could steal the time from other work.

But let's not sit here in the apple-box laboratory and merely talk about it. Come with me and see for yourself just how we hunt the trapdoor nests for the parasites they *may* contain.

As usual, the car is packed and ready. Danny has a wad of old papers for markers. Down the winding canyon road, past the Southwest Museum, over the Arroyo Seco bridge, and on up the three-mile grade into the high adobe hills, we rattle along.

"SEE THE TRAPDOOR? THAT'S THE ENTRANCE TO THE SPIDER'S HOUSE"

The author breaks in a new assistant—at the age of 13 months! After being pried out (opposite picture), the adobe lump has been broken apart and the tube split free. Sometimes the clay bakes almost as hard as concrete. Spiders excavate and mold their snug houses after winter rains have softened the earth. Circumstantial evidence gleaned from the nests pointed to two different assassins that attacked the spiders in their lairs (pages 812 and 821).

Here we are at last, on the top of the world. Off to the south, half hidden by the smoky haze, sprawls Los Angeles, with the Pacific shimmering on the faraway horizon. Miles to the east lies the high wall of the San Bernardino Mountains, topped by the snow-capped peak of Old Baldy in the hazy distance.

Look! Danny has found a trapdoor, and marked it with a weighted scrap of paper. To see it, close by the paper, you will need a keen eye. It is about the size of a quarter, but blends into the ground surface so perfectly that it is hard to spot. Danny has become an expert. Sometimes he brings along two or three of his pals, and they all hunt trapdoors at a penny apiece, while I dig furiously, trying to keep up (pages 808 and 827).

INTO AN INSECT UNDERWORLD

I wrecked several ordinary spades and shovels before I found a nurseryman's spade of tempered steel. The digging is comparatively easy on this hill because the adobe is mixed with shale and sand. For convenience in keeping my records, I give a distinguishing name to each good hunting ground we find. So we call this one "Crumbly Hill."

But the pure, sun-dried adobe is a different matter. One of the hardest spots we ever found lies about four miles west of here. "Concrete Hill" would have been an appropriate name.

Adobe is a compact clay, and is very similar to what is called "blue gumbo" in the East. Even a pick fails to make much of an impression after it has been baked hard by the summer sun, and it is no wonder that Mexican houses built of sun-dried adobe brick often outlast several generations of owners.

At first I was puzzled by the fact that the trapdoor spiders seemed to prefer the hardest spots, but I soon learned their secret. They never attempt to dig in the dry adobe, but wait until it has been softened by the winter rains. Then it is easily dug and of just the right consistency for modeling the walls of their tubular nests.

But Crumbly Hill is not too hard, even

FINE FAT TARANTULAS FOR SALE!

Sammy, a volunteer helper, used to "jump the job" of hunting trapdoor spiders to capture his favorite game, the big hairy fellows whose burrows are often found near their relatives' clay tubes. Tarantulas are easily caught, for they climb upward when a glass jar is inverted over them.

now. Ordinarily a spade is only a spade, but here it is more than a spade. It is the magic key that unlocks the underground caves where the trapdoor spiders are the Forty Thieves, cunningly hidden in the lidded silken casks that prove to be only death traps under the clever attacks of the Ali Baba parasites.

To insert this magic key in the adobe lock, I stand on it with both feet, balancing as I work the handle to right and left, forward and back, driving it full length into the ground. Then I swing back with all my weight, again and again if necessary, prying up the mass of earth containing the nest.

If the soil is crumbly enough, the mass splits away on all sides, freeing the nest—a short tube of clay, closed at the top with a close-fitting hinged trapdoor. This one has broken in digging, and we have drawn a blank, for it is old and empty.

Here is number two, and it is a fine, strong tube. But I have a hunch: I will lift the trapdoor with the point of my knife. Sure enough, it is a mother with babies! So I replant the nest. Without the mother to raise the lid for them, they would remain imprisoned in the nest, and it seems wicked to let two or three hundred baby spiders die just to feed a couple of black widow layers, no matter how important the objective.

But we must not stop to examine each nest now. Every hour of daylight is precious. So we dig fast and pack the nests in our apple boxes for a more careful examination during the long night hours when I check them in and make a careful record of each one. As you will understand later, a substantial percentage of these nests will reveal the cocoons of parasitic wasps and other worthwhile specimens or data. So the checking in of a bunch of trapdoor spider tubes is always an interesting gamble.

And even the hard digging has provided some real fun, particularly the daily demonstrations of universal curiosity. Every day cars have stopped on near-by roads while the occupants watched us and wondered what on earth we were doing. Sometimes they conquered their curiosity and drove on, but in most cases they just had to ask.

Their guesses have run all the way from prospecting for gold to hunting buried treasure. I remember one bright young lady who asked if we were collecting "botanical specimens"—on a hill where the ground was burned bare, save for a blanket of dry ashes! But the lady who called the police topped them all.

I was digging busily when I heard Danny's excited stage whisper:

"Daddy, look! Radio cops!"

Sure enough. A patrol car had stopped on the road below and an officer was climbing the slope. As he approached and sized us up, he began to grin, but he seemed to be puzzled, too.

It appeared that his curiosity was partly official and partly personal. I told him that we were prospecting for parasites in the nests of trapdoor spiders. He grinned and explained that some good lady had phoned in and demanded that Danny and I be investigated as "suspicious characters"! I knew that our clothes had seen better days, but I wasn't aware that we looked like criminals.

"Aw, she was just burning up with curiosity," he said disgustedly. "And she took that way to find out what you were doing."

THE AUTHOR OPENS "THE CASE OF THE CURIOUS COCOON"

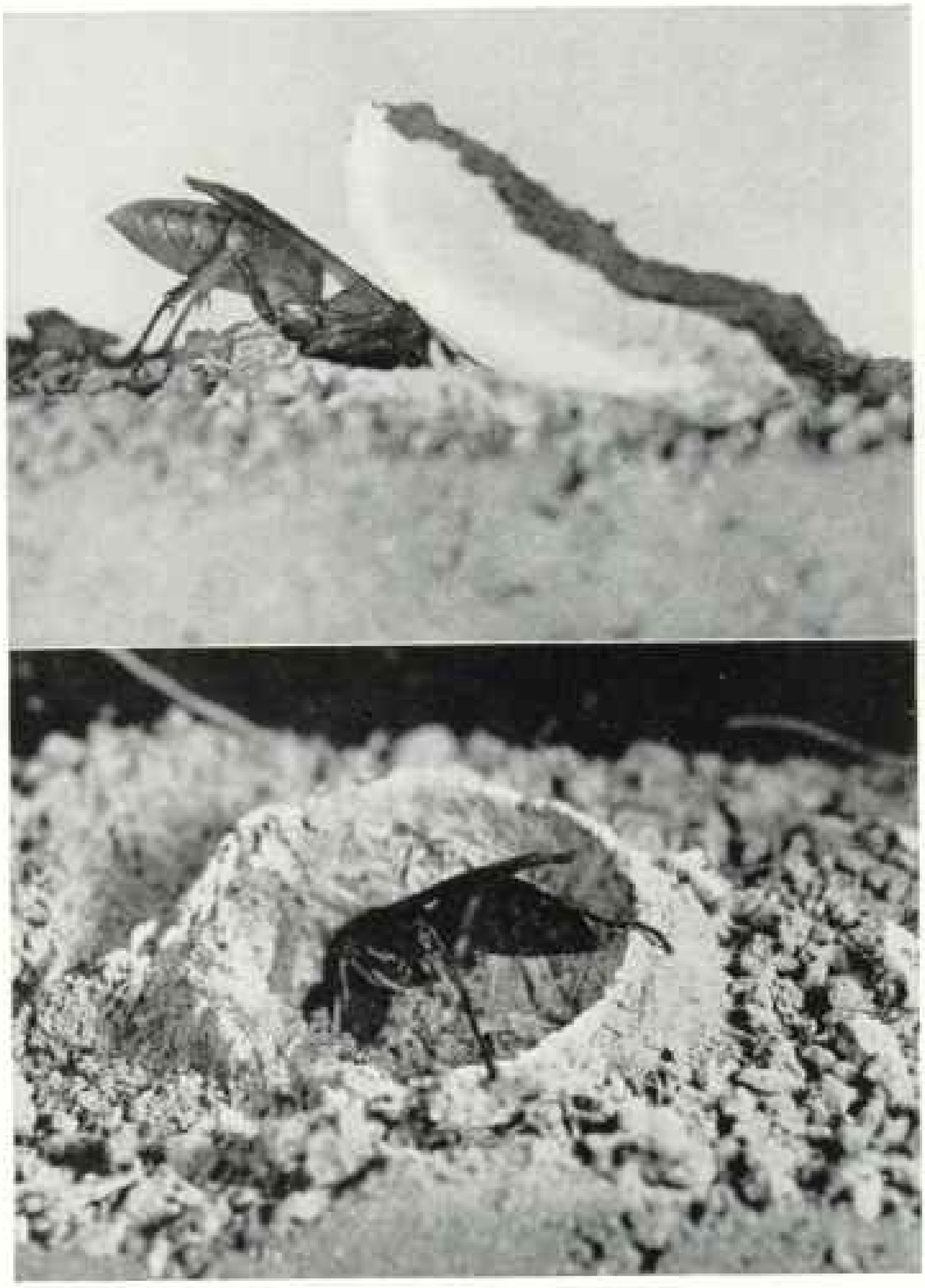
"Special Investigator" Jenks pursued clues for two years before finally forcing the little-known hunting wasp to "confess" her crime in action (pages 812-819). Here he holds a trapdoor spider's tube cut open after the insect invader fled. Carefully he lifts the lid of the wasp's skillfully wrought cocoon, found within the slain spider's dwelling.

HELPFUL HUNCHES

If I have been unusually fortunate in finding valuable clues and rare specimens along the way, it is only fair to give credit to helpful hunches.

For instance, there was the first day's trapdoor spider hunting in the fall of 1935. Male trapdoor spiders are rare. Naturalists have searched for years without finding a specimen. The curious two-story cocoons of the wasp that preys upon this spider are also rather rare. And yet I left home that day without any definite plans, followed my hunches along new roads, stopped at a place I had never seen before, and found three males and three cocoons the very first day! Besides, I found proof of the existence of still another mysterious enemy of the trapdoor spider.

The first day's discoveries opened up three possible lines of investigation. I quickly decided against making a special



WITH CLAWS AND BACK THE WASP JIMMIES UP THE LID OR ELSE GNAWS A HOLE RIGHT THROUGH IT

Guided by instinct to the spider's subterranean dwelling, the sleek criminal in "The Case of the Curious Cocoon" raises the trapdoor with her strong claws and supports it on her back (upper picture) as she slips through to attack her victim (opposite page). If unable to lift the tightly sealed portal, she tears a hole in it with her powerful mandibles (lower picture). Because the parasitic hunting wasp belongs to the Family Psammocharidae, she was nicknamed "Psammy" (page 815).

study of the spiders themselves. There were still a number of unanswered questions concerning their lives, but the ground had already been well covered and beautifully photographed by Passmore and Beck.*

On the other hand, very little was known about the wasp, and nothing at all about the other mysterious enemy. So both of them offered new trails to explore.

From the very first it was apparent that my role would be similar to that of a detective or a G-man, starting with a few slight clues and following the two trails patiently and persistently until I "got my man." And I saw that here there would be advantages over similar investigations among ordinary web-spinning spiders and their enemies. Here in the locked, silk-lined rooms of the trapdoor spiders, every clue, every bit of incriminating evidence, would be preserved for my examination many months after the killers had come and gone.

Every time I opened and examined a trapdoor nest there would be a chance of finding new evidence against one racketeer or the other. The more nests I dug up, the more evidence I would find, and so it would be up to me to dig and dig and dig.

THE CASE OF THE CURIOUS COCOON

At the same time I must search the official scientific records for information about the habits of all known insect racketeers, and check that evidence carefully against the new facts I was unearthing.

My examination of the first day's collection of nests showed considerable similarity between the crimes. In all cases I found the remains of partially devoured spiders in the bottom of the tubes. In about half of these cases there was also a curious two-story cocoon hanging in the tube (p. 818).

I had seen a photograph of such a cocoon,

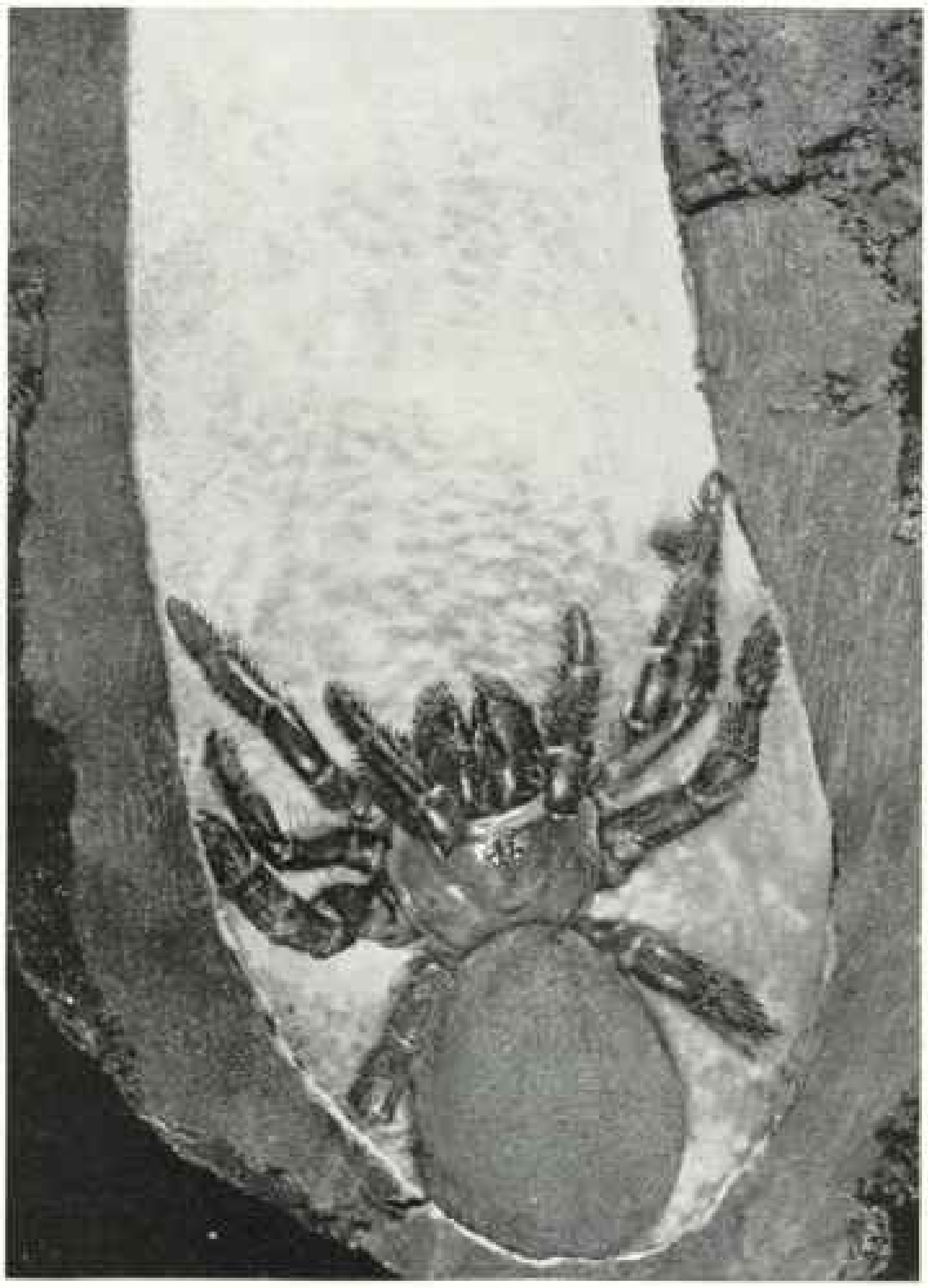
* See "California Trapdoor Spider Performs Engineering Marvels," by Lee Passmore, NATIONAL GEOGRAPHIC MAGAZINE, August, 1933.

and knew that it was made by the larva of a wasp, but the identity of the wasp was unknown to me. So we might label this one, "The Case of the Curious Cocoon."

I soon learned that the identity of the other killer was unknown to science as well as to me. The only clue left behind, besides the empty shell of the spider, was a crumpled pellet of Cellophanelike material. This could only be the pupal case of the mysterious enemy. As near as I could make out in its shriveled condition, it had been a smooth, transparent sheath or sack—unlike any pupal case I had ever known. So that became "The Case of the Cellophane Sheath" (page 826).

Trapdoor spiders were the victims in both cases, but I knew there was no connection whatever between the two killers. Nevertheless, I followed a single trail in solving the crimes, because practically all of the evidence was to be found in the nests of the spiders.

But the telling of the story is a different matter, for we have two separate stories—two different trails to follow. So I will begin with the wasp and tell that story straight through the three years of pursuit, and then go back and tell in the same way the story of the unmasking of the mysterious enemy.



THE TRAPDOOR SPIDER IS TRAPPED!

Cornered in her own fortress, the alert arachnid rears up on guard while the dreaded invader storms the gate (opposite page). A moment later, like a blue-black bullet, Psammy struck her giant adversary. The author cut away the sides of spider nests and wasp cocoons and smoothed their edges, so they would fit snugly against the glass fronts of photographic cages (following page). Thus was he able to observe and record crucial developments in two separate underground crimes.

PURSUING A CLUE FOR THREE YEARS

Out of the first thousand nests dug up I secured about fifty "live" cocoons, and more than a hundred "empties" from which the wasps had departed. Then the 1935 trapdoor hunting season ended with the year.

By that time the trapdoors were completely hidden under a luxuriant new crop of grass and weeds. There would be no more hunting until the summer grass fires again laid bare the adobe hills.

So I settled down in my home laboratory to study my specimens and complete my records. I also sent a number of the cocoons to the Los Angeles Museum and to western scientists.

"ACTION! LIGHTS! CAMERA!"—THE AUTHOR-DIRECTOR "SHOOTS" HIS LEADING LADY IN HER TINY GLASS-ENCLOSED SET (PAGES 818-819)

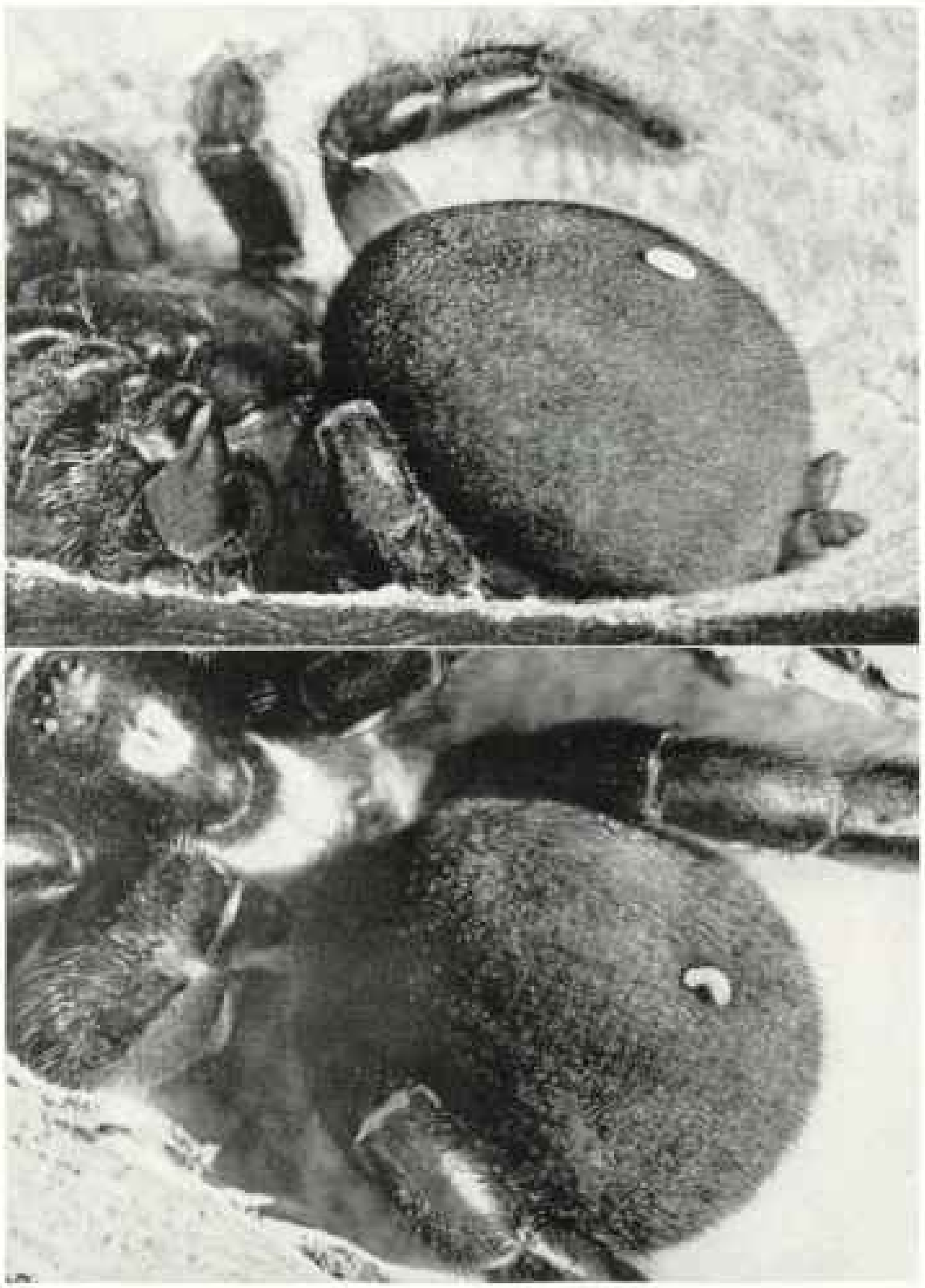
The set is the photographing cage, held together with clothespins (right). Snug and safe lies the insect Sleeping Beauty in her cocoon within the windowed chamber, while the Peeping Tom camera records the secrets of her magical transformations. With this apparatus were made the greatly magnified insect "portraits." All specimens were photographed alive and unposed.

PSAMMY LAYS AN EGG ON HER INERT VICTIM'S ABDOMEN

In a furious rough-and-tumble duel, the wasp has stung the spider into a paralyzed state of partially suspended animation. Psammy is a careful and efficient worker. She examines and fusses over the spider, sometimes stinging it several times until she considers it properly "knocked out." Above the emerging egg, which sticks slightly and doesn't fall off, appears the wasp's deadly sting. Only during the act of egg laying is the light-colored, triangular, stinging muscle at the end of the abdomen visible. At other times it is protected by the overlapping armor plates.

I found that very little was known concerning the maker of the curious cocoons. More than one investigator believed it to be the cocoon of *Pepsis*, popularly known as the "tarantula hawk," but I could not see how a two-inch *Pepsis* wasp could be packed away in a cocoon that averaged only a little over an inch in length. It seemed to me that the maker of the curious cocoon must be a smaller species of hunting wasp.

This proved to be true. Further research and inquiry revealed a puzzling situation. Although practically nothing was known about the wasp's life history, and the male had never been found and described, the adult female had been on entomological records for many years. But she had been variously known as *Pompilus planatus*, *Parapompilus planatus*, *Planiceps planatus*, and *Psammochares planatus*.



"PSAMMY JUNIOR" STARTS EATING AS SOON AS THE EGG CHANGES TO A LARVA

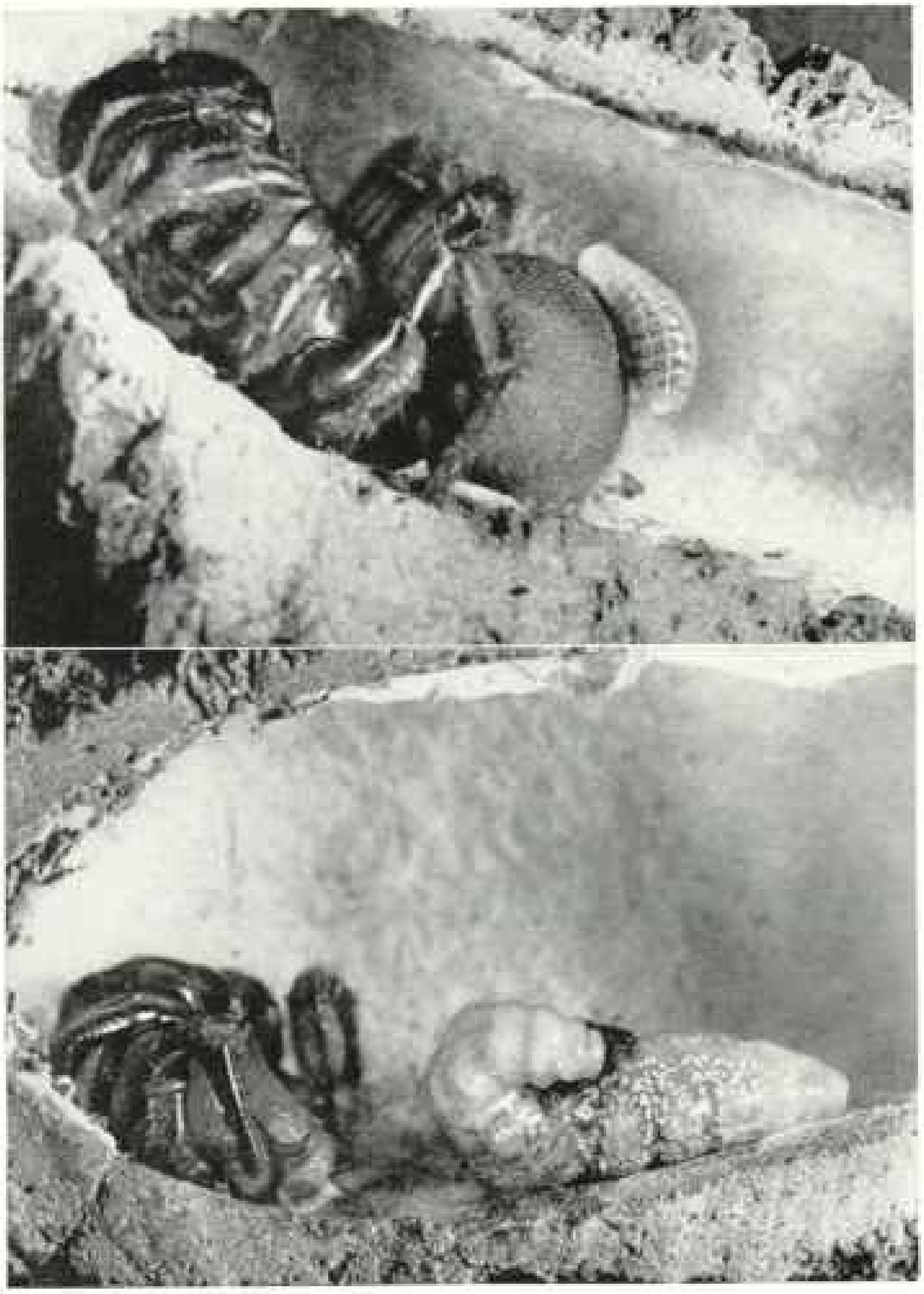
In a partial coma, the spider may live for six months or more, serving as a nourishing free lunch for its unwelcome guest (page 816). After several days, the egg (top) turns into a wriggling larva which at once begins feasting on the spider's fat abdomen (lower picture).

Afterwards, Dr. Kenneth A. Salman, of Berkeley, an entomologist of the United States Department of Agriculture, and P. H. Timberlake, of the University of California Citrus Experiment Station at Riverside, explained that these changes were due to certain reclassifications, and that the generally accepted title was *Pedinaspis planatus* (Fox), of the family Psammocharidae.

So Danny and I decided to call her "Psammy"!

Apparently no one had ever actually witnessed Psammy's crime, but a good guess could be made about certain angles of it. Considering the methods used by other hunting wasps in attacking other species of spiders, it was safe to assume that Psammy had stung the spider into a helpless paralysis and laid her egg on its body. When the egg hatched, the larva had feasted upon the meat so marvelously provided and preserved, and eventually spun its cocoon and gone into hiding right there in the murder room.

But no one seemed to know how, when, or where the mother wasp attacked the spider. Did she enter the nest to get at the spider, or did she attack it outside and



AS THE WASP LARVA GROWS, THE SPIDER SHRINKS

After feeding for a week or ten days, the larva is about one-third grown (upper). The spider is still alive, but will die quietly when its vital organs are attacked. In the lower picture, the full-grown larva has devoured the abdomen and is gnawing on a "drumstick," which she holds against her chest.

drag the limp body back into the nest? Possibly by studying the scenes of the killings I might find circumstantial evidence that would answer these questions while I was waiting for my cocoons to "hatch out."

So I laid out a number of trapdoor tubes containing cocoons, sat down at the table, and proceeded as follows:

Here is a group containing empty cocoons. The lids are loose and work easily. Obviously the "daughter" wasp, after emerging from the cocoon, pushed up the trapdoor and escaped that way. It is quite possible that the mother wasp lifted the lid and entered the tube to attack the spider in the first place, but there is no evidence here to prove that she did.

Well, here is another group, also containing empty cocoons, in which a large hole has been gnawed through each trapdoor, obviously by a wasp, either to enter or to leave the nest. The lid itself is hard to open, but that might be because of the mud washed into the crevices by the winter rains. There is nothing here to prove whether the mother gnawed the hole to enter or the daughter to escape from the tube.

But there is still another group of nests, which contains live wasp cocoons. These trapdoors are also gnawed through, but they cannot be raised. They are sealed tight from below with silk and mud, which is the spider's habit during the hot summer months.

At last, I've got the goods on her! I know that the young emerging wasp could not have gnawed the hole in the trapdoor to get out of the nest, because she is still inside, sealed up in her cocoon. Therefore, her mother must have gnawed the hole in order to get in and attack the spider.

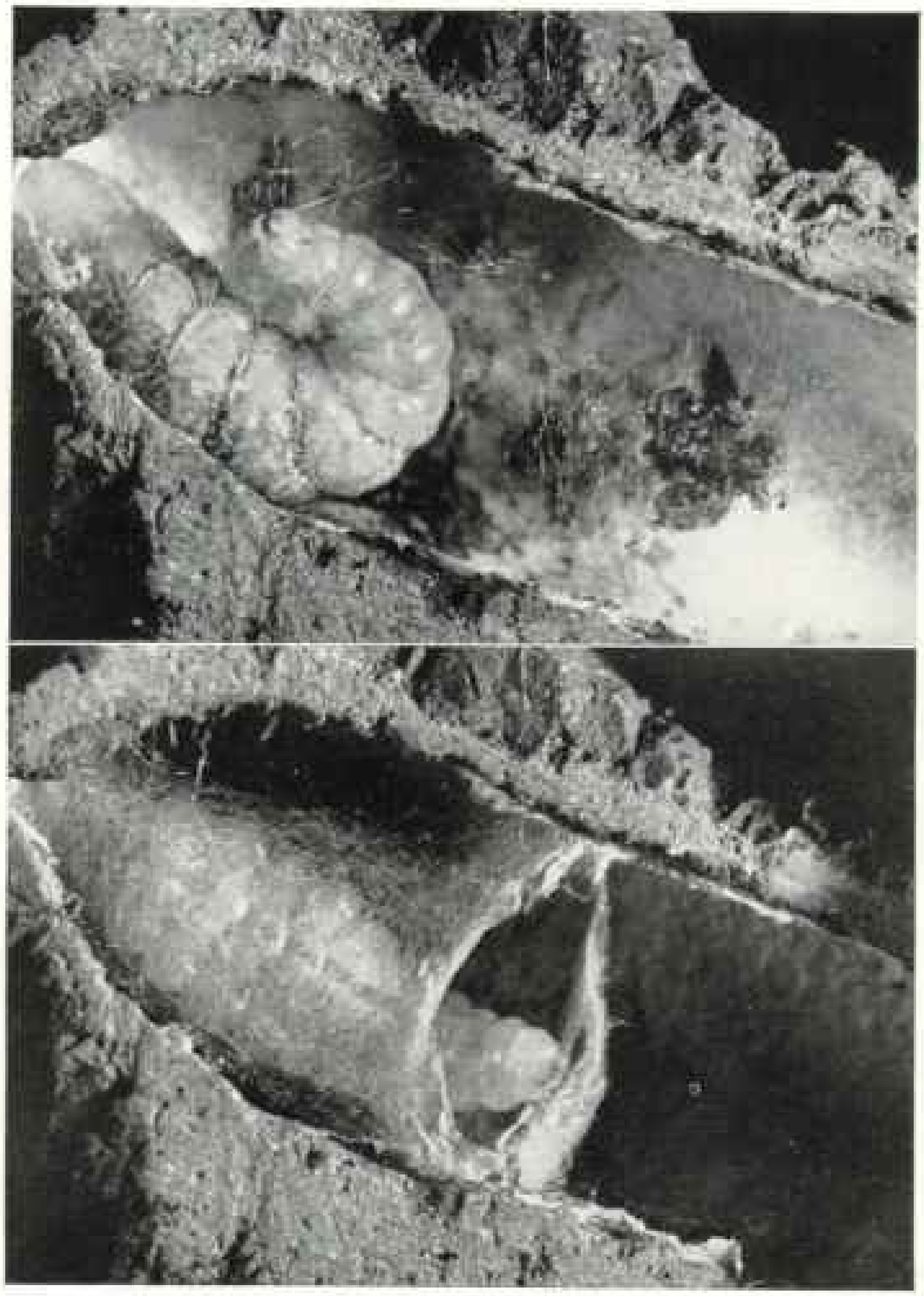
So the circumstantial evidence proves not only that Psammy enters the nest to attack the spider, but it indicates that she recognizes the trapdoor for what it is, seems to know exactly what is hidden beneath it, and goes right after her prey even if it means tearing a hole through a sealed trapdoor.

So that was that. Afterwards I was able

to verify these conclusions in the field as well as in the laboratory.

In one case I literally caught her in the act. I first saw her racing back and forth on the bare ground, so busy looking for a trapdoor that she did not notice me at all. Suddenly she saw a small trapdoor and fairly pounced upon it, first trying in vain to open it with her claws, and then ripping and tearing at it with her powerful mandibles.

In less than a minute she had torn a hole through it and disappeared down the tube. But the joke was on Psammy that time. I quickly corked the hole with a bit of wood, dug up the tube with Psammy inside, and took her home to join my laboratory family.



WELL FED, THE NEW PSAMMY WEAVES HERSELF A CRADLE

At the bottom of the trapdoor tube, the larva spins her amazing cocoon. The primitive mouth that has been gobbling spider meat suddenly becomes an unerring spinneret fashioning "guy ropes" to hold the cocoon in place (upper picture). Below, the maggot engineer "licks in" a smooth, tough diaphragm of waterproof material—the roof of the "attic room" (page 818).

INCUBATOR BABIES

Early in May my cocoons began to hatch, and I prepared for laboratory rearing by carving away one side of a number of trapdoor tubes and grinding the edges smooth with sandpaper so that they would fit snugly in my photographing cages. Through these observation windows I was able to study all the action and photograph it almost at will.

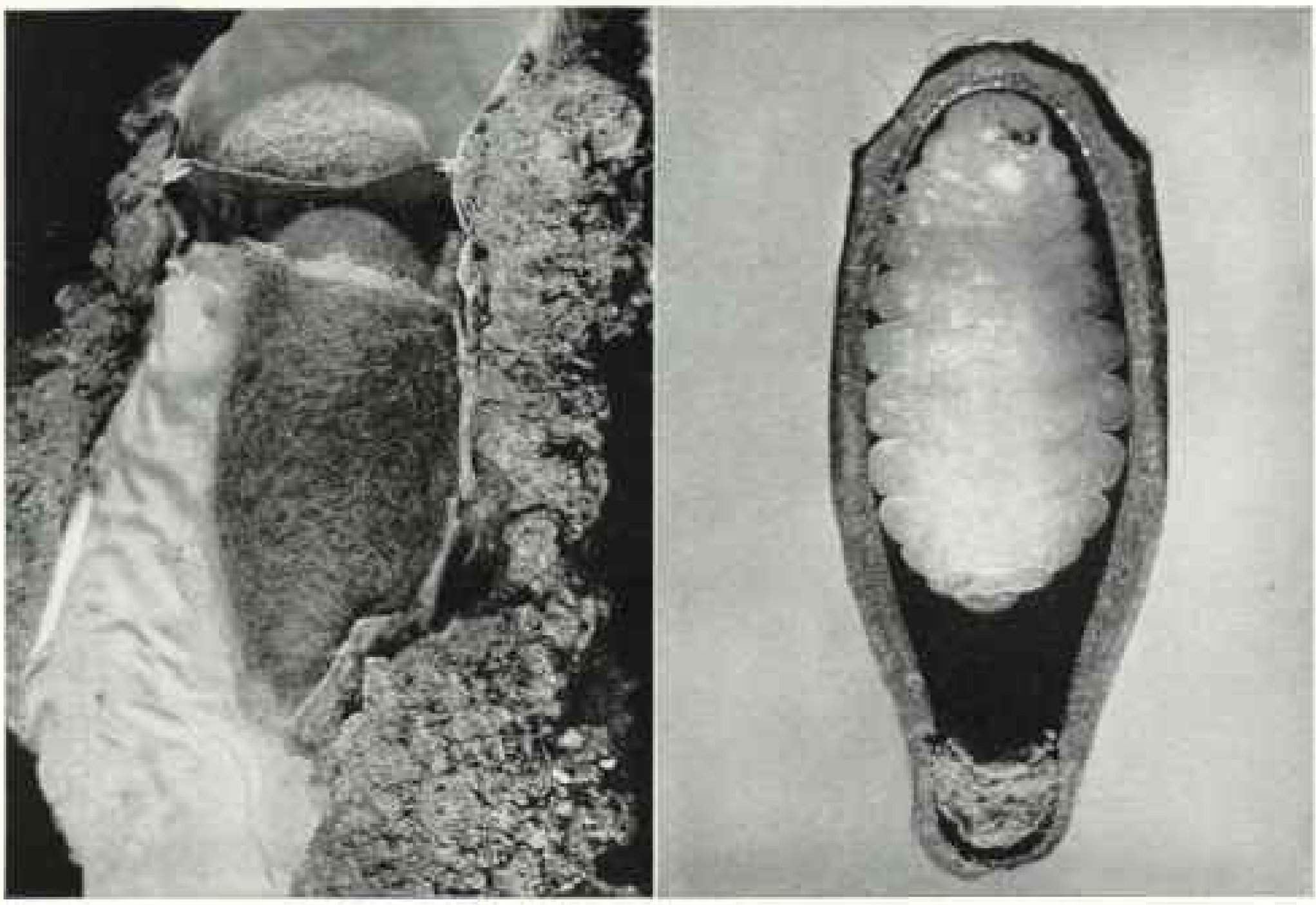
The spiders did not like so much light and would often spin webbing over the glass at night, but the wasps seemed to feel perfectly at home. Both males and females emerged from the cocoons. I established a matrimonial bureau, and found that they were quite willing to meet Dan Cupid more than half way. Then, with several mated females, I was ready for the next important step in solving The Case of the Curious Cocoon.

By this time I had a good idea of the whole story, but I could not photograph a mental picture. I must have her "confession" in action, so that I could photograph it as unquestionable evidence.

PSAMMY CONFESSES HER CRIME

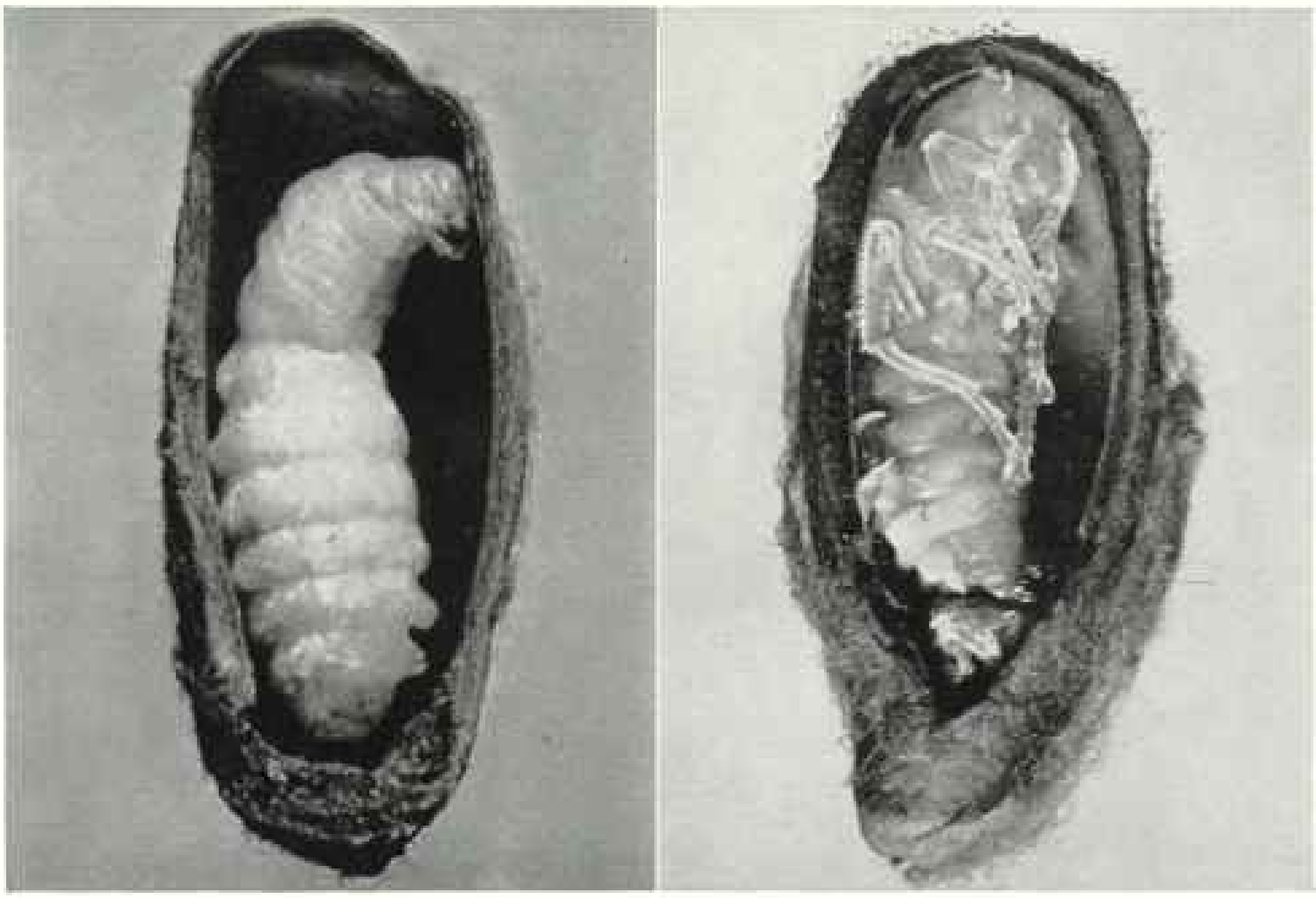
So I put a Mrs. Psammy in a cage containing a trapdoor tube, hoping that she would "talk." She certainly did!

Almost before I could close the cage, Psammy found the trapdoor, flipped it open,



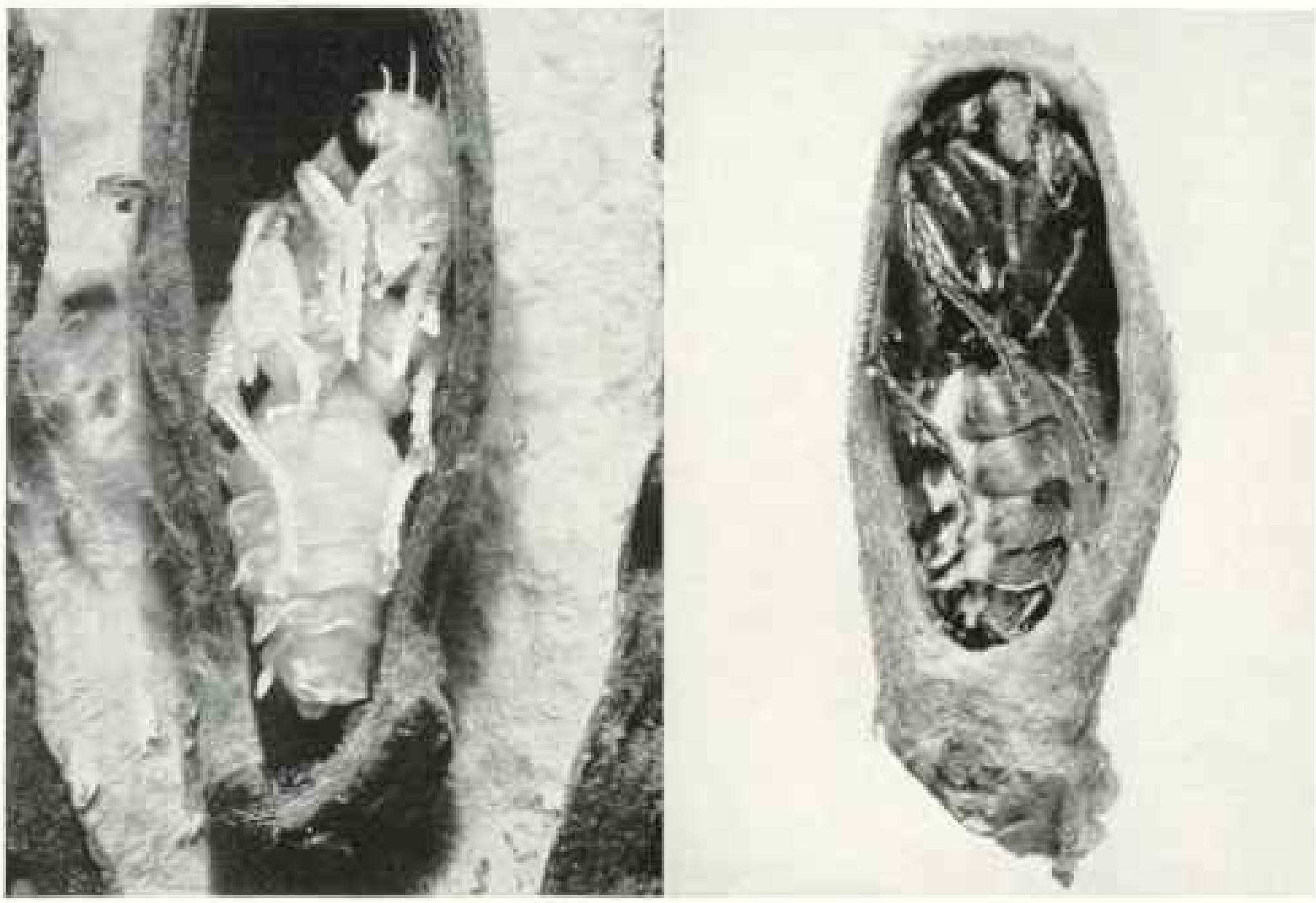
IN HER SNUG "HIBERNATION" CHAMBER, PSAMMY SLEEPS OUT THE WINTER

Like a man in a diving suit with his head in a helmet, the woven cocoon projects up into the sealed and waterproof "attic room." On the roof rests the ornamental cupola. After she has finished "licking in" a smooth, polished lining to her retreat (right, side of cocoon cut away), Psammy becomes quiet and changes hardly at all in appearance for several months.



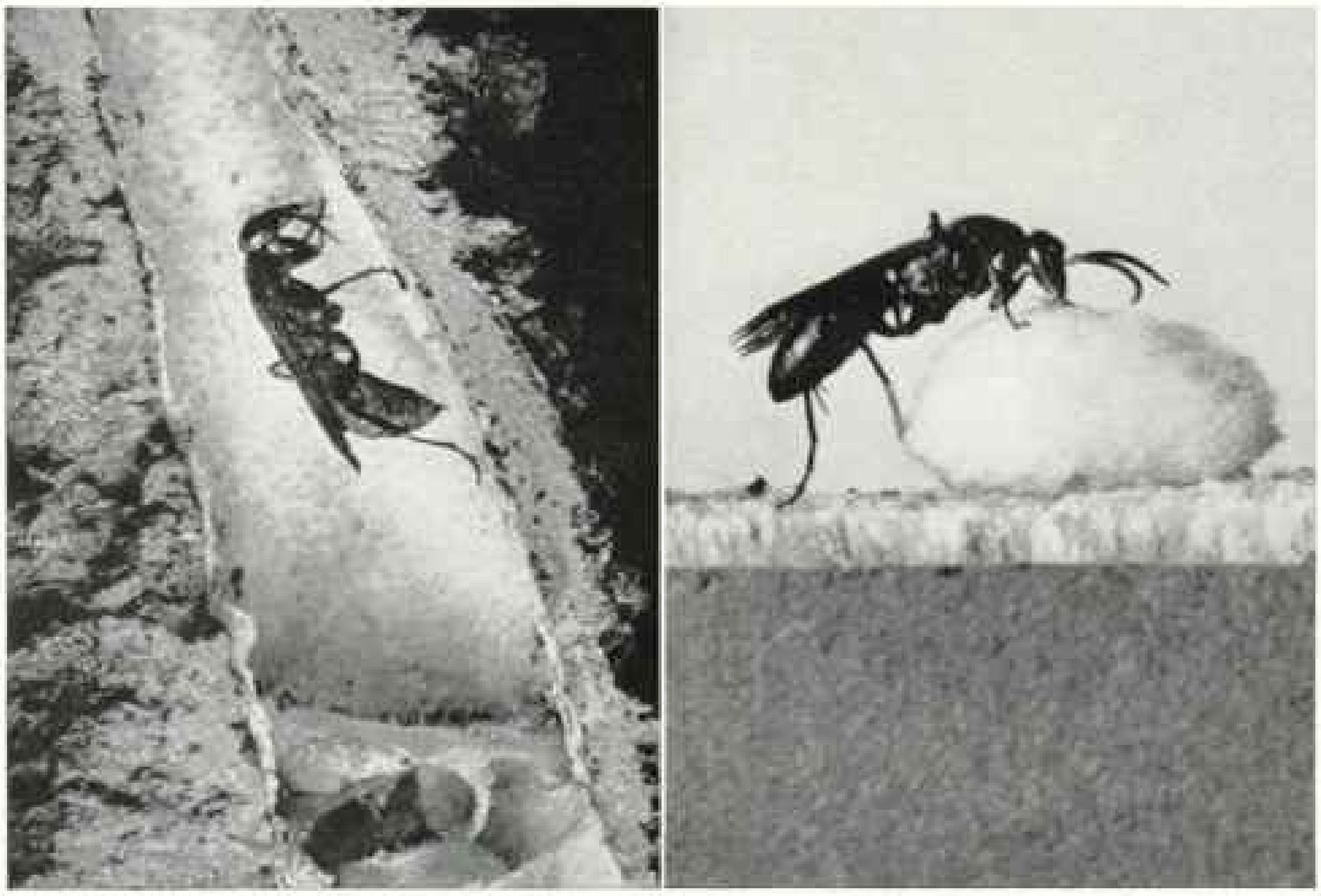
WHEN SPRING COMES, NATURE'S HOCUS-POCUS BRINGS STARTLING DEVELOPMENTS

Some time in May, the prepupal larval stage is reached (left) and the mummylike figure shows roughly the adult divisions of head, thorax, and abdomen. When the larval skin splits and shucks off, the ghostly pupa slowly unfolds. During the next day or two the features grow more distinct, like a picture gradually brought to focus. (Magnified about four times.)



AFTER SHEDDING ONE MORE DRESS, PSAMMY IS READY TO MAKE HER DEBUT

One brilliant black eye stares fixedly (left). The whole waxlike body has become compact and wasp-shaped. From the thorax, black pigment slowly spreads through the insect, even to the tips of legs and antennae. Articulated armor plates harden on the abdomen. After wriggling out of the transparent pupal sheath, she is a real wasp at last (right).



OUT CLIMBS THE VIRGIN MOTHER; HUNGRY IS HER FATHERLESS SON

Using her sharp mandibles like a carpenter's auger, Psammy has cut her way out of the cocoon. Though she never had a mate, she laid eggs that hatched and produced only "boys" (pages 823, 876). Her "synthetic" offspring, sucking honey-water from a pellet of cotton (right), probably can never become a father. This is the only known photograph of a parthenogenetic Psammocharid wasp.

INTO TRAPDOOR TUBES HIS FLASHLIGHT SHOOTS A RAY OF HOPE

A Cyrtid fly pupa? A wasp cocoon? Or only a blank? The author's gambling thrill comes when he checks in the day's "bag" of spider homes. Once he drew 74 successive blanks—and then found an *Ocnaea smithi* pupa in number 75. When he peeped into an unopened tube, just for this photograph, he found—believe it or not—a fine wasp cocoon in the first of 225 nests collected this year!

and slipped through (page 812). Like a blue-black bullet she flashed down the tube and struck the waiting spider (page 813). The rough-and-tumble fight that followed was too fast for the eye to follow or for the camera to catch.

The spider outweighed the wasp fully ten to one. Psammy almost disappeared in the hugging clutch of the eight powerful legs. The spider's needle-pointed fangs struck at her again and again. You would have bet a hundred to one on the spider, and I would have agreed with you. But, not so fast!

The wicked-looking fangs were only glancing harmlessly off Psammy's steel-like armor plates, while her facile abdomen, as pliant and powerful as a swordsman's wrist, was working busily within that fierce embrace, jabbing again and again with her daggerlike sting as she sought an opening in the spider's armor.

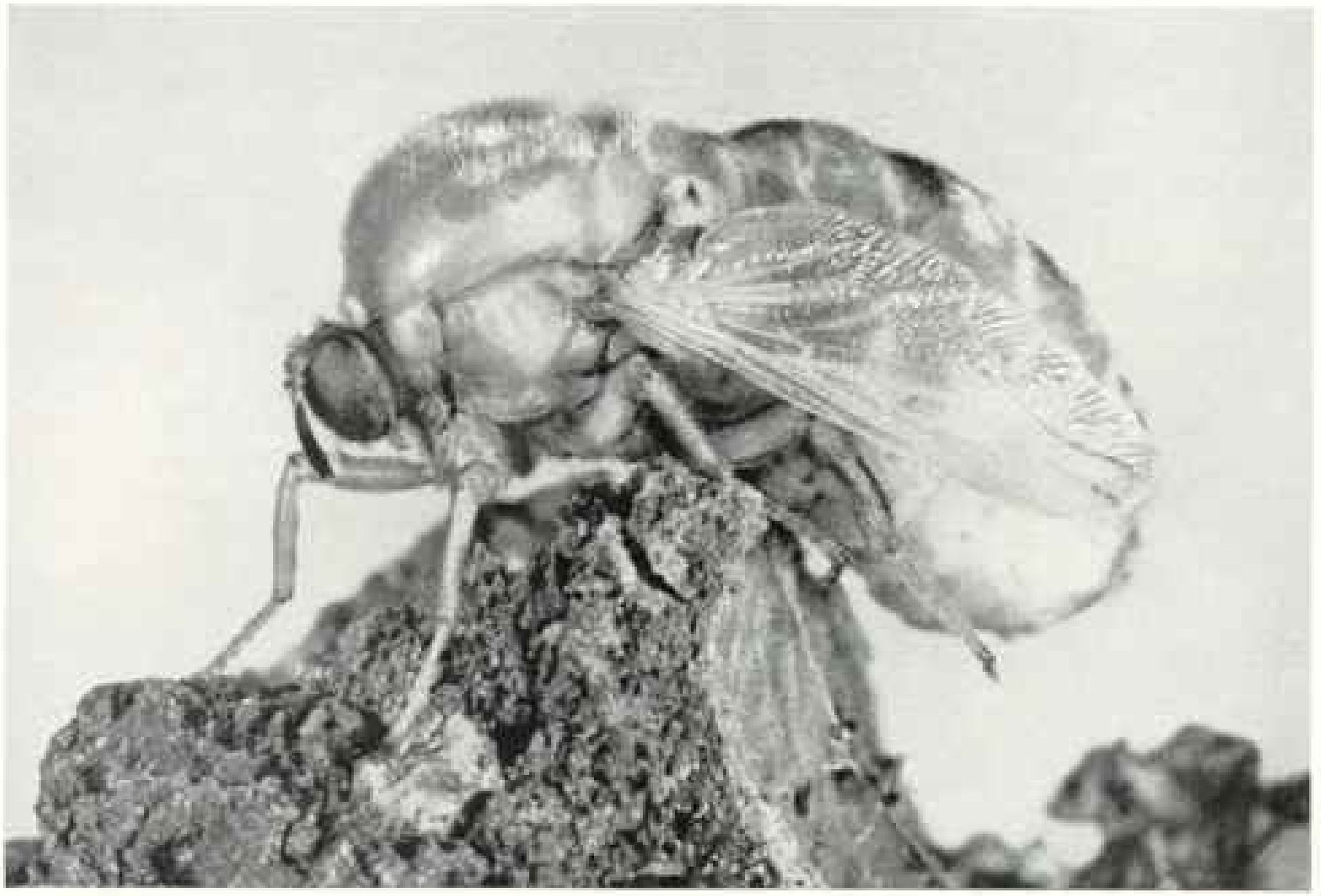
Such a battle lacks the spectacular qualities of a duel between expert swordsmen. It is more like a rough-and-tumble fight between a giant and an adroit dwarf—where the dwarf has a poisoned dagger up his sleeve. We might not even see the dagger, but its effect upon the giant will tell us when it finds its mark. And so it was in this battle.

Suddenly the action slowed down. The big spider wilted into a limp paralysis. Psammy's sting had found its mark. Very calmly she relaxed the bulldog grip of her mandibles and disentangled herself. When she stepped clear she never once glanced back. She did not wait for the count. She seemed to know the potency of that hypodermic shot of knockout poison.

Anyway, she knew that the fight was over, and calmly proceeded to "wash her face and hands" with all the smug satisfaction of the cat that has just eaten the canary!

CHAMPION "DIES WITH BOOTS ON"

In the long run, however, these efficient hunters fall afoul of Nature's law of compensation, and "get theirs." The spiders are so much more powerful that a single slip, an instant's carelessness on Psammy's part, may prove fatal. Even my champion layer, after depositing forty eggs on forty vanquished spiders, died with her boots on at

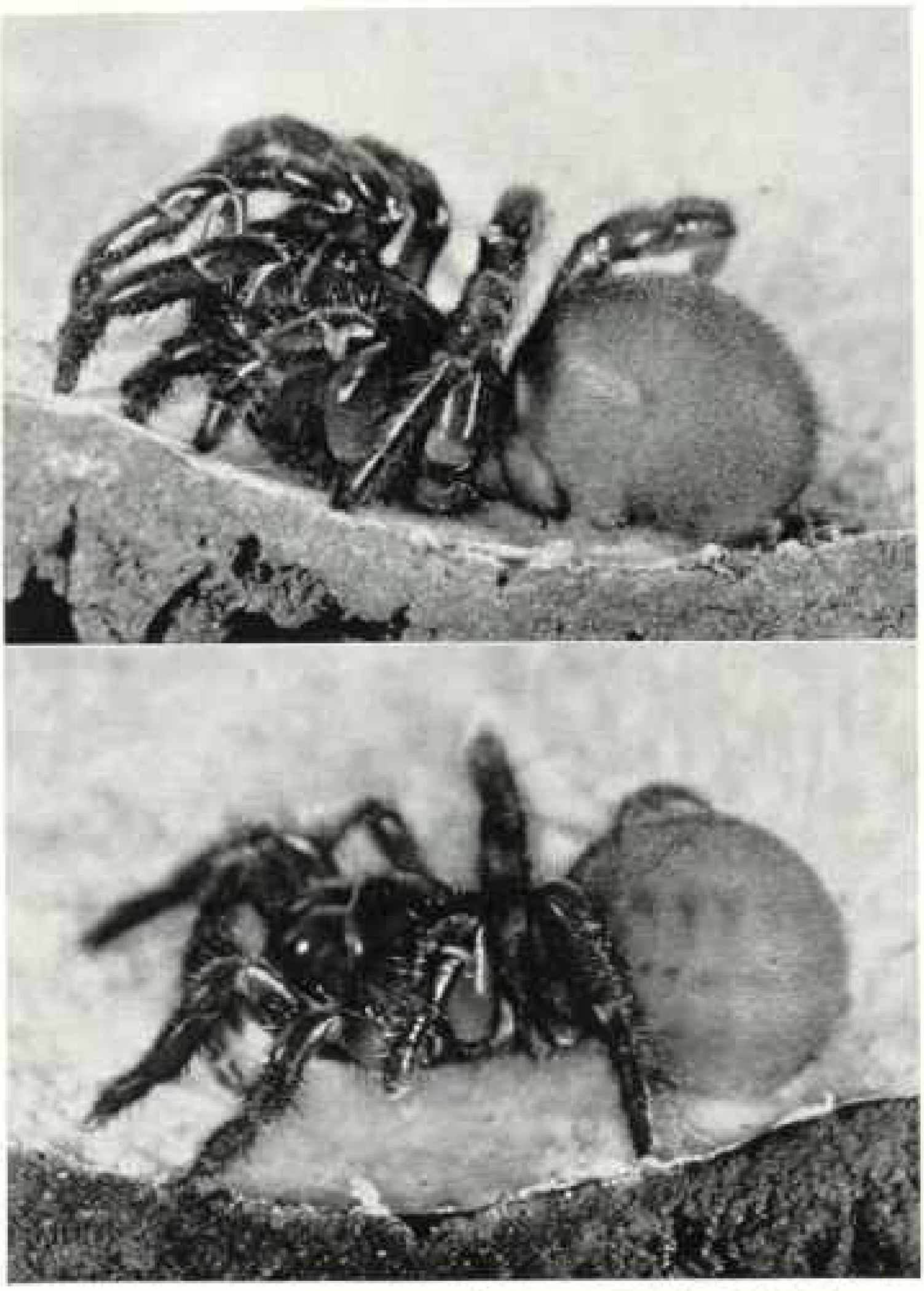


THIS IS THE FLY THAT LAID THE EGG, THAT PRODUCED THE KILLER, THAT LIVED THE LIFE THAT THE CAMERA CAUGHT

Exhibit *B* in the dual mystery is "Smithi" (*Ocnaea smithii*), the villain in "The Case of the Cellophane Sheath" (page 826). Like an insect warplane, the adult female of this fly cruises over the countryside firing burst after burst of microscopic eggs. When the tiny larvae hatch out on the ground, many of them miraculously find their way into nests of trapdoor spiders.

A BATTALION OF MINUTE SMITHII LARVAE BURROW INTO A SPIDER'S LEG

The author discovered that the crawling marauders descended the clay tube to bore into the host, tightly sealed in her home. They easily made their way down through the crevices around the trapdoor and even through the silken mesh of the seal. In this laboratory experiment so many larvae were present that they attacked the spider's legs as well as the abdomen.



INSIDE THE SPIDER THERE'S FOOD BUT NO PRIVACY

During fall and winter, Smithi's slow growth can easily be observed, because of its whiteness and the transparency of the host's abdominal skin (upper picture). "Twins" and "triplets" and, very rarely, "quadruplets" are found in an occasional spider, and in these cases the adult flies are dwarfed. The predatory larva's appetite improves with the coming of spring, until she is so fat she seems almost to fill the spider's body. Yet the unwilling host is still alive and kicking! Passing quickly through a scalloped, segmented phase (lower), the unwelcome boarder, by mid-July, is ready to take leave of her long-suffering "meal ticket."

last, her slender waist torn apart by her forty-first opponent.

And so, bit by bit, these fascinating wasps revealed their life secrets behind the observation windows of my cages. Many times I saw Psammy lay her egg upon the abdomen of a paralyzed spider (page 814). I saw the egg hatch, and the young larva begin to feed upon the unspoiled spider meat so marvelously preserved for its use (pages 815 and 816).

I have known a spider to live for more than six months in this paralyzed state of partially suspended animation—Psammy's perfect process of cold storage without refrigeration!

To me, the wonder of it is that this is not the ferocity of a meat-eating animal, for Psammy herself lives upon the nectar of flowers. She kills only to provide food for her babies-to-be.

And then I watched in amazement as the mature larva spun a marvelous cocoon with its mouth. How could this mere skinful of digested spider meat have the mysterious intelligence that enabled it to outspin even the trapdoor spider, in building its complicated, two-story cocoon?

INTO THE KILLER'S HIDE-OUT

Then the Psammy larva spun itself out of sight in its cocoon, and I was up against my old, old disappointment—when the butterfly larvae had hidden within their mummy-case chrysalids. But this time I kept right on the heels of my quarry and followed Psammy into her hide-out.

The butterfly chrysalis is attached to, and a part of, the pupa within, but I knew that the wasp larva was not attached to the cocoon and did not fill it completely. So, very carefully, I cut away one side of the stiff cocoon and fitted it snugly behind an observation window, just as I had fixed the trapdoor nest.

And so at last, after many years, I could see and study "what happened inside," and

watch every pupal transformation as the larva became a pupa, and the pupa became a wasp. But I am not going to try to describe these changes. The photographs tell the story far better than I can tell it in words (pages 817-819).

A HOMEMADE CANDID CAMERA

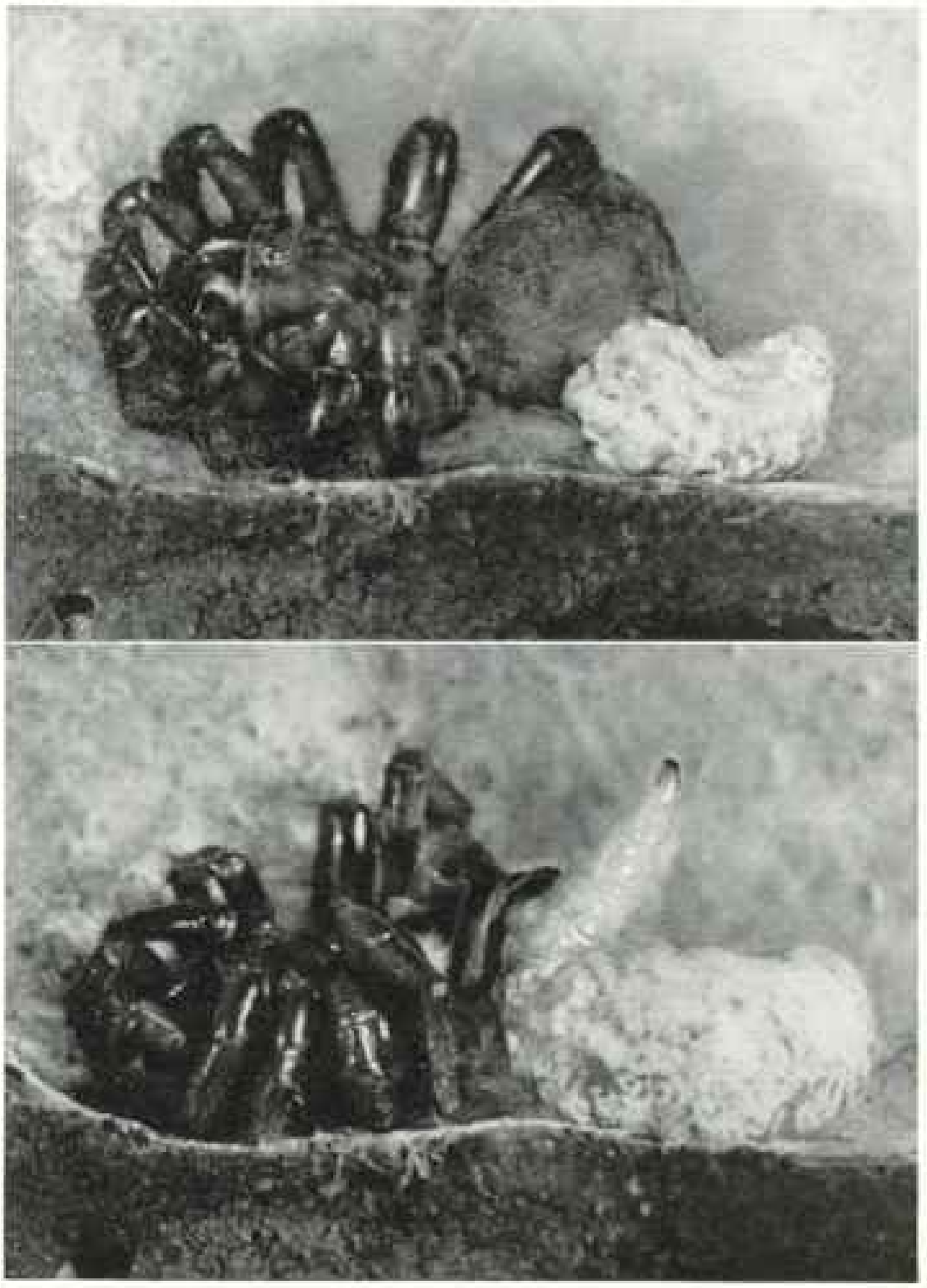
My photographic equipment is neither fancy nor elaborate. I use a cheap, short-focus Kodak lens in an old view camera frame with a long bellows, which gives me a four-times-direct magnification on the negative. My darkroom is the bathroom and the kitchen sink, and the homemade entomological laboratory occupies one end of the cottage living room.

Such working conditions have certain advantages over regular schedules in any college laboratory. I live right here and can be on the job night and day when necessary, and that often means the difference between success and failure in getting some rare shot.

Bugs are utterly indifferent to prevailing working hours, and vital moments in insect life, such as sudden changes in larval or pupal forms, are just as likely to occur after midnight.

More than once my camera has caught them in the act because I set the alarm clock to go off every hour or two, so that they could not get a chance to slip one over on me while I was asleep on the job.

Early in 1937 it appeared that The Case of the Curious Cocoon was fully solved. The photographic record was complete, the "action" confession in pictured proof. But Psammy still had an ace up her sleeve.

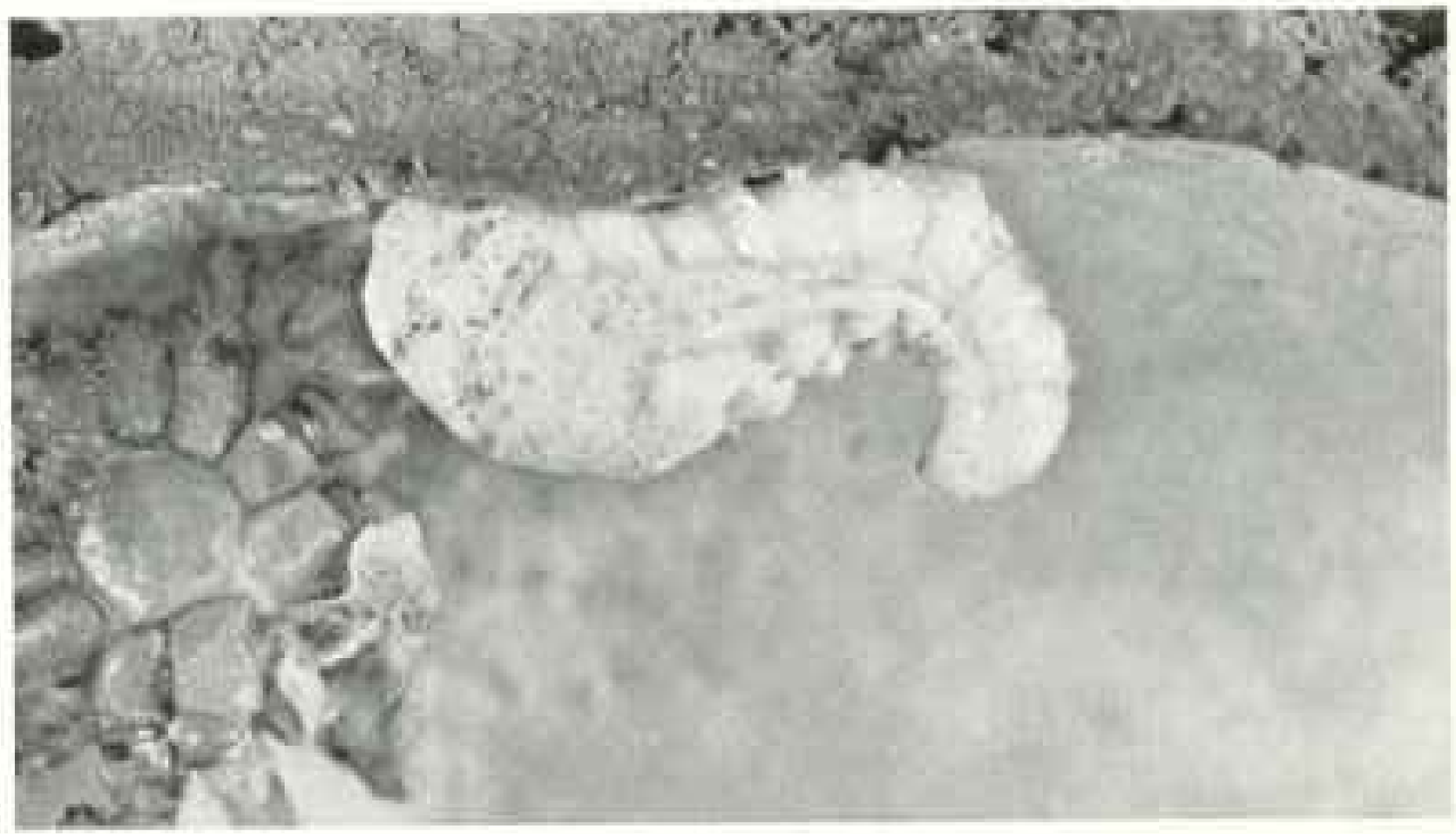


WHEN THE LARVA EMERGES, THE SPIDER DIES

The "crime" is consummated when the parasite bites a hole through the host's skin and "flows" out backward. The exit aperture is of much smaller diameter than the body of the maggot, which can change its shape at will like a snail. Smithi's head and neck linger within the shriveled spider for a day or two to lick the "cupboard" bare—for she'll never eat again. At the end of its ten months' feast, the fat grub must have stored up energy enough to last its entire pupal and adult life. Free at last (lower picture), the larval assassin rears her head, as if sniffing the strange new world of space.

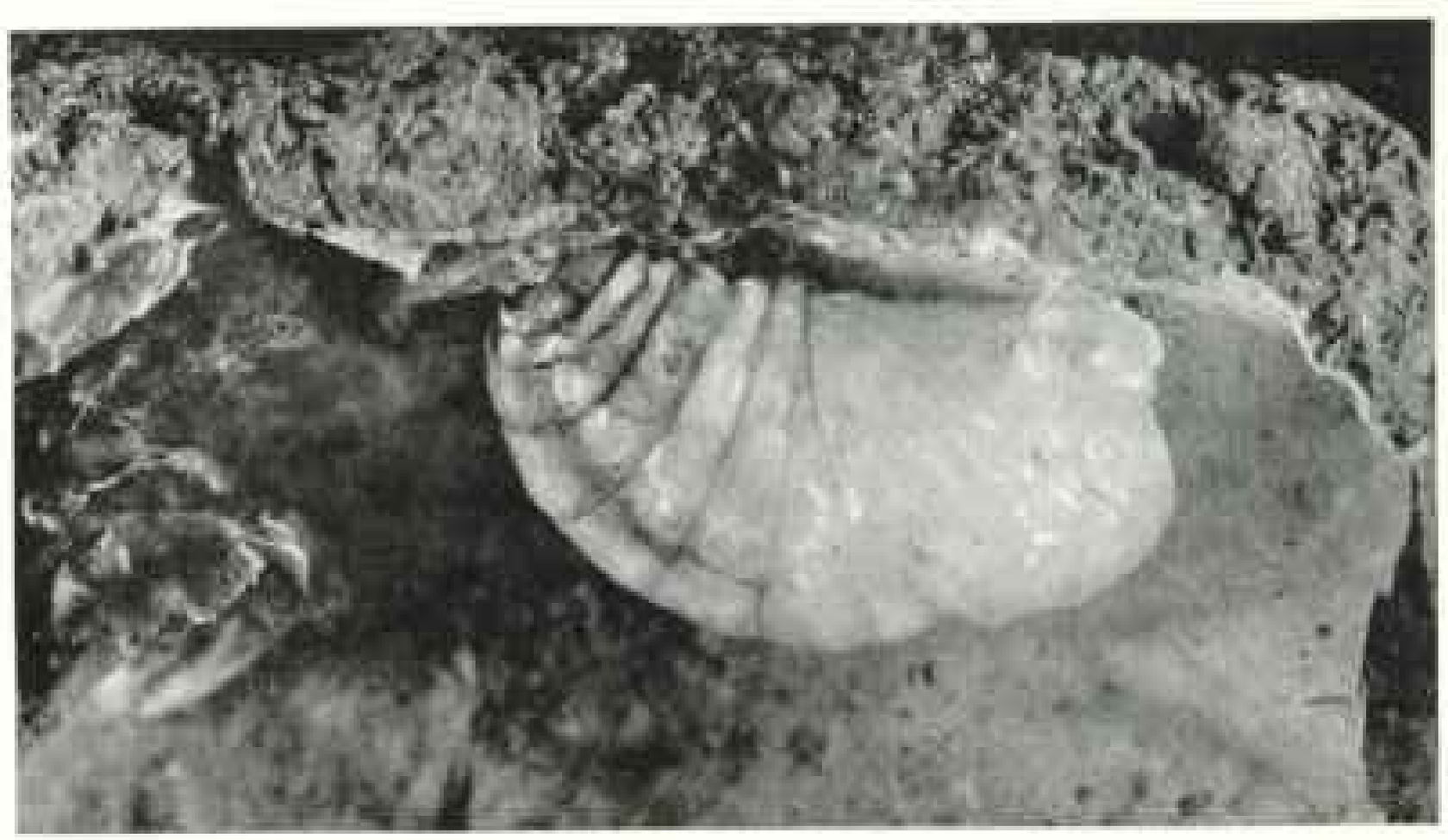
PSAMMY PLAYS ANOTHER ACE

I was still rearing a few Psammies in the laboratory. Among those to emerge was a fine healthy female, but there was no male to be her mate. She seemed destined to live and die an old maid.



ONLY A FAT GRUB, BUT DESTINED SOON TO SOAR ON DELICATE WINGS

BESIDE HER VICTIM'S CARCASS, THE MURDERESS "ROPES" HERSELF



AS THE LARVA PUPATES, IT GETS A SWELLED HEAD

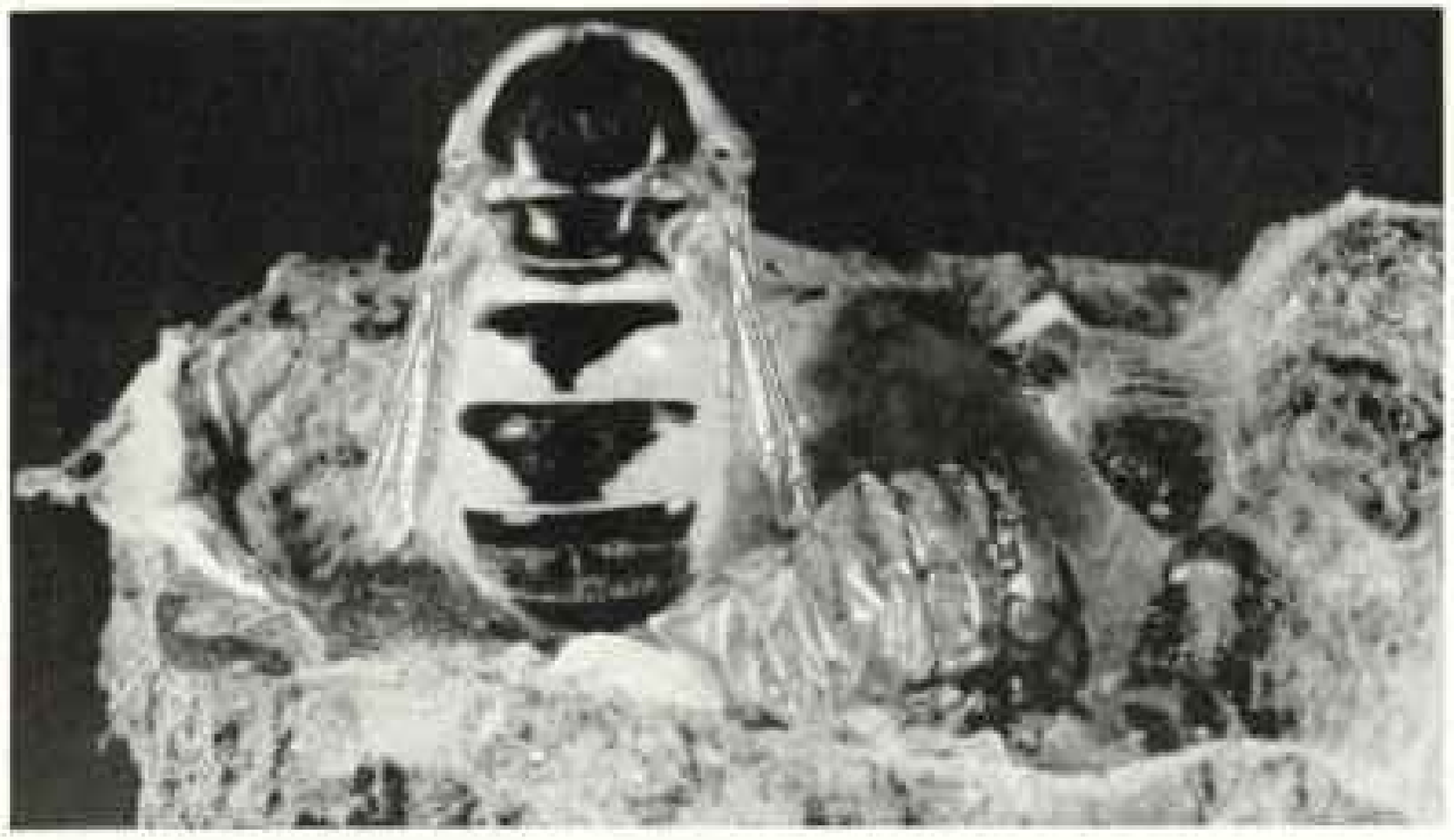
GNOMELIKE SMITHI IS READY TO BECOME A GROWNUP

Smithi's life is an open book because all her transformations are visible through successive transparent "dressing gowns." In her second larval stage (upper left) Smithi climbs the wall of the spider's tube, pecks at the silk lining of the nest, and draws out short threads with which to fashion gooey strings strong enough to support her weight (upper right). Secretions exude to make a slimy, translucent skin. In about a week the prepupal larva is partially molted (lower left). After three weeks of the pupal phase the soft, crumpled larval skin remains only as a sling supporting the segmented abdomen (lower right). Another perfectly transparent protective sheath has formed. Now exposed is the tiny black head, almost all eyes, and the smooth, rounded hump of the developing humpbacked fly.

OUT OF ITS "CELLOPHANE" WRAPPER WRIGGLES THE ADULT SMITHI

FREE OF THE "COMING-OUT FROCK," SHE HANGS HERSELF UP TO DRY

ALL DRESSED UP AND READY TO "STEP OUT" WITH HER—



—BRIDEGROOM AND LIVE HAPPILY EVER AFTER, FOR JUST FIVE DAYS

The emerging gangstress, although certainly no beauty (upper left), is spick-and-span even after many weeks in her damp underground cell, while beside her lies the moldy corpse of the spider. The shape of the short black antenna, or feeler, just above the small dark head, proves that this *O. smithi* is a female. At first colorless and wraithlike, she dangles for two days (upper right), slowly acquiring adult markings and gaining strength. With her fuzzy yellow body and brilliant black stripes, Miss Smithi, finally "come of age" (lower left), looks like a funny little humpbacked bumblebee. Upon crawling from her hidden nook, she probably will be greeted by a handsome mate (lower right), with broad black markings, just emerged from his near-by tube.

One day I had a sudden impulse, or hunch, to put her with a spider and see what happened. Would she attack the spider, and lay an unfertilized egg upon it? Or would she be wise enough to know that it would be wasted effort?

Somewhat to my surprise, she acted exactly as her married sisters had always acted, paralyzed the spider and laid the egg upon it just as if it had been a fertile egg. I knew that parthenogenesis, reproduction by virgin females, was very rare among insects in general, but that it was known to exist among a few species. It had never been recorded among the hunting wasps of the Family Psammocharidae.

So I knew the egg wouldn't hatch—but it did! And that meant that the *Pediinaspis planatus* wasp, in addition to its other remarkable qualities, was capable of parthenogenesis: that is, development of eggs from virgin females by self-fertilization.

To establish this discovery, I must be able to verify it by many instances and complete data. So I put Miss Psammy to work laying eggs, and added other unmated females as fast as they emerged. I raised more than fifty wasps from unfertilized eggs, and they were all males. So it was safe to assume that the unfertilized eggs of this wasp produced males only.

Among yellow jackets, parthenogenesis takes place only in the event of the accidental death of the queen. Other types of reproduction without mating are found among aphids and gall wasps. But it seems to me that Psammy's case is a little different. She seems to be a woman absorbed in her career, the reproduction of the species. And, since she can follow her career alone, it is easy to imagine that she is serenely indifferent as to whether she mates or not.

If there is no eligible young bachelor available, she should worry! She goes right along, following her destined career and, perhaps, evening up the ratio for the next generation by producing an extra flock of boys!

"THE CASE OF THE CELLOPHANE SHEATH"

And now we must go back to the fall of 1935 and pick up The Case of the Cellophane Sheath (page 813).

That case was more mysterious than that of the Curious Cocoon. This killer was not known, had no criminal record, was not mentioned in scientific literature. The clues left in the murder room failed to give a hint as to its identity.

The empty shell of the devoured spider indicated that it had been eaten from within by a true body parasite, rather than from without by a "predator" of the wasp larva type. Nor did the pellet of Cellophanelike material tell me anything of value. I knew of no insect having such a pupal case.

Out of all the thousand trapdoor nests dug up that fall, I failed to find a single adult "mysterious enemy," alive or dead. The killer had gone, but where? If it was alive, how and where was it spending the winter? How and when and where did the female lay her eggs? Was it a wasp, a fly, or what have you? What did the critter look like, anyway?

And so the 1935 season ended, conspicuous for what I had *not* learned about the mysterious enemy.

BEHIND THE SMOKE SCREEN

Another summer, and a day in August. A great wall of smoke was rolling skyward across the Arroyo Seco. It appeared to come from the direction of our trapdoor hunting ground.

No pair of happy kids ever chased a fire engine more gleefully than Danny and I raced toward that rolling smoke. And sure enough! Many acres of adobe hills were being swept bare of tangled weeds, and the trapdoor season was open again.

Up the long grade we drove, and into the ash-blackened hills behind the smoke screen. Suddenly I swung to the roadside at the foot of an untried hill.

"Grab your little broom, Sonny," I said. "I think I have a hunch."

The warm black ashes lay thick upon the ground. The brooms swirled them into the air in clouds—two clouds, a little one and a big one. The dust settled on our perspiring bodies and stuck tight. But we found trapdoors, plenty of them. I began to dig. We grew blacker and blacker—and then it happened!

I broke open a cracked tube and peeked into the bottom half. A weird-looking creature came climbing slowly and clumsily up the silk-lined tunnel! It looked like a small, humpbacked bumblebee, with a tiny, low-hung head that seemed all eyes (page 821). I let out a wild yell. Danny came running.

At last! The mysterious enemy!

During the two weeks that followed we found about 20 more of these long-sought

"SEE ALL THE MARKERS I HAVE!" CRIES BOBBY, LAST IN LINE

Prize hunts for trapdoor spiders' tubes were often staged, the collectors receiving one cent for each nest found. A grand prize of five cents was awarded for a clay tube containing a parasite or a male spider. Each boy uses a different kind of paper marker, and the author collects them as he digs up the tubes. Here the boys are "cashing in their chips," with Mrs. Jenks acting as "banker."

parasites—larvae, pupae, and adults—but not a single parasitized spider with the larva still within its body. So it became evident that the season was short and definite, and that the fires had come just a few days too late. The maggots had already emerged from the bodies of the spiders.

I must wait at least another year before I could complete The Case of the Cellophane Sheath.

Nevertheless, I had specimens for laboratory rearing and to send to scientists for possible identification. Again I was fortunate in that I applied to P. H. Timberlake, for it just happened that Prof. Harry S. Smith, a co-worker of his at the Citrus Experiment Station, was the man who had found the only previously known specimen.

He had seen it flying, knocked it down with his hat, and placed it in a glass jar. This adult female had sprayed many eggs on the interior of the jar, but had died during the night.

This fly was afterwards identified as a new species of the Family Cyrtidae, by Dr. F. R. Cole, of Redlands, noted authority on that family of parasites. Dr. Cole determined my male and female specimens to be of the same species, which he had named *Oncaca smithi* and had described in a manuscript as yet unpublished.

Apparently the name and description of the adult female was about all that was known, and so almost its entire life history was new territory for me to explore.

And what a joy it was to explore that virgin territory! Here at last was the insect I had dreamed of for many years. I need not even cut away the side of a cocoon, as in the case of the wasp, for every side of the transforming insect was constantly visible through its transparent Cellophane sheath.

Time after time I was able to watch and photograph that strange succession of gnomelike forms, dissolving from one into another like scenes in a motion picture. Here, too, my "little movie in stills" ought to tell the story far better than I can tell it in words (pages 821-825).

During these few weeks while my specimens lived, I worked long hours, making hay while the sun shone, and while the moon beamed, too!

But, all too soon, the larvae and pupae developed into adults, lived their brief lives of 7 or 8 days, and died, without presenting me with any eggs or first-stage larvae.

So 1936 ended with good progress made, but a great deal still to be learned, and another summer seemed a long way off. But it came at last, with the hills burned bare a full two weeks earlier.

And yet the first few days of hunting brought only disappointment. Not a single *Ocnaea smithi* did I find on the old hunting grounds, even on Cyrtid Hill where I had found so many the year before.

I tried to resign myself to another year's delay, and to settle down to the finishing of my Psammy life-history prints.

I was sitting at my typewriter that day trying to concentrate upon writing captions for photographs, but I was uneasy. Then I became conscious of a strong urge, a desire to try hunting in a new direction, to the west. Of course I followed the impulse.

I came to unfamiliar roads that wound along new adobe hills, and, at the first place I stopped to hunt, ran slap-bang into a regular epidemic of *Ocnaea smithi* parasites!

That first afternoon I found twelve parasitized spiders with the larvae still in their bodies, besides many emerged larvae, pupae, and adults. I learned afterwards that these conditions existed only in a limited area about equal to four city blocks, but that, within that district, from 25 per cent to 60 per cent of the trapdoor spiders had been attacked by these insect racketeers.

"CELLOPHANE SHEATH" MYSTERY SOLVED

With a wealth of material at hand, the final solution of The Case of the Cellophane Sheath was soon reached. Even the life of the larva within the abdomen of the spider was easy to observe, for the white maggots showed clearly through the dark but transparent skin of the spiders.

Judging by various known facts, it seems quite certain that the female *Ocnaea smithi* fly scatters her eggs over the ground while flying. Obviously this action cannot be photographed. Nor can we follow, with the camera, the strange search of the microscopic larva for its host. But an experiment proved that these minute larvae go hunting for the trapdoor spiders and are not simply "hitchhikers" that wait to attach themselves to a passing spider, as do some other larvae of the Family Cyrtidae.

In the laboratory, *smithi* larvae hatched in a glass cage found their way into trapdoor tubes, which I had sealed with strips of paper so that I could tell whether the owners had opened their doors. After several weeks, I broke my still-intact seals and examined the spiders. Five out of twenty-five were parasitized! Through infinitesimal "chinks in the armor," many *smithi* larvae had penetrated several of the trapdoors and attacked the spiders (page 821).

AN INSECT WARPLANE

A bit of imagination will enable us to visualize this epic quest of the tiny creatures in Nature. The mother fly, a grotesque insect airplane, cruises slowly over a tangled jungle of dry grass and weeds. Her powerful wings beat the air with an audible hum, like the drone of a far-off sky pirate, as she showers potential death, in the form of hundreds of microscopic eggs, on the trapdoor civilians below.

Many of the eggs will undoubtedly be lost or destroyed; others will stick to the dry stalks and hatch there. But we will follow in fancy the flight of one egg that safely reaches the earth below.

How different is the infancy of Psammy's baby as it awakens upon a soft cushion of preserved food so marvelously provided by a mother's "foresight"! But the Cyrtid fly's baby emerges from the egg to find herself a homeless waif, abandoned to shift for herself on the cold, bare ground. (The same would be true of a male.) She is so tiny that, to her, the dry jungle above must seem like a great forest.

But she does not seem to be dismayed. She just stretches and starts out, following her "hunches" as she toddles along through a strange and lonely world where grains of sand are huge bowlders and little pebbles are thousand-foot mountains.

On and on she goes, guided unerringly by the still voice of Nature. Surely the little traveler must get hungry, but she never makes the mistake of stopping to attack some tempting insect along the way. She has just one destined host, and will not stop until she finds it.

And so at last she reaches the massive door of her host-to-be. She seems to recognize it instantly—and down she goes. To us it may look like a tiny, snug-fitting trapdoor, but to the little traveler the waterproof joint is a wide passage, easily traversed.

Down the silk-lined tube she hurries, and climbs onto the huge and unsuspecting spider. No need to hesitate. This is her goal! She bores into the hairy skin.

Home at last!

NATIONAL GEOGRAPHIC SOCIETY

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

Articles and photographs are desired. For material which The Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

Immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

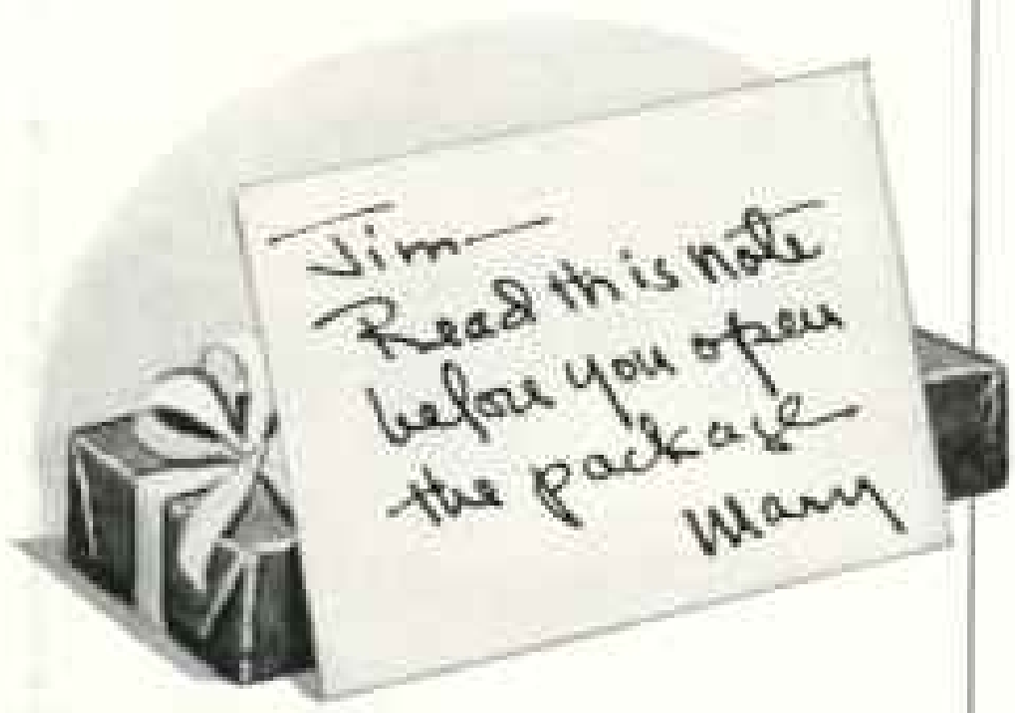
The Society cooperated with Dr. William Beebe in a deep-sea exploration of undersea life off Bermuda, during which a world record depth of 3,028 feet was attained August 15, 1934, enabling observations of hitherto unknown submarine creatures.

The Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed $100,000 to Admiral Byrd's Antarctic Expeditions.

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

The Society's notable expeditions to New Mexico have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches have solved secrets that have puzzled historians for three hundred years. The Society is sponsoring an ornithological survey of Venezuela.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to an officially recognized altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.



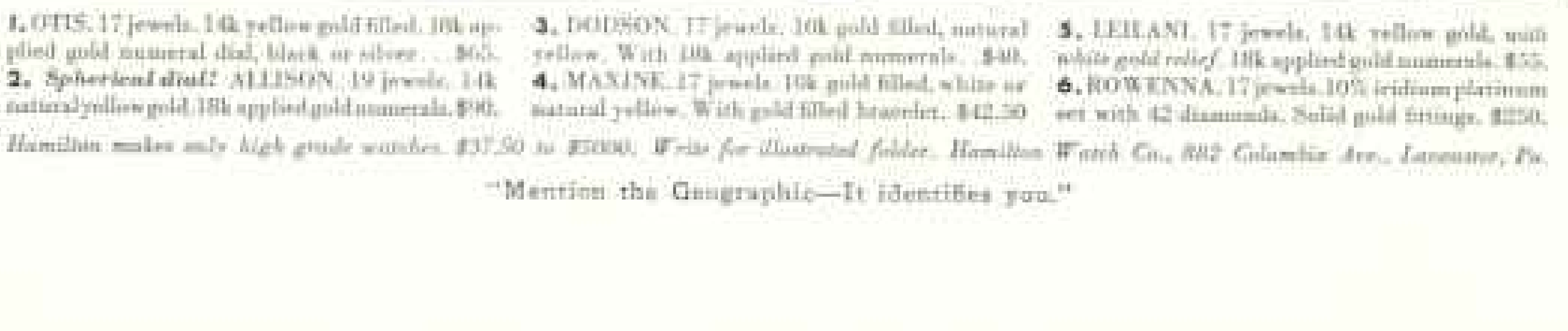
Dear Jim,

Do you remember last Christmas? I gave you some neckties. You said they were very pretty, but something in your voice sounded like a little boy that Santa Claus had forgotten. I went upstairs and cried . . . . I thought how Christmas had gradually become a day when you did everything for us, and got nothing for yourself . . . . I've waited a whole year to give you something that would really bring back the feeling of Christmas the way you used to know it. I think this Hamilton Watch will do it. And I hope it will remind you for many, many years that Dicky and I think you are the finest fellow in the world.

Your wife, Mary

HAMILTON

The Watch of Railroad Accuracy



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5. LELAND. 17 jewels. 14k yellow gold, with *white gold relief*. 18k applied gold numerals. $75.
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Hamilton makes only high grade watches. $37.50 to $5000. Write for illustrated folder. Hamilton Watch Co., 882 Columbia Ave., Lancaster, Pa.

"Mention the Geographic—It identifies you."

Your money is worth more in hosiery

if you buy the Realsilk Shop-at-Home way

	YES	NO
Are you considered just moderately well dressed?	☐	☐
Do you ever spend on impulse, then repent at leisure?	☐	☐
Does money seem to dribble through your gloved fingers? . . .	☐	☐
Do you buy only one or two pairs of stockings at a time, instead of planning for a whole season?	☐	☐

If you answer "yes" to any of these questions, it's a good idea to call Realsilk.

● *It's as simple as A, B, C—how to get added hosiery elegance at no extra cost. The key is:*

A . . . Woman who Buys Hosiery on a Budget

B . . . Expert who Helps Her Plan

C . . . Tools to Help Her Choose

It's as old as Cleopatra—the secret of being well dressed. It's merely this—*plan before you spend.* And that's the secret of Realsilk's Wardrobe System.

That's why smartly dressed women are turning to the Realsilk Wardrobe System to answer their hosiery problems. Here's how it works:

A trained representative of our mills comes to your home with an authoritative color book which shows weight and color of hosiery that goes best with the new fabrics and shoe colors.

You sit quietly in your own home and plan hosiery needs for an entire season.

Color confusion is eliminated.

You try hosiery shades with *all* of your suits and dresses, instead of just the one you have on—and guessing at the rest.

You check them in daylight—the only honest test of color.

Our representative will show you how weight can make or break hosiery color. He will give you expert advice on how skin tones affect hosiery shades.

He will show you the shades that do the most for your ankles.

He will show you the filmiest sheers and Realsilk Steadies, the largest selling daytime hosiery in America.

You will be sure of getting satisfactory fit. Instead of just one or two pairs, you can buy six, nine or twelve pairs at a time—to fit your wardrobe and save you money.

Our representative takes your order and the hosiery is shipped to you direct from our mills—fresh from the knitting machines.

In re-ordering you can be sure of the same colors, the same fit—the same quality.

Realsilk is made from pure fresh silk *—the highest quality that can be bought.*

It's made with full, unskimped needle bars *on special ringless machines. It is knitted to fit—not merely stretched to fit.*

The threads are high twist *and snag resistant (Gremine).*

The dyes are *the finest obtainable—many times the cost of ordinary dyes.*

If you would like to get a plus in glamor on a bread and butter hosiery budget, see the Realsilk man or woman who calls at your home (or office). In addition to hosiery and lingerie, he will show you smart, long-wearing socks and other haberdashery for men.

If no representative is calling regularly, phone the Realsilk branch office in your city and make an appointment.

Real Silk Hosiery Mills, Inc.
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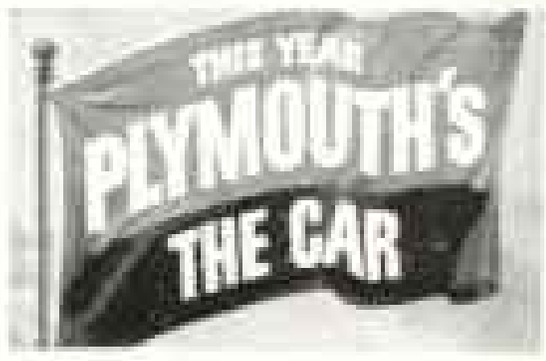
NEW "DE LUXE"



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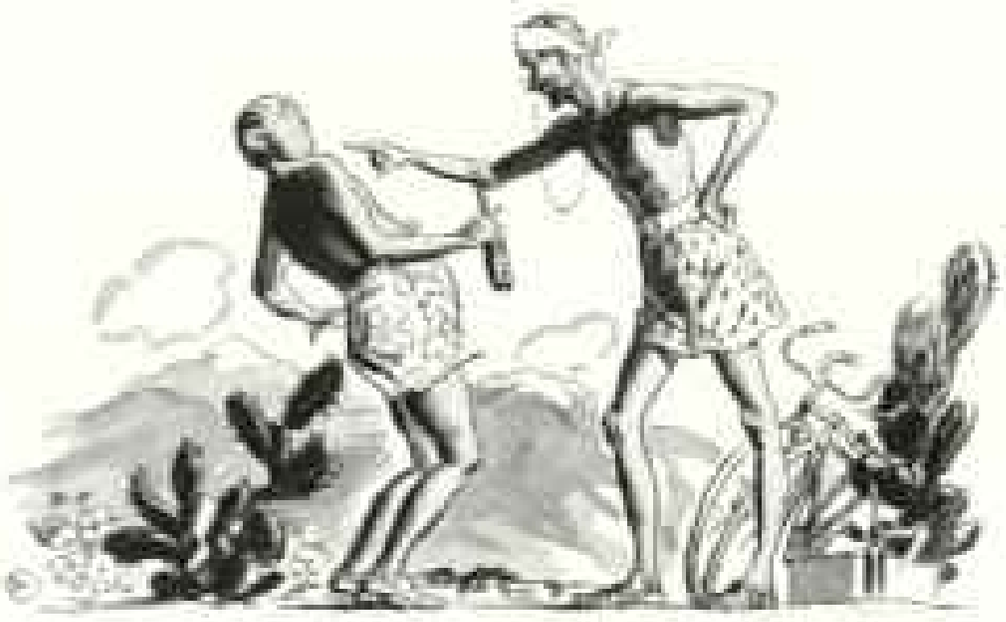

2

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3

"What about your big network radio shows? Your Hollywood premieres, ace swing bands, your curious industries producing oil, airplanes and wine... your harbor...your friendly people...the air of youth and gaiety and accomplishment that's everywhere? Why, my friend, this place is so much more than just a resort—it's *twice* as stimulating as any other vacation land I know of!"

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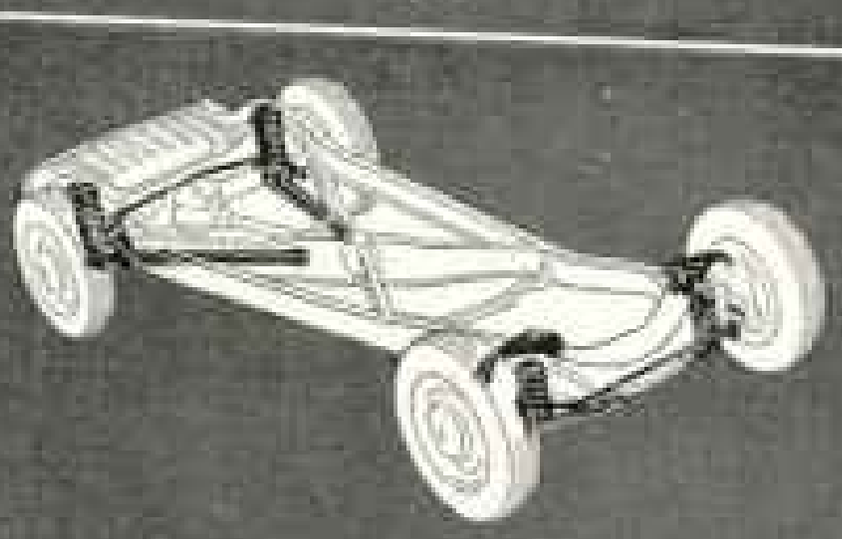

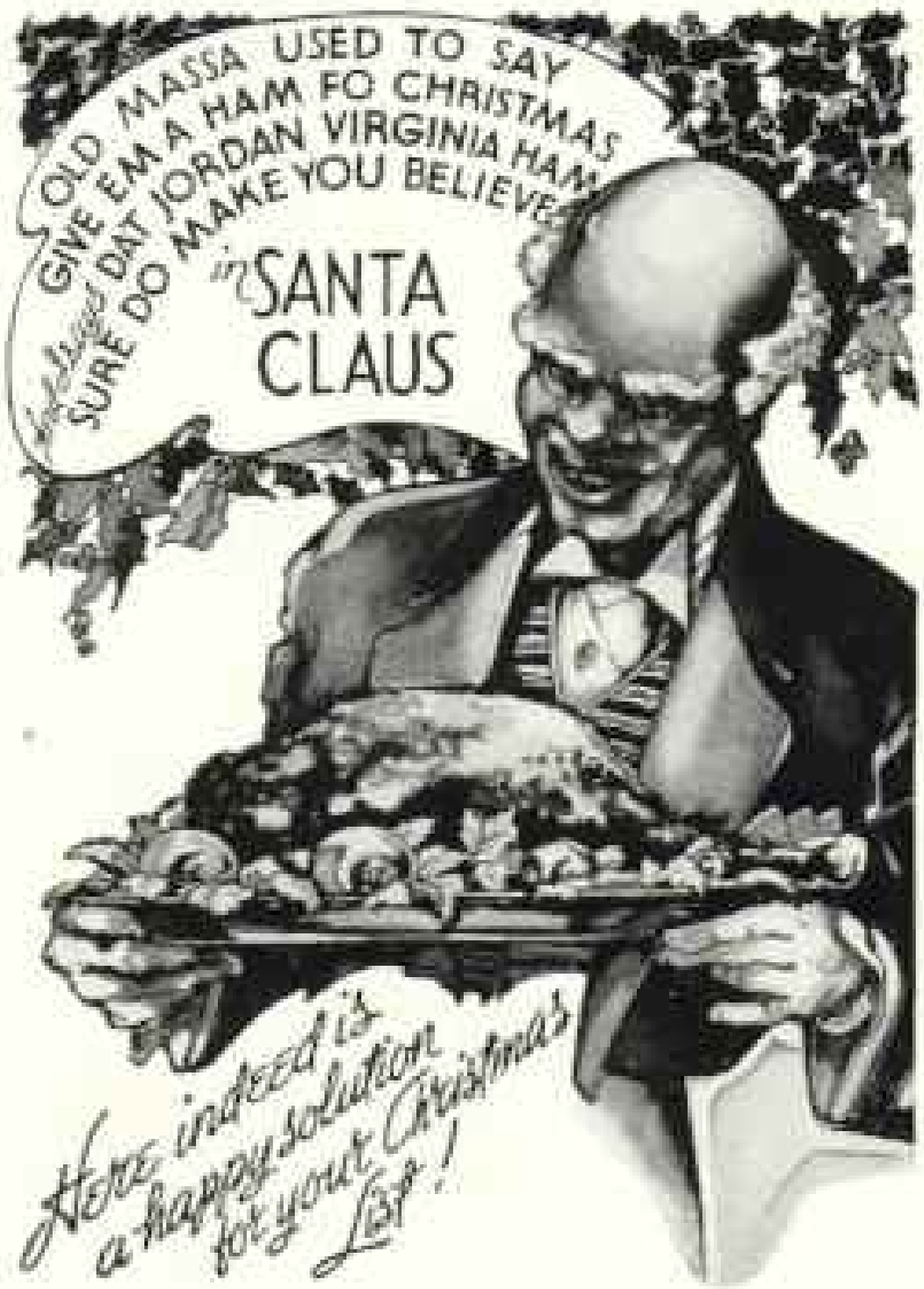

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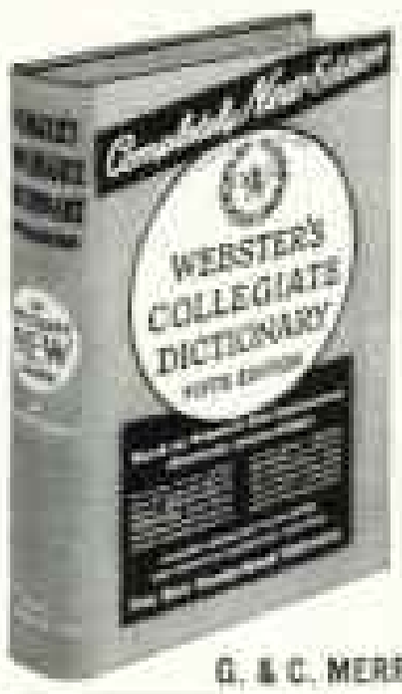

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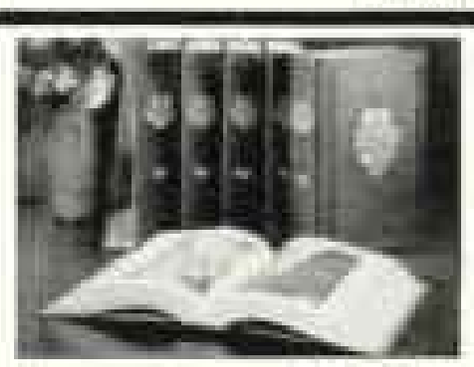

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THE seven thousand miles of highways in Tennessee offer an invitation to explore and an opportunity for adventure. Highways that lead through a state rich in romance and history with a scenic background unsurpassed in America. It's a land of contrasts where most modern conditions exist beside remnants of a picturesque past—where colleges and Indian villages are a few miles apart—negroes sing in the cotton fields—and over all a charm of manner and a graciousness that is distinctly Southern.

Send now for profusely illustrated booklets of this state of thrills and heart throbs.

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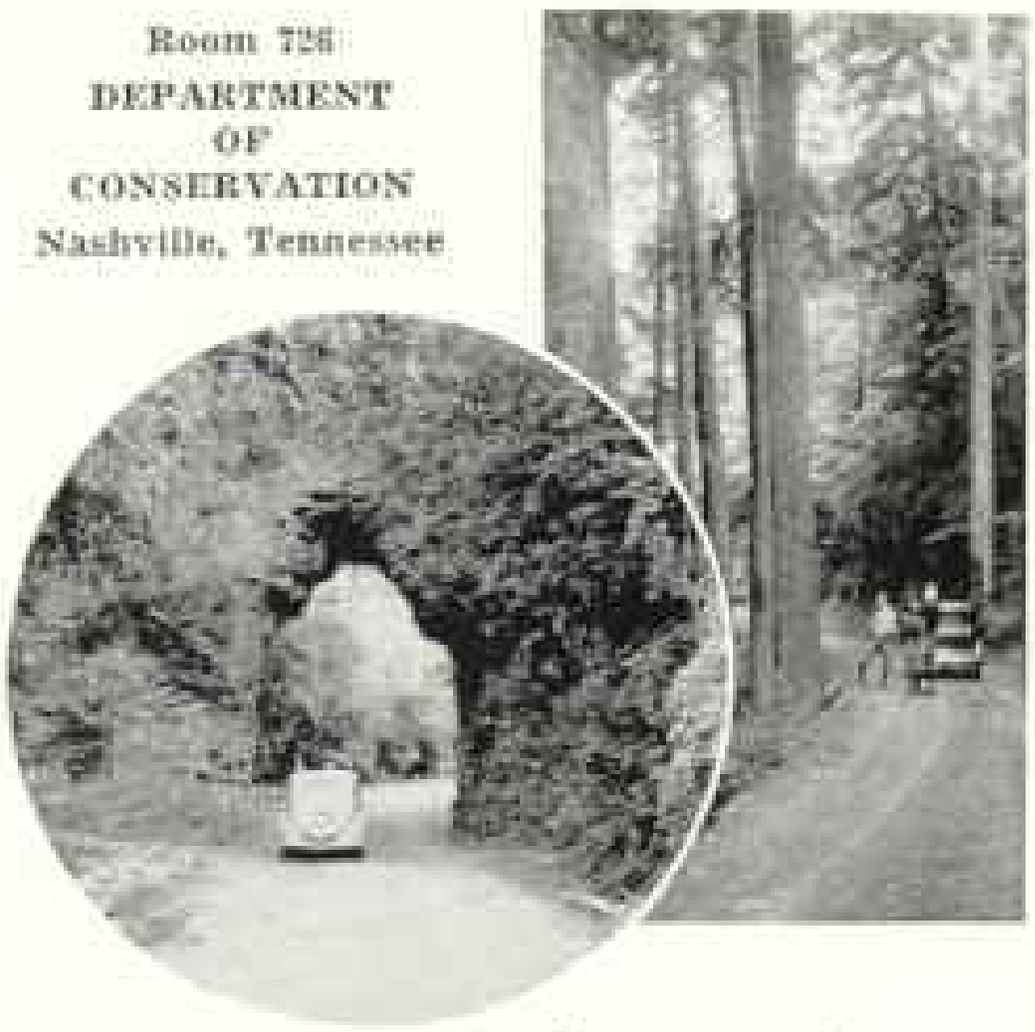

Scenic State of TENNESSEE

Your family will always remember

THE CHRISTMAS YOU GAVE THEM A HAMMOND ORGAN!

NO LARGER THAN A WRITING DESK . . . EASY TO MOVE AND INSTALL. The Hammond has no pipes nor reeds. Instead, it creates lovely organ tones by electrical impulses. No complicated installation is necessary. The Hammond is ready to play when connected to an ordinary electric outlet. It fits in a space approximately four-foot square; two men can carry it anywhere.

The Hammond has made lovely organ music available for the first time to families of moderate means

THINK WHAT IT would mean to you and the children to have lovely organ music right in your own living room! Today, this princely gift to your family is well within your reach.

With a Hammond in the home they will find new interest, new adventure in music. For, in a sense, the Hammond is not one but *dozens* of instruments. With scores of orchestral voices—flutes, trumpets, clarinets, strings—at your command, you can create music that is ever fresh and varied . . . music that doesn't grow monotonous.

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You are invited to visit your local Hammond dealer to see and hear this lovely instrument. Drop in today—with only a small down payment you can finish buying it out of income—and make this a Christmas your family will never forget.

Hammond dealers are located in all the principal cities of the United States and Canada. Or write to The Hammond Organ, 2959 N. Western Ave., Chicago, Ill. *In Canada*, address Northern Electric Company, Ltd., Montreal.

ON THE NEW AEOLIAN-HAMMOND PLAYER ORGAN, anyone can play the world's greatest organ music. A complete library of rolls is available. See and hear it.

THE HAMMOND ORGAN

$1250 and up, f. o. b. Chicago

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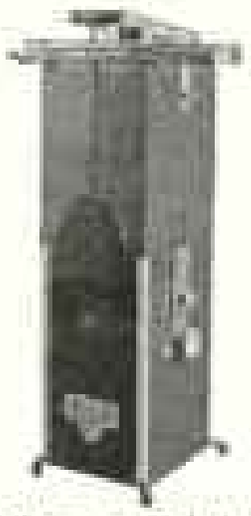

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SOUTH AFRICA

"The most interesting travel land"

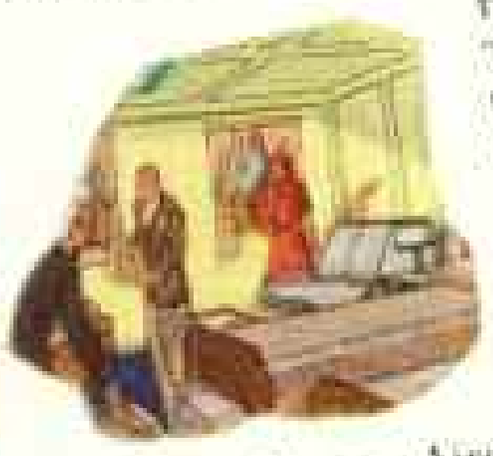
FAREWELL BROADWAY — HELLO RIO!

(and Santos, Montevideo, Buenos Aires)

BELOW the equator, a fascinating new world awaits you...the east coast of South America. It's springtime down there now—summer is but a few weeks off. And linking that wonderland and ours are three newly appointed modern express liners—the S.S. BRAZIL, S.S. URUGUAY and S.S. ARGENTINA.

Your vacation begins when you step aboard in New York. Spacious promenade, sun and sport decks, open-air swimming pools, a veranda cafe, luxurious salons and libraries—invite you to rest or play as you wish, during the thirty-eight glorious days a complete round trip affords you.

Twelve days out you enter the world's most magnificent port, the harbor of Rio de Janeiro—then Santos, the greatest coffee port in the world—next Montevideo, capital of cosmopolite Uruguay—and on the eighteenth day you're in Buenos Aires, the gay metropolis of the Argentine.



On a complete cruise you visit them all, including historic Trinidad on the return voyage. Delightful shore trips may be arranged at each port, where you will find excellent hotels at reasonable rates. And you may even cross the continent and visit the beautiful Andean country.

All rooms on these liners face outside—have hot and cold running water, full-size beds and modern ventilation. A courteous, capable staff is at your service. Every meal is an event you will genuinely enjoy.

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Confidentially, if you are thinking of Christmas presents, have you considered cruises for a Good Neighbor Fleet cruise to South America?

THE AMERICAN REPUBLICS LINE — The Good Neighbor Fleet

See the Americas First

VIA **AMERICAN REPUBLICS LINE** TO BRAZIL, URUGUAY, ARGENTINA.

SAVE YOUR EYES

Nature places your eyes in deep sockets, surrounds them with bony structure, provides quick-action lids and cleansing tears to help protect your eyesight.

Moreover, Nature warns you when all is not well with your eyes. If you have unexplained headaches, a tired feeling after reading, watering or bloodshot eyes, crusts or scales on the lashes, puffiness of the lids or blurred vision—a competent eye specialist should be consulted.

The specialist may be able to give relief by prescribing and fitting glasses, or he may find that treatment of some underlying medical condition is necessary. If you wear glasses, have them checked periodically by your eye specialist. Incorrect lenses or frames that do not hold the glasses in the right position can cause serious eyestrain.

Simple Rules for Conserving Sight

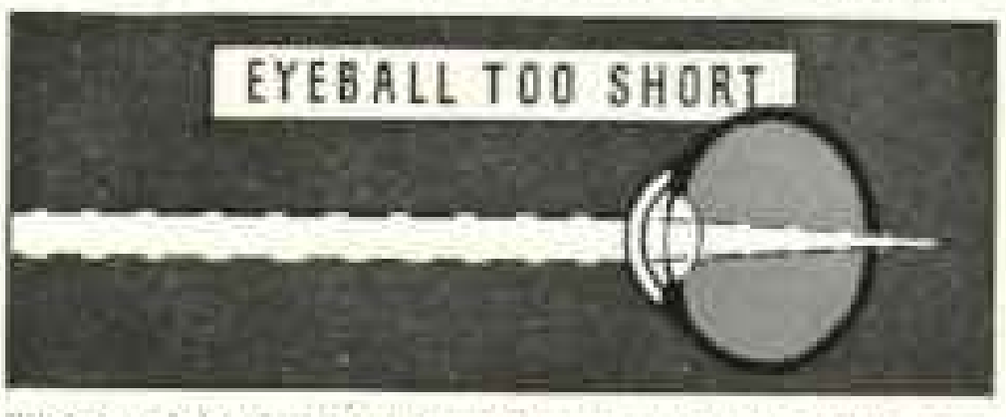
Don't strain your eyes by reading or working in a dim light. Avoid glare. Frequently interrupt prolonged close work such as reading, writing or sewing by resting the eyes; either shut them or look off into the distance. If you read in bed, make sure that your book is held at equal distance from *each* eye—never read when lying on your side and always have the page well lighted and *below* the level of your eyes.

If something gets into your eye rubbing it may have serious consequences. When tears do not wash out the offending substance, draw the upper lid over the lower. If this fails, have a doctor remove it. Unless ordered by an eye specialist, avoid the use of ointments, salves and other remedies.

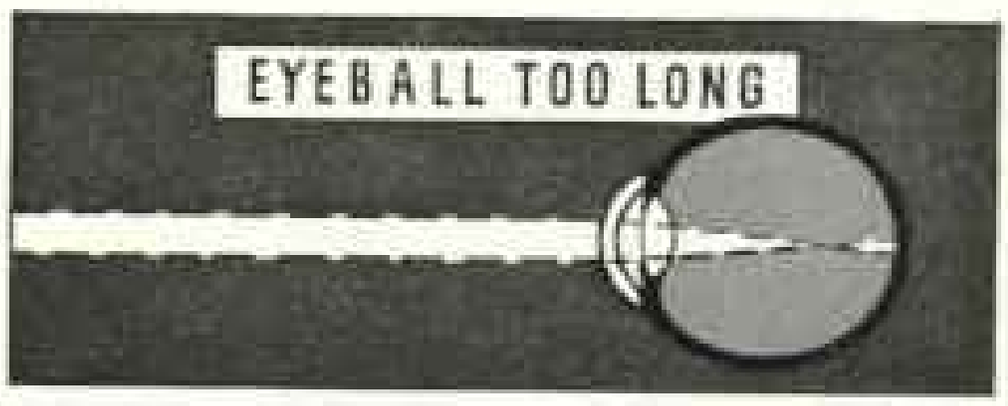
The eye is subject to changes due to advancing age. Even though your eyes seem normal, your safest course lies in regular examinations.

If discovered in time many defects can be rectified and the eyesight corrected. The Metropolitan booklet "Care of the Eyes" contains valuable information. A post card brings you a free copy. Address Booklet Department 1238-N.

When the normal eye is looking into the distance, light rays focus the image directly on the retina—or back part of the eyeball. The muscles which control the lens of the eye come into play for close work.



The *farsighted* person has a short eyeball. Light rays entering his eye focus the image *back* of the retina. He may be able to see distant objects but cannot focus on nearby objects without straining the muscles of the eye.*



The *nearsighted* person has a long eyeball. Light rays entering his eye focus the image in *front* of the retina. He can see objects close at hand but cannot focus for distant objects.*

ASTIGMATISM

Astigmatism is the incapacity of the eye to see both vertical and horizontal lines at the same time with equal sharpness. Thus, light rays entering the eye cannot be brought to a common focus at any point. This results in a blurred image.*

* These defects can be corrected by glasses.

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We don't want to spoil your fun by telling you what's going to happen.

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"Here's the first movie we made with our Christmas Ciné-Kodak"

FROM A KODACHROME ORIGINAL

FORTUNATE are those who receive "the gift of the year"—a Ciné-Kodak. From the youngest to the oldest, all participate in the joy of making home movies, and of seeing them unroll on the screen. By this means, as in no other way, you are able to capture life itself and relive its treasured moments.

FULL-COLOR KODACHROME . . . With a Ciné-Kodak, you can make your movies either in black-and-white or in all the brilliant, glowing colors of nature . . . using Kodachrome, Eastman's wonderful color film. No fuss, no extra equipment, simple as black-and-white.

Make this a Ciné-Kodak Christmas—with any of the four movie cameras below. Ask your dealer to put them through their paces . . . Eastman Kodak Company, Rochester, N. Y.

Give a Ciné-Kodak

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It costs only $14.95 to give Victor Record music this way!

$25.95 value—in Victor Records and RCA Victrola Attachment—for $14.95! RCA Victrola Attachment plays Victor Records through any modern AC radio, with full tone and volume of set. This special offer gives you $14.95 (list price) RCA Victrola Attachment, $9.00 in Victor or Bluebird Records, $2.00 subscription to Victor Record Review, membership in the Victor Record Society—at a saving of $11.00!

A gift of Victor Records costs only 75c up

26049, 26050, 26051—A collection of the six most popular Christmas hymns—$2.25

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The Palms . *John McCormack* $2.00

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Let this book be your guide to joyful Christmas presents

Most complete, compact and convenient musical reference work . . . lists 6,500 Victor Record selections. COMPLETE with biographies, portraits, cross indexes, pronunciation table. See your RCA Victor music dealer.

The World's Greatest Artists are on Victor Records

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You can buy RCA Victrolas on C. I. T. easy payment plan. Any radio instrument is better with an RCA Victor Master Antenna.

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NATIONAL acceptance of Miami as a winter residence for Americans of moderate means springs from many factors. Plenty of fine, medium-range accommodations, absence of fuel and winter clothing expense, low all-season rates, excellent schools, all contribute to making the idea of moving entire families here for the winter a practical reality. Thousands who carry it out every year prove it.

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Litchfield

The Wigwam. Distinguished winter resort hotel and bungalows in glorious desert setting near Phoenix. Famous cuisine. Golf, ride, swim, recreate. Bklt.

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Hotel Westward Ho. Premier Hotel of the Southwest, in world famous Valley of the Sun. Midtown with desert resort atmosphere. Am. & E. Plans. Bklt.

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The Ambassador. Twenty-two acre Playground in heart of City. All Sports, Plunge, Beach, Lido, Cocoanut Grove for Dancing. European, $5.00 up.

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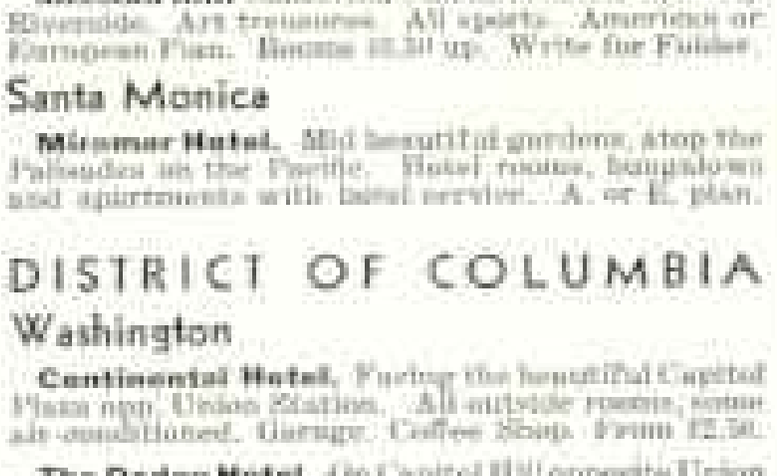
Fort Lauderdale



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Florida's Foremost Resort Hotel—Famed for food, service, unsurpassed location, and distinctive clientele—surrounded by 12 acres of beautifully landscaped grounds, yet in the center of social and sports activities—As exclusive as your own club—Particularly attractive rates during December—Just the place for your winter holiday. Booklet on request. C. S. Krom, Mgr.

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St. Petersburg

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Vinoy Park Hotel. On Glorious Tampa Bay. Sun bathing. Every recreational feature. Open December 15. Booklet. Clement Kennedy, Managing Director.

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Barbizon-Plaza. New streamliner hotel overlooking Central Park at 6th Ave. Rooms from $3 single, $5 double. Continental breakfast included. Hilt. W.

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Savoy-Plaza. A distinguished hotel where hospitality reigns. Spacious rooms overlooking Central Park provide every harmony for enjoyable living.

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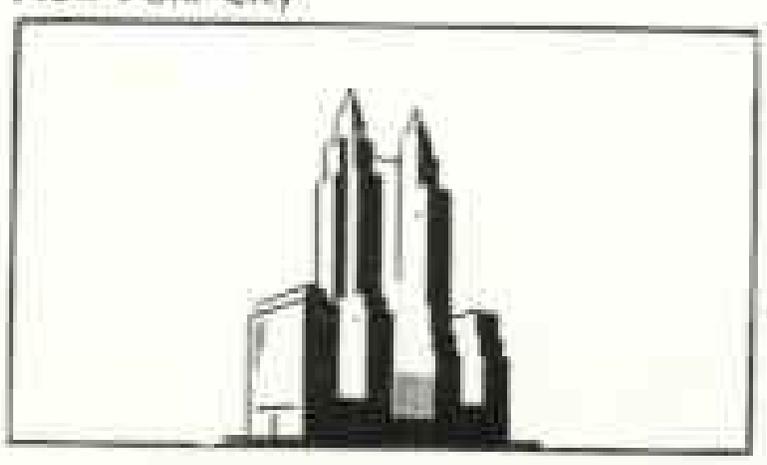

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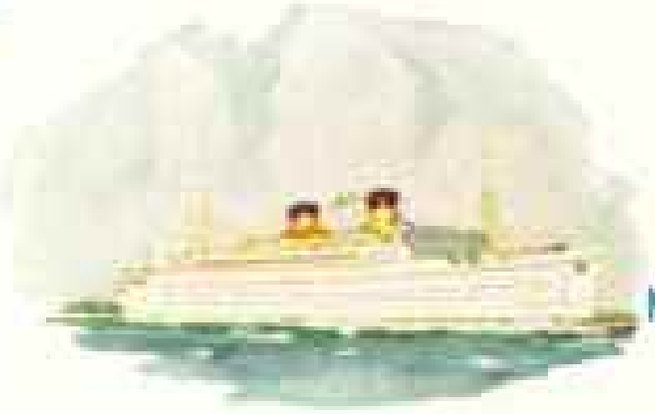

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