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CONTENTS

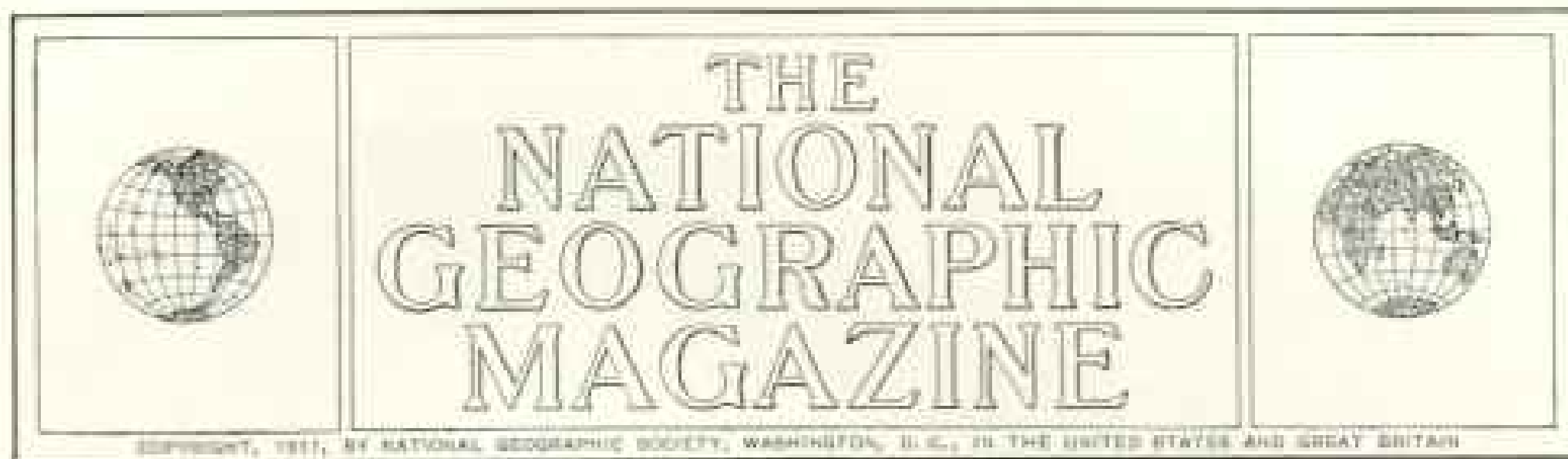
THIRTY-TWO PAGES OF ILLUSTRATIONS IN FULL COLOR

- Visits to the Old Inns of England  
With 17 Illustrations HAROLD DONALDSON EBERLEIN
- Cradles of English History  
15 Natural Color Photographs CLIFTON ADAMS
- Tropical Toy Fishes  
With 20 Illustrations IDA MELLEN
- Iridescent Denizens of the Miniature Aquarium  
8 Paintings from Life HASHIME MURAYAMA
- On the World's Highest Plateaus  
With 40 Illustrations HELLMUT DE TERRA
- Life on the Steppes and Oases of Chinese Turkestan  
32 Natural Color Photographs W. BOSSHARD
- Crusader Castles of the Near East  
With 20 Illustrations WILLIAM H. HALL

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## VISITS TO THE OLD INNS OF ENGLAND

Historic Homes of Hospitality for the Wayfarer Dot  
the Length and Breadth of the Kingdom

BY HAROLD DONALDSON EBERLEIN

**T**HE old English inn still has its sign out. It continues a distinctly "going concern." Of this fact many a Red Lion or Green Dragon bears plain witness by its record of active hospitality dating back for hundreds of years without a break. Should you imagine it at all a moribund affair in its last bloom, highly picturesque but fated soon to disappear along with other landmarks of antiquity, you are greatly mistaken. Neither is it holding on merely by virtue of acquired impetus, as you might possibly fancy.

The old inn is a very living factor indeed in the scheme of modern existence. Attracted by its ineffable charm, thousands habitually resort thither for lodging or refreshment, and most innkeepers are fully aware of the substantial advantage they derive by preserving in their premises all the essentials of ancient character.

### EVERY WAYSIDE HAS ITS ANCIENT INN

Now and then it happens that an old hostelry seems to be altogether one of those idyllic survivals from a bygone day, so invested by a mysterious, elusive halo of romance, and so hidden in some out-of-the-way corner that you can come upon it only by the barest lucky chance—a thing whose discovery you must ever afterward cherish in the lavender and rose petals of memory as an experience too rare to befall one mortal twice in a lifetime. But, as a matter of actual fact, old inns are

dotted over the whole length and breadth of England.

Most of the Swans and Mermaids, the Mitres, White Harts, and Crowns, are not concealed in remote places, far off the beaten lines of travel, so that they have to be made the objects of special visits to be seen. No particularly keen sight is required to discover them. Not a few of them you will find beside much-frequented highways and in country towns, where every day a constant stream of traffic passes them. It needs only the seeing eye and a sympathetic sense of appreciation to recognize their manifold claims to your esteem when good fortune lands you at their doors without your seeking.

Besides all the old inns you cannot help discovering on the main roads and in the towns, there are those others, of course, on lonely heaths or fronting peaceful village greens. There are likewise modest "ordinaries" by the brinks of little rivers where the disciples of Izaak Walton love to lodge. And there are inns at bridge ends or where roads meet, to say nothing of seaside inns whose windows look out to sea or command busy harbor views.

In short, there are plenty of them of all kinds to offer an admirable field for the collector. And a more fascinating holiday hobby than collecting old inns it would be hard to imagine.

Gratifying this hobby involves no great expense; there is always the lure of wholly



Photograph from Harold Donaldson Eberlein

#### THE INN OF YESTERDAY STILL HAS ITS SIGN OUT TO-DAY

Whether it fronts a village green, nestles by the riverside, stands stark on a lonely heath, or lines a busy street, the English inn, down through the centuries, is linked intimately with the Nation's daily life. The Saracen's Head, at the Essex village of Dummow.

fresh discoveries to be made; and of variety there is no end, for no two of these venerable hostelries are alike. Furthermore, collecting inns is not a pursuit merely for dry-as-dust antiquarian poking and prying; it is alive with the full-running sap of human interest—human interest both past and present—and, if you are a close observer of your fellow men and women, you will draw from it an unfailing elixir of amusement.

Once, on the way home from Liverpool, my wife and I stopped for tea at a tiny roadside inn in Cheshire. When the waitress came along, she asked whether we would have "meat tea or sweet tea." That little inn at Tarporley and that waitress, with her naïve rhyming distinction between the modes of tea-serving, have always stuck more vividly in our memories than even the kindly landlord's vast pride in showing all his antique furniture and his old Spode china, which courtesy on his part, despite scandalously fast driving and the briefest possible stop afterward for dinner, made it midnight before we got back to Worcestershire.

If you care to add a special division to inn-hunting as a holiday pastime, there are the inn's "poor relations," the taverns and roadside alehouses. These have a set of characteristics and usages all their own, and most diverting they are, too. While you are warming up on a cold day, or quenching a summer thirst, the landlord and his rustic patrons will probably regale you with a delightfully bucolic version of all the neighborhood happenings or their reflections on parish-pump politics.

#### WHERE DICK TURPIN RECEIVED HIS INSPIRATION

Time and again you will chance upon a bit of history or romance and find the local associations with some famous personage proudly treasured by the country-folk. Think, for instance, of dropping into Dick Turpin's birthplace, the Rose and Crown, in the Essex hamlet of Hempstead! Think of drinking a toast on the spot to the memory of that doughty knight of the road! His father was the Hempstead publican of that day, and the people thereabout all know Dick's story and can



Photograph by Möller and Harris

## THE BELL, IS THETFORD'S OLDEST REMAINING INN

For almost 500 years it has dispensed the traditional hospitality of the English inn in this town of mystery and forgotten history, the capital of East Anglian kings. Alterations and modernizations have not spoiled it.

point out to you his cockpit, now marked by a ring of trees, just across the way, beside the stream.

You can see, too, the knot hole in the taproom ceiling, which is also the floor of the bedroom above. To this knot hole the youthful Dick used to glue his ear, when he was supposed to be fast asleep in bed, and listen to wayfaring customers below telling tales of the latest holdups and robberies. These yarns fired his imagination and seem to have inspired his future career. The Hempstead folk of to-day apparently have a livelier recollection of Dick than of another Hempstead celebrity, the great Doctor Harvey of blood-circulation fame.

Beguiling as roadside alehouses may be for their picturesque aspect, or for the fragments of history they enshrine, they are to be taken merely *en passant*. The only kind of physical entertainment they are usually equipped to supply is liquid, though their keepers are ready enough to do the best they can at a pinch in the way of more solid hospitality.

More than once, I *know* we have eaten the landlord's own dinner, so that he and

his wife had to make out for themselves with what odd bits a scanty larder could yield. We have even spent the night trying to sleep on the hard, narrow settles of a remote tavern taproom when a frightful ice storm had put the roads in a dangerous condition and made it impossible to drive any farther. But such incidents belong in the list of adventures that it is much pleasanter to remember afterward than to go through at the time. If you wish to be really comfortable, stick to the inns and don't expect too much of the poor-relation alehouse or tavern.

## NO OSTENTATION, BUT AMPLE COMFORT

Whether you purposely make a pilgrimage to old inns, or whether you casually seek their shelter, bear in mind that they are neither Ritz-Carltons nor Biltmores. Put aside for a little while your accustomed notions of 20th-century luxury and splendor. Be willing to take things as you find them. For a day or two, forget about the regiment of uniformed pages you generally see in modern establishments—the hall porters, the bedside telephones, and



THE EPITOME OF ALL THAT AN OLD ENGLISH INN OUGHT TO BE

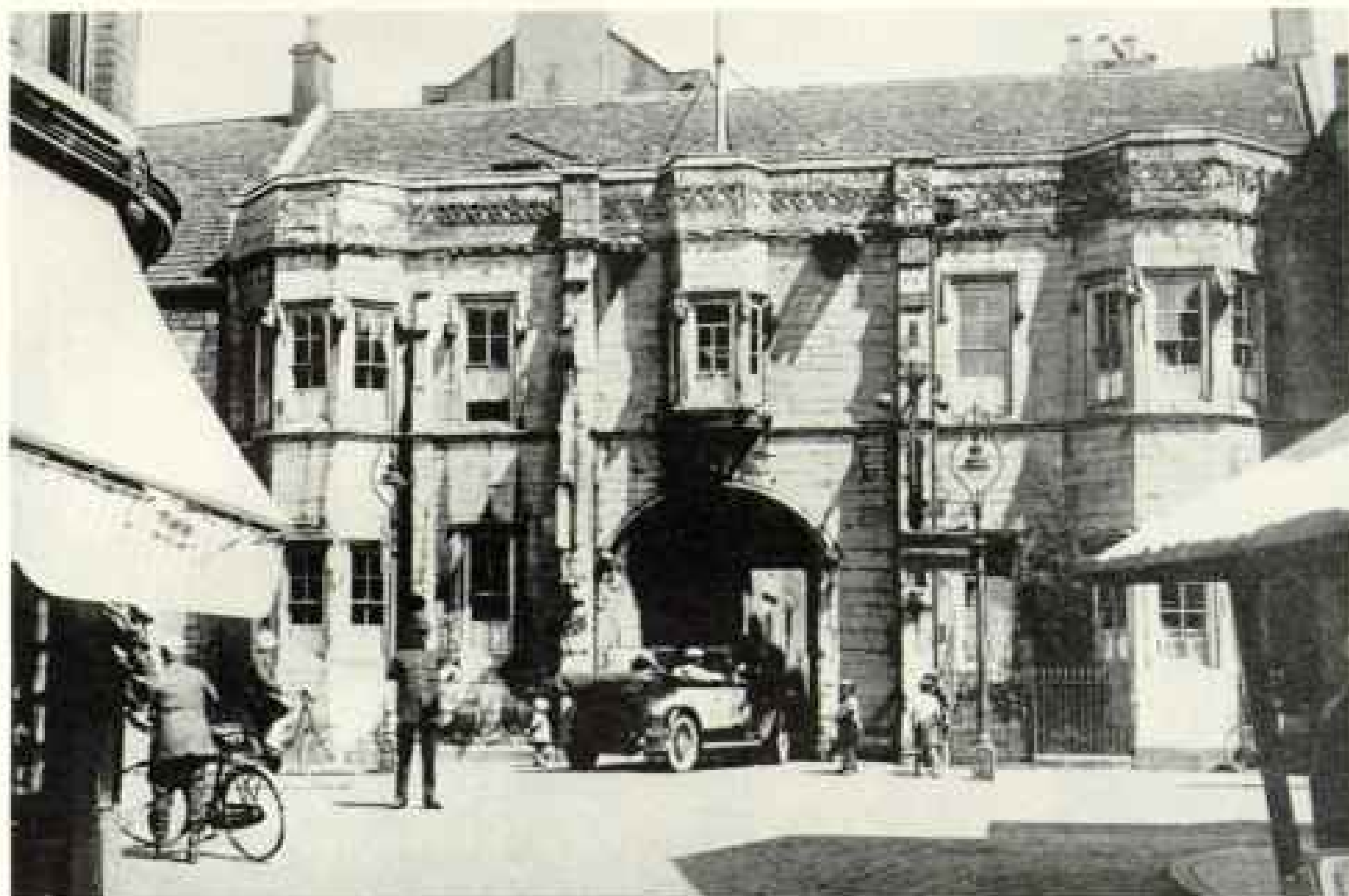
A rambling Tudor structure with mullioned windows and leaded casements, the Lygon Arms, at Broadway, Worcestershire, one of England's loveliest villages, holds and delights the imagination (see, also, text, page 277).



Photographs from Harald Donaldson Eberlein

TRAVELERS ON THE GREAT NORTH ROAD TOOK THEIR EASE AT THE LION

In days gone by, when the York stagecoach swayed and rumbled Londonward, this old posting house at Buckden, Huntingdonshire, responded to many a cheery blast from the horn and a clatter of hoofs.



Photograph by Arthur W. Jack

#### THE MIDDLE AGES HOVER OVER THE ANGEL AT GRANTHAM

For several centuries the well-known hostel in Lincolnshire has ministered to king and commoner and watched the pageant of English history along the Great North Road (see, also, text, page 277).

all the array of patent electric gadgets that can be switched on and off at will.

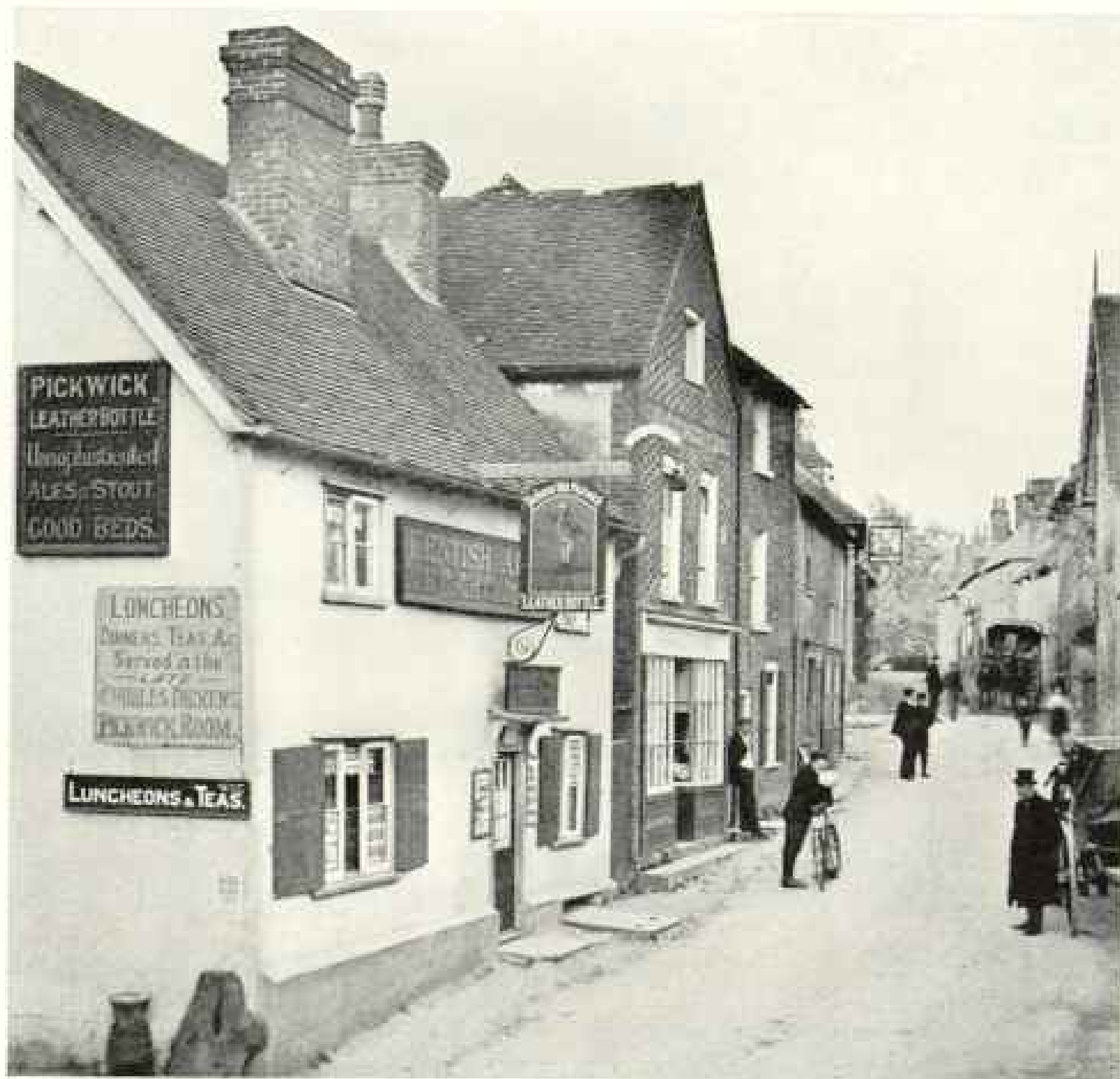
All or some of these adjuncts you may be surprised to meet with in more than one old inn where you would least expect to find them; but if you find none of them, it will do you no harm to walk upstairs instead of being taken up in a lift, or to go to bed by the light of a candle instead of by the glare of 32-candlepower electric bulbs.

What you are always certain to find in all of these old ordinaries will be comfort of a really homely, substantial kind, scrupulous cleanliness, genuine courtesy, from mine host down to "boots," and unfeigned hospitality whose character none could mistake. Not least in adding its share to your enjoyment will be that baffling atmosphere that pervades well-kept hostelries of long repute. If you are at all sensitive, you will detect it immediately you cross the threshold.

"Atmosphere" is the only thing you can call it. It is an elusive, subtle thing that well-nigh defies attempts at close analysis;

it is not exactly an odor or a series of odors; neither is it altogether attributable to what you subconsciously perceive with the eye. Rather is it a composite sense of linen that has lain in lavender, brasses conscientiously polished by generations of tidy housemaids, floors and furniture neatly waxed, good pictures on the walls, savory viands well cooked, and a general air of tidiness along with unobtrusive but very convincing cheerful, solid comfort. Nor will it escape you that there is everywhere evident an attitude of respect for the inn's past, a silent tribute, as it were, to the character the place has acquired through its long and useful life as a haven of hospitality.

What may, perhaps, surprise you is the unassuming excellence of the appointments quite commonly encountered. Again and again you will find furniture that would bring a high price in antique shops. The landlords would scout the very idea of selling any of it; every piece is regarded as a treasured possession of the inn. It is always pleasant to eat at a fine old ma-



Photograph by Ewing Galloway

#### COBHAM'S LEATHER BOTTLE LIVES IN THE "PICKWICK PAPERS"

To this Kentish hostelry the lovelorn Tracy Tupman fled to hide his sorrows. The Dickens Room preserves many pictures and other items associated with the famous novelist.

hogany table or to sit on a superb Hepplewhite or Sheraton chair, and to know that all the succession of guests share that same pleasure.

You will find good pictures on the walls—Rowlandsons, Morlands, and a variety of prints that collectors eagerly covet. You will find good silver on the table and good knives that will really cut.

#### SILVERWARE COLLECTORS NOT WANTED

In some places you will have your ale in silver cans, and in the dining room of the Globe, at King's Lynn, there is a great cupboard full of old silver belonging to the house. Once this silver was regularly used on the tables. Now the cupboard is

carefully locked and guests may feast their eyes on the treasures through the glass doors, but must content themselves with eating from plate of more recent date. And the story of the locking is a sad comment on the predatory covetousness of some visitors.\*

Aside from all the antique plenishings of ordinary occurrence, you will often find some quaint survival to remind you of long bygone usages. For one thing, as like as not you will see in the hall of an old coaching inn a glazed show case, set in mahogany framework, hanging on the

\* See, also, "A Tour in the English Fenland," by Christopher Marlowe, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1929.



WHERE MR. PICKWICK MET WITH AN EMBARRASSING ADVENTURE

After blundering into this room of the Great White Horse, Ipswich, the bewildered old gentleman had an unpleasant encounter with "the middle-aged lady in yellow curl papers" (see, also, text, page 278).



Photographs from Harold Donaldson Eberlein

DICKENS LOVED THE WHITE-HORSE TYPE OF INN

Spacious and hospitable, the venerable hostelry at Dorking, in Surrey, was the kind he delighted to write about in his novels. Inlogra and out, the atmosphere of the generous days of the stagecoach lingers on. The landing in the hall.



wall. This was meant to hold a display of cold meats, game pies, cheese, and pastries for the inspection of passengers on the fast-mail coaches, who stopped for a hasty meal while the horses were being changed and the driver refreshed with food and a rehearsal of the latest local gossip. At a glance, they could see the choice of fare awaiting them, give their orders while divesting themselves of their coats and wraps, and find their food ready on the table in the dining room the instant they sat down. The quick luncheon counter of to-day could have rendered no more expeditious service.

#### A VISIBLE RECORD OF SOCIAL LIFE THROUGH CENTURIES

The ancient appointments, the etceteras, and the various little elegancies of other days are all intimately bound up with the history of the inns. They form part of the visible record of social life for centuries past, and many a quaint reminder there is of manners and customs that are now but memories. But, more than that, the very air of the old hostelries is vibrant with mellowed associations. On crossing their thresholds you catch a pervading sense of genial human intercourse through many generations.

Before the mind's eye a goodly company of those who long ago enjoyed each inn's hospitality seems to people the public rooms—exalted personages and also men of low degree. The common hearth was free to all alike. These thronging memories of those who erstwhile sheltered beneath its roof, along with the actual present beauty and interest of its buildings, are among the most potent of all the many factors that go to make up the subtle lure of the old English inn.

Should you chance to visit Saffron Walden and put up at the Rose and Crown, you will be reminded that, almost beyond doubt, Shakespeare stayed there when he visited the town with his company of players in 1607. Though the inn was refronted with brick in 1690 and "new sashed and beautified in the year 1748," and has undergone sundry other alterations in the course of centuries, much of the original Tudor work remains as it was when Shakespeare knew it.

The Rose and Crown is by way of being a literary shrine on another count, too.

Himself a poet and the associate of literary men, young William Holgate, the son of the Rose and Crown's landlord, seems on credible evidence to have been the mysterious "Mr. W. H." to whom Shakespeare dedicated his Sonnets.

#### GOODLY SHADES PEOPLE THE ROOMS

Time and again you will find yourself dining and sleeping at the same inn where some famous historical personage has stayed; perhaps the very same room may fall to your lot. In the George at Buckden, Huntingdonshire, for example, you may be given the room where Queen Victoria slept as a girl, when, her carriage having broken down on the road, she had to spend the night at this hostelry. The inn people will probably ask you to be careful not to disarrange anything in this sanctum, for they pride themselves on keeping the room exactly as it was when its royal occupant slept in the mahogany four-poster.

It is somewhat more stimulating to the imagination to sit in the taproom of the White Horse at Eaton Socon and picture Dick Turpin coming in and calling for a pot of ale or a hot toddy. But both the George at Buckden and the White Horse at Eaton Socon are rich in picturesque appeal and quite capable of holding the visitor's interest without the added lure of historic association. Under a Georgian exterior the White Horse retains its 15th-century characteristics and structure. Both inns are filled with no end of old furnishings which enhance their charm.

Amid environments no less alluring and highly varied, you can keep company at Portsmouth with Lord Nelson and the Duke of Wellington; at Grantham with Richard III; at Guildford with Samuel Pepys; at Chigwell with Queen Elizabeth; and at Broadway, if you like the contrast when extremes meet in the same inn, with both King Charles the Martyr and Oliver Cromwell.

#### NELSON AT THE GEORGE

To the George at Portsmouth, famous in the unofficial annals of the British Navy, went Nelson on that September morning in 1805 for a few hours' rest after an all-night post-chaise journey to join his flagship *Victory* for the last time (see Color Plate I). A vast crowd soon gathered in

CRADLES OF ENGLISH HISTORY



AT PORTSMOUTH LIES NELSON'S "VICTORY," HOME FROM THE SEA

On the deck of the flagship of the hero of Trafalgar visitors are shown the spot where the gallant admiral fell.



© National Geographic Society

Natural Color Photographs by Clifton Adams

SOUVENIR CHIPS FROM REPLACED SPARS FILL THE SHIP'S OLD GROG TUB

Visitors contributing to naval charity funds receive bits of the original wood from the *Victory*.



RED HORSE HOTEL, OF "SKETCH BOOK" FAME

Washington Irving once stayed at this old Stratford hostelry and praised it unforgettably. His room is kept as he described it, with the poker treasured as "Geoffrey Crayon's scepter." The allied inn, the Golden Lion, was the sign of the Peacock in Shakespeare's day.



© National Geographic Society

Natural Color Photographs by CHRON ADAMS

HERE MAY ONE WELL "LOSE AND NEGLECT THE CREEPING HOURS"

Stratford-upon-Avon's White Swan once stood in the Forest of Arden; and its beams and rafters, smoke-blackened by 16th-century fires, are from the oaks among which Shakespeare's fancy sent Orlando to the "desert inaccessible" of "As You Like It."

## CRADLES OF ENGLISH HISTORY



© National Geographic Society

Natural Color Photograph by Bernhard Wakeman

### OLD-WORLD HOMES GRACE THE WAY TO STORIED WARWICK

What tales of Richard Neville, the stout-hearted "Kingmaker," what gossip of Elizabeth and her Dudley could be told by this quiet road in leafy Warwickshire, whose cottages, built for eternity, have been unmarred by the march of stirring events they have witnessed.



© National Geographic Society

Natural Color Photograph by Clifton Adams

### MERRYMAKERS OF THREE CENTURIES HAVE PLAYED AT MARGATE

"Billy," the toy locomotive, spinning along a mile track of 15-inch gauge, delights children of to-day. Before the end of the 18th century, bathing machines, invented by Benjamin Beale, were a principal attraction at this same Kent resort.



© National Geographic Society

Natural Color Photograph by Clifton Adams

CENTURIES ROLLING OVER CLOVELLY HAVE CHANGED IT LESS THAN THE TIDE ITS ROCKY SHORE

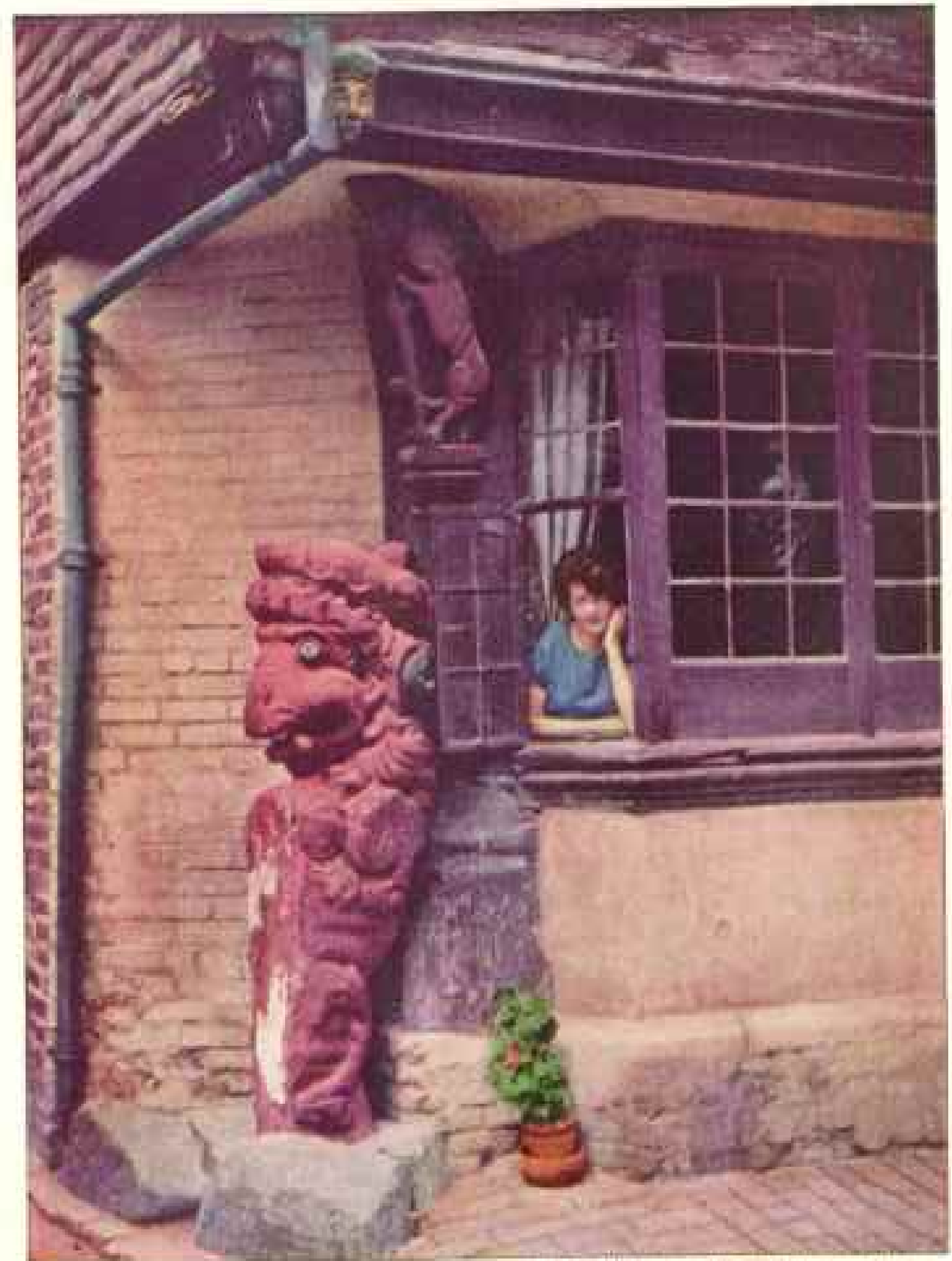
Time has stood still in this Devonshire village, where lingers in thatched cottages and sharp-pitched ancient street much of the Elizabethan atmosphere. The keeper of the Red Lion Hotel says nothing has been built in his day and repairs have merely restored the venerable houses. Near the side door of the inn are kept burros to carry visitors up the steep, cobbled path from the port to the town.



© National Geographic Society

**NO DEVON PILGRIM SHOULD MISS THE CAT AND THE FIDDLE**

Beside the old Roman road near Clyst St. Mary's and Exeter, this comfortable inn, one of many by the same name to be found in England, gives hospitable welcome to wayfarers.



Natural Color Photographs by Clifton Adams

**CHAUCER'S FRIENDS MAY HAVE SUPPED AT THE STAR**

This 16th-century inn at Alfriston probably originated in a 13th-century resthouse for pilgrims. The lion figurehead was taken from a Dutch ship wrecked long ago on the Sussex coast.



CANTERBURY PILGRIMS KNEW THE IGHAM GEORGE AND DRAGON

The street—formerly innyard—sign, unknown to modern hotels, proves the antiquity of the hostelry, which is thought to have been built about 1490 and restored in the time of Queen Anne. Jack Cade recruited a part of his army near here.



© National Geographic Society

Natural Color Photographs by Clifton Adams

WILLOW WATTLING MAKES THE PERFECT BINDING FOR A THATCHED ROOF

This old English cottage, in the New Forest west of Southampton, stands not far from the spot where a mysterious arrow struck down William II, called Rufus the Red.

## CRADLES OF ENGLISH HISTORY



ELIZABETHAN SMUGGLERS ONCE THROVE WHERE THESE CHILDREN FROLIC.

Pebbly Dymchurch beach, sheltered by the old sea wall, is sequestered to-day just as it was in the brave days of old, and those who would avoid publicity still seek it out. Caesar's Romans are said to have used the place as a landing station.



© National Geographic Society

Natural Color Photographs by Clifton Adams

AGE MELLOWS THE CHARM OF THE KENT ROADSIDE COTTAGE

It was no careless or slipshod builder who carved his initials and the date of construction, 1667, in the gables of this sturdy home near the village of Wingham.





STORMS CONSTANTLY CUT BACK THE CHALK CLIFFS AT ROTTINGDEAN. Near Brighton is the secluded village where Rudyard Kipling lived for a time.



© National Geographic Society

Natural Color Photographs by Clifton Adams

SHIPS ONCE ANCHORED WHERE THIS COTTAGE STANDS

A capricious sea has played outrageous tricks on Winchelsea. In Norman times the village was one of England's chief ports, but in the 15th century it was inundated and destroyed. Rebuilt on higher ground in the days of Edward I, it thrived and later became one of the Cinque Ports, only to be deserted by the water and left high and dry.

front of the inn and Nelson had to show himself at an upper window. Then he was smuggled out through the back of the inn yard to avoid the weeping throng.

Nine years later, at the visit of the Allied sovereigns, after the Peace of Paris, the Duke of Wellington stayed also at the George.

In the Angel at Grantham, on an October night in 1483, lodged Richard Crookback, and there he signed the death warrant of the Duke of Buckingham. The room where the King slept is much the same to-day as it was then. The galleries and outside stairways, the timber-built wing to the right of the main front, and the rambling barns at the back, which were part of the establishment when Richard lodged at the Angel, are all gone, but the traceried stone front still looks out over the market square and faces the ancient cross that has witnessed so many centuries of history along the Old North Road.

In the garden of the Lion at Guildford you can still fancy Samuel Pepys cutting asparagus for his supper, or from the mounting block before the King's Head at Chigwell you can readily imagine Queen Elizabeth cuffing the ears of an offending page. At Broadway, in Worcestershire, in the Lygon Arms, you will see the targeted chamber where Oliver Cromwell once lodged, and also the oak-paneled room where King Charles took counsel with his officers.

#### AN EPITOME OF THE OLD ENGLISH INN

Aside from all its historic memories, the Lygon Arms is an epitome of all an old English inn ought to be. A rambling Tudor structure with mullioned windows and leaded casements, it was built of stone, in the traditional Cotswold manner, early in the 17th century, though parts of the building are probably older. From the painted sign in its wrought-iron frame before the door to the spacious posting yard at the back, it realizes the ideal of an ancient, well-kept country hostelry.

The house is a veritable museum of old furniture, old china, old pewter and brass, old prints, and all manner of oddments of other days. In the hall hang long copper coaching horns on which, if you have the knack, you can blow a note like the blast of Gabriel's trump. Along the beams in the back hall are rows of hooks for hanging game.

There is an iron pipe-rack to hold the long churchwarden clay pipes when they were set before the log fires to be burned clean of incrustated nicotine. A cone-shaped copper mulling horn recalls the custom of mulling ale over the glowing embers. "Act of Parliament" clocks sedately tick the time from the walls, and not a few of the minor accessories of past centuries, as well as the larger items of furniture, are still actively fulfilling their original purposes.

The exterior of the inn holds and delights the imagination no less than the interior, and its aspect of venerable geniality is completely in harmony with the rest of the village, admittedly one of the most beautiful in all England (see page 264).

Furthermore, there is a delectable garden behind the many-gabled wings at the back, where, from early spring till late autumn, the flower-lover may rejoice in the amenities of old-fashioned gardening or play at bowls on the bowling green.

What a perennial joy such a garden is you can judge when you know that in the more sheltered parts of the Cotswolds, like Broadway, roses bloom till December, the primroses, polyanthus, and laurestinus usually keep going all winter, the forsythia is ready to break forth on the slightest encouragement, and spring begins in good earnest in February.

#### A BOWLING GREEN IN USE 400 YEARS

Not a few inns have either kept or restored their old gardens, and some of them have retained also their original bowling greens. The Globe at King's Lynn (see text, page 266) still has its bowling green at the back, with a little gazebo from which you may either survey the green and the game of bowls or look out over the broad waters of The Wash.

At Hadley, a remote hamlet not many miles distant from Worcester, the inn has a superb bowling green that has been regularly in use for considerably more than 400 years.

In the brick-paved bar-parlor of this almost forgotten ordinary, high-backed deal settles surround the fireplace, hams tied up in paper bags hang from hooks on the beams, and bunches of drying hops suspended near by diffuse their pleasant aroma. In the long room across the hall you may still see the royal arms blazoned within a lozenge, presented to the inn by Queen Elizabeth to commemorate her visit



Photograph from Harold Dunstons Eberlein

#### NUMBERED BELLS ADORN AN INN YARD

Newmarket has been the headquarters of horse racing in England since the 17th century. One wonders what racing magnates' summonses these time-worn bells at the Rutland Arms have conveyed to hostlers and "boots" (see, also, text, page 281).

to the bowling green at the time of her progress to Worcester—that time when she borrowed some hundreds of pounds in Worcester which she always forgot to repay.

From the walls look down old portraits, and the rules of the green, made at a time "to which the memory of man runneth not back," are hung up so that all may read. One of them orders that if a bowler be convicted of profanity "he shall be dragged over the green on the seat of his breeches" and pay a fine of two shillings for the benefit of the poor of the parish. If the bowling green were a golf course,

the poor of Ombersley parish would doubtless be bloated plutocrats.

#### IN THE FOOTSTEPS OF MR. PICKWICK

In your visits to old inns, should you prefer to consort with departed guests of lesser rank than kings and queens and the great ones of the earth, you can have the amiable company of sundry Dickens characters at such places as the Saracen's Head (now called the Pomiret Arms) at Towcester.

The Saracen's Head figured in the "Pickwick Papers" as the meeting place of Slurk and Pott.

At the Great White Horse at Ipswich you can like as not sleep in the "tolerably large double-bedded room with a fire," and live over again, in retrospect, with Mr. Pickwick his embarrassing adventure with "the middle-aged lady in yellow curl papers." You could, in short, find many a less stimulating diversion than a tour of the Dickens

inns, with all the accompanying incidents of scenery and inevitable adventure.

If you choose to follow up other literary associations with old inns, there are scores of them waiting to reward you with their varied character. For example, there is the Bell at Tewkesbury and its memory of "John Halifax, Gentleman." And Tewkesbury is a pleasant spot in which to indulge a literary quest.

#### STATELY MEMORIES HAUNT THE LION BALLROOM

If you fancy more general reminders of the social life of the past in its many



Photograph by A. W. Cutler

#### THE COACHING ERA LINGERS A MINUTE AT PORLOCK

A motor vehicle now makes the run, but this horse-drawn *char-à-bancs* used to pull up with a flourish at the famous Ship Inn, where, in the old chimney corner, the poet Southey wrote of the "verdant vale" of this Somersetshire village.



Photograph from Harold Donaldson Ederleis

#### "THERE IS BIBURY AHEAD OF YOU"—AND THE WHITE SWAN

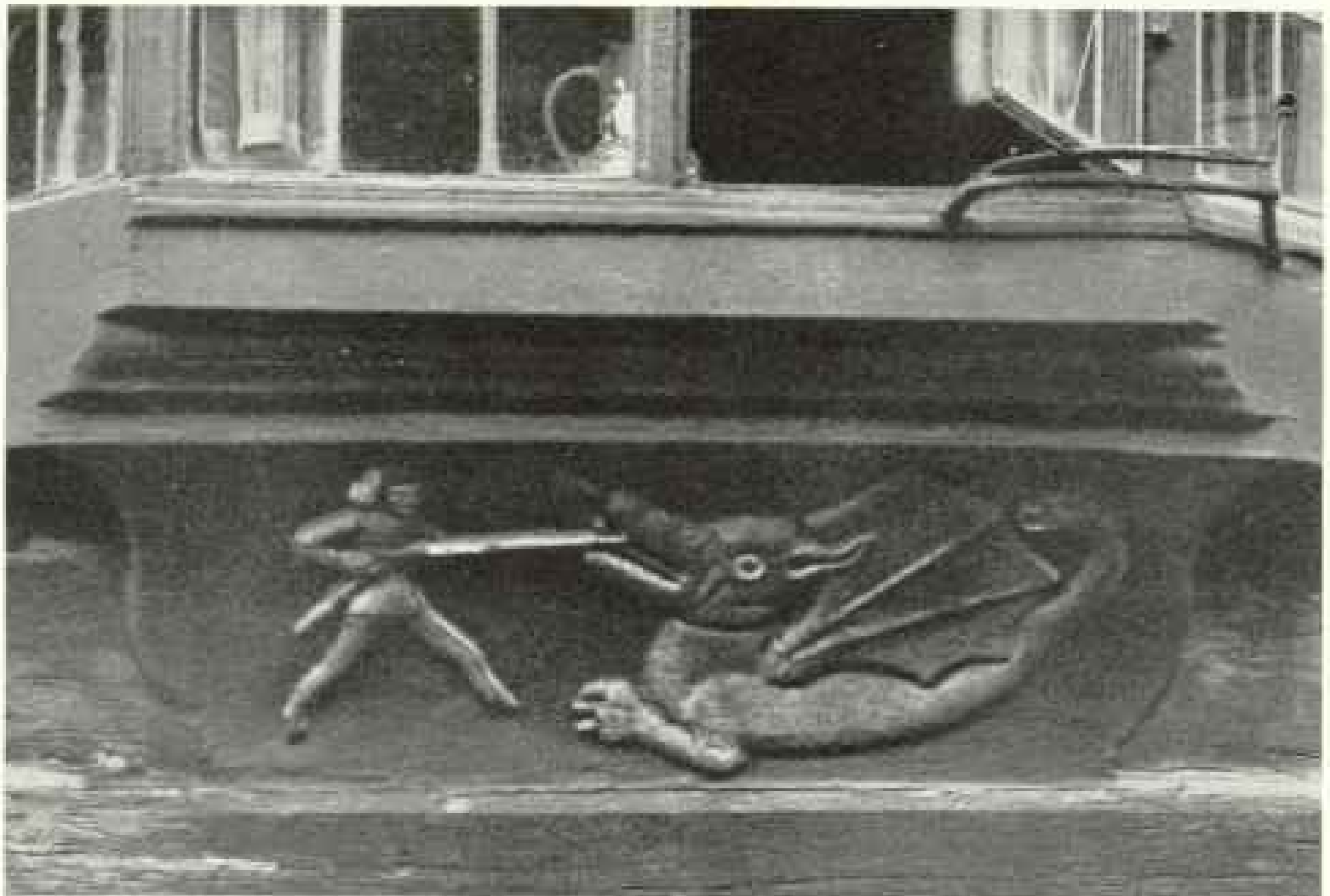
The inn in this Cotswold beauty spot of Gloucestershire lies at the end of the bridge across the Coln, seeming to "tread on the very toes of the steep, wooded, clifflike hill against which it is set" (see text, page 285).



Photograph by Clifton Adams

#### TRADITIONS OF GOOD FARE LINGER AT THE ROSE AND CROWN

It would be difficult to discover an English inn of any repute where a generous supply of eatables and drinkables has not been the rule. This old hostelry at Wisbech, Cambridgeshire, is no exception (see text, page 282).



Photograph by Millar and Harris

#### ST. GEORGE FIGHTS THE DRAGON UNDER THE STAR'S ORIELS

Finely carved woodwork distinguishes this ancient inn, which is in the Sussex village of Alfriston (see, also, text, page 285, and Color Plate V). The time-defying Star is one of England's best specimens of half-timbered hostelry.

varied aspects, you could not find a happier memorial of the county balls, the hunt balls, and divers other brilliant assemblages of the Georgian Age that periodically caused an enlivening flutter in the shire towns than the famous Adam ballroom of the Lion at Shrewsbury. It was long the scene of Shropshire's gayest and stateliest gatherings and still, with undimmed glory, it serves its original use.

This courtly ballroom has its very personal memories, too, as well as its recollections of anonymous splendor. To mention only two of them, it was here that William IV, while he was still a prince, "took the floor"; and it was here that Thomas De Quincey, then a youth, who had just trudged from Oswestry to take the London coach at Shrewsbury, was bedded for the night because all the other rooms in the inn were full.

De Quincey afterward wrote: "I stepped into the sumptuous room allotted to me. It was a ballroom of noble proportions—lighted, if I chose to issue orders, by three gorgeous chandeliers, not basely wrapped up in paper, but sparkling through all their crystal branches and flashing back the soft rays of my tall waxen lights."

Paganini once played in the musicians' gallery of this ballroom, and the inn has its intimate Dickens associations, too.

To remind us of a quite different side of social life, there is the Rutland Arms at Newmarket, "a classic essay in brick," its great ranges of stabling to one side, in whose stalls and loose boxes many an old



Photograph by A. W. Cutler.

#### AN INN WHICH PICTURES ITS NAME OVER THE DOOR.

In olden times innkeepers announced their hospitality to the public by painted signboards or carved and gilded lions, bulls, harts, dragons, and other creatures. The Plough and Harrow, in the Gloucestershire village of Ashton-under-Hill. Artists not infrequently settled their accounts with landlords by painting a sign for the inn.

favorite of the race course has champed his hay and oats. As you look at the row of numbered bells over the inner arch of the inn yard, you cannot help wondering what racing magnates' summonses those same time-worn bells have conveyed to hostlers and "boots" (see page 278).

It would be hard to discover an old inn of any repute where there is not a tradition of good fare. Though generous providing has always been the rule, the excellence of food and drink has been more emphasized in some than in others, with a corresponding degree of fame attached. Not seldom do we come across traces of



Photograph by A. W. Cutler

#### THE CROOKED INN LIVES UP TO ITS NAME

Inside and out, the curious structure at Kingswinford, in Staffordshire, deviates from the perpendicular (see, also, illustration on opposite page). A rear view of the inn in its rural setting.

some particularly notable feast. Here is the bill of fare of a dinner long ago given to the Mayor of Wisbech at the Rose and Crown, in that town:

"FIRST COURSE.—Soups: Mock Turtle, Swan Giblet.

"Fish: Turbot, Smelts, Red Mullet, Whittings, Filets of Soles, Fried Ditto, Codfish, Stewed Eels.

"SECOND COURSE.—Swan, Haunches and Saddles of Mutton, Roast Beef, Breasts of Veal, Filets of Veal, Hams, Tongues, Boiled Turkeys, Guinea Fowls, Roast Ditto, Ducks, Boiled Fowls, Roast Ditto, Geese, Pigeon Pies.

"ENTREES: Lobster Cutlets, Dresden Patties, Oyster Ditto, Fricassee Chicken, Cutlets and Tomato Sauce, Sweetbreads.

"THIRD COURSE.—Snipes, Wild Fowl, Pheasants, Partridges, Leverets, Plum Puddings, Bakewell Puddings, Cherry Tarts, Plum Ditto, Gooseberry Ditto, Apple Ditto, Damson Ditto, Apricot Ditto, Mince Pies, Cheesecakes, Blanc Manges, Jellies, Swiss Creams, Dutch Creams, Coconut Dooce, Custards and Syllabubs.

"DESSERT: Grapes, Pears, Filberts, Oranges, Preserved Fruits, &c., &c."

This reminds one of the "sinful feasts" of 18th-century Philadelphia that John Adams so often refers to in his Diary. Needless to say, the potables fully matched the eatables in diversity and quality, and,

it ought to be added, many of the old cellars have left worthy descendants. Is it any wonder that some of our forebears had the gout?

#### WHERE COCK-AND-BULL STORIES BEGAN

In the very names of the inns is an unending source of interest. Furthermore, the names embody much of both history and romance. At the same time, you can often get a degree of amusement out of them, too. The familiar expression "cock-and-bull story," while given a French origin by most philologists, has been credited by others to the names of two old coaching inns, not far apart, in the High Street of Fenny Stratford. The habitual patrons of one inn were always ready to cap a story emanating from the other by something more astounding. It was like the ancient game of gossip. The unbelievable yarns resulting from this competitive process of "drawing the long bow" were hence called "Cock and Bull stories," which meant that they had little or no foundation at all in fact.

On the road between Cheltenham and Painswick, in one of the loveliest parts of

the Cotswolds, there is a tiny hamlet called Paradise lying concealed from the highway in a deep comb. The little roadside "pub," the only part of the hamlet readily visible to passing motorists, is called Adam and Eve, and, at the bottom of the signboard, beneath the title, is painted Paradise—an inn name verily in keeping with the name of the place. Oftentimes amusing absurdities of inn nomenclature arise from the association of incongruous objects. Well might the early 18th-century doggerel versifier write in the *British Apollo*:

"I'm amazed at the Signs  
As I pass through the Town,  
To see the odd mixture,  
A Magpie and Crown,  
The Whale and the Crow,  
The Razor and Hen,  
The Leg and Seven Stars,  
The Axe and the Bottle,  
The Tun and the Lute,  
The Eagle and Child,  
The Shovel and Boot."

Some of these incongruities of inn nomenclature can be accounted for, of course, by the fact that the present forms are corruptions of older names that have been lost sight of. For example, the name Bull and Mouth is a corruption of Boulogne Mouth, the mouth of Boulogne Harbor, a title seemingly given in allusion to the fact that Boulogne was long the headquarters of the English Army in France during the Middle Ages. The Swan With Two Necks must originally have been the Swan With Two Nicks, the *wick* being the manner of marking royal birds. The sign of the Goat and Compasses must be a corruption of the Puritan sign "God Encompasseth Us."

Nearly all of the inn signs and names fall under one or another of the following categories, or under some combination of two or more of them: heraldic, ecclesiastical, historical, humorous, prophetic, religious, warlike, peaceful, nautical, astronomical, pagan, or zoological. There is practically no limit to the symbolism and allusive quality they may contain. Crosses, Mitres, Cross Keys, Angels, and the names of sundry saints, such as St. George and



Photograph by A. W. Cutler

#### A PASSAGEWAY OF CRAZY ANGLES

It leads from front to back of the Crooked Inn at Kingwinford (see, also, illustration on opposite page).

the Dragon or St. Dunstan, generally indicate that the inns bearing such titles were at one time monastic property—possibly guest houses for some of the great abbeys or hostels for pilgrims to noted shrines.

The erstwhile church-owned inns did not always bear names of ecclesiastical allusion. There is, for example, the Fox and Goose at Fressingfield, built by the parish as a "Cherche House" in 1500, modernized in 1616, and still owned by the church, with several of the rooms reserved for various parochial meetings and clubs.

While not a few of the numerous Georges were named for the kings of the House of Hanover, many of them bore this title as an abbreviation for St. George.





Photograph by Herbert Feltner

#### SHAKESPEARE MAY HAVE PONDERED UPON THESE MURALS

In the lounge of the White Swan at Stratford, these 16th-century mural paintings were rediscovered in 1927 under a cover of 17th-century paneling (see text, opposite page, and Color Plate II). Such art treasures are frequently discovered when old inns are restored.

National heroes and important events were celebrated in the names of hostelries and eminent personages also received this compliment. Nelsons, Dukes of Wellington, Royal Oaks and Marquises of Granby attest this habit of bestowing names.

The White Hart was a favorite name in the Middle Ages and was given in honor of Richard II, whose badge the white hart was. This name, however, has always been popular and many hostelries of far later establishment bear it. As for heraldic names, it has ever been a common practice

to style inns the Arms of this, that, or the other family of local note, the said family oftentimes being the actual owner of the inn, and to paint their arms on the sign.

#### MANY INN SIGNS DESIGNED BY PAINTERS OF NOTE

The inn signs themselves exhibit the greatest diversity and are a source of unending interest. Both the wrought-iron frames in which they are frequently suspended and the devices painted on the actual signs are pleasant incidents of the

road and impart a strong note of individual character to the hostelries they adorn.

In olden times landlords took much proper pride in the devices that announced hospitality to the passing public. The sign was the standing advertisement of the inn. It is gratifying to note that there has been a wide and wholesome revival of solicitude for beauty and originality in this legitimate sort of wayside advertising, to which no reasonable objection can be raised.

Among the painters of repute who are known to have adorned inn signs with their handiwork are Cipriani, Samuel Wale, R. A.; Robert Dalton, keeper of the pictures to George III; Ralph Kirby, Thomas Wright of Liverpool, Smirke, and Peter Monamy. To this list we may also add David Cox, the elder Crome, Harlow, Sir Charles Ross, Heming, and Millais, and we know that George Morland plied his brush in this direction on several occasions. It seems likely, too, that more than once he left a freshly painted sign in lieu of payment for his score.

Instead of painted signboards, the device before the inn often took the form of sculpture, and many carved and painted or gilt lions, bulls, bears, bunches of grapes, swans, harts, horses, unicorns, and dragons rejoice the eye of the traveler by road.

Often a wrought-iron bracket or framework supported these embellishments and far exceeded in elaboration the frames in which signboards were ordinarily suspended. Occasionally the structures would extend across the road, as at the White Hart at Scole, in Norfolk, where there was a marvelous creation of carved wood and wrought iron, painted and gilded.

This wonderful architectural sign disappeared many years ago, but the inn itself is still there, a perfect example of the 17th-century hostelry, built in 1665.

#### MANY INNS CONTAIN PRICELESS ART

In many an old inn, too, you will find unexpected treasures of early art and craftsmanship that are worth a visit for their own sakes. To mention only two such instances, there are the 16th-century mural paintings in what is now the lounge of the White Swan at Stratford-on-Avon (see Color Plate II and illustration, page 284) and the carved paneling and parget-work at the Feathers, in Ludlow.

The paintings in the White Swan depict the story of Tobit and must certainly have been well known to Shakespeare. In the 17th century they were covered over with paneling in the fashion of the time and were rediscovered only in 1927.

In the Feathers the rich paneling, the carved chimney-pieces, and the parge decorations of the ceilings in several of the rooms can well hold their own with any of the best early 17th-century work of that sort to be found anywhere.

For sheer fascination of ancient building, the Star (see Color Plate V) at Alfriston, in Sussex, would be hard to beat. Cecil Aldin made it the subject of one of his inimitable sketches. Alfriston is reputed to be one of the oldest villages in Sussex, and some of the old Sussex folk say it was here, instead of at Athelney, that King Alfred failed to keep the cakes from burning, and thus brought down on his head the rebuke of an indignant housewife.

For beauty of setting, nothing could be more appealing than the White Swan at Bibury. "Coming from Cirencester, just as you drop down the hill and turn a bend of the road, there is Bibury ahead of you. To the left, by the mill race, is a great stone mill with heavily buttressed walls. Directly before you is the bridge across the greenest of water meadows cut by streams, the Coln rippling along its farther side. At the opposite end of the bridge, with only the width of the road between it and the bridgehead, is the White Swan Inn, seeming to tread on the very toes of the steep, wooded, clifflike hill against which it is set. Separated from the inn by the river is a diminutive island garden, where you can lunch or have tea in the shade with the purl of the water for music."

One might go on indefinitely telling of the old inns of England, dwelling on their associations, and describing their numberless allurements. The variety they afford is practically endless. The only sameness they all share is in the spell they exert, once you come in sight of them or cross their thresholds. Their pictorial appeal and their wealth of visibly embodied history and romance are amply supported by the substantial traditions of homelike comfort and cheerful fare that generations of landlords have kept fully alive.



Photograph by Clifton Adams

#### TEMPTING A PAIR OF CHINESE "WALKING FISHES"

This species of the *Channa* group does not actually walk, but by wiggling makes some progress when out of water. When about four inches long, they are vicious and will snap at a finger brought near them in the water. This breeding pair is being tempted with meat while their tank is being cleaned.

## TROPICAL TOY FISHES

### More Than 600 Varieties of Aquarium Pygmies Afford a Fascinating Field for Zoölogical Study in the Home

BY IDA MELLEEN

**I**T WOULD be interesting to know in what country little fishes were first placed in glass receptacles for purposes of esthetic enjoyment. Rumor names Egypt; but, although the fresh waters of Egypt are replete with curious and beautiful dwarf fishes and the Egyptians developed the art of glass-blowing during the Ptolemaic and Roman periods, after 300 B. C., there is no evidence that vessels of glass were used for aquaria.

The question cannot be resolved with certainty, but it is well known that the lure of breeding fishes in captivity took possession of the Chinese several hundred years ago, spreading to Japan, and thence over the Western World, with the goldfish as its original object of interest. During the past 75 years experimentation with the balanced aquarium has passed through various salt and fresh-water phases until, with tropical toy fishes, it has reached the peak of enthusiasm and success in Europe and America.\*

Not that the goldfish has suffered a loss of popularity. Seventeen million still are reared annually in the United States, largely for martyrdom in the quart globe, and there is little diminution in the demand for bizarre and costly varieties. Among cold-water species it has no rivals.

Nevertheless, tropical fishes have superseded goldfishes in many of the smaller hatcheries, and some of the larger goldfish farms have built conservatories for rearing them.

#### FISH "FANS" SUCCUMB TO BEAUTY AND FORM

Many shops in the larger cities are devoted exclusively to their sale, and a pet show without a display of these colorful midgets would be noticeably incomplete. But it is true, also, that, while most American and European homes have been orna-

mented at some time by the presence of a few goldfishes, the majority have not as yet succumbed to the allurements of the toy tropical, though fish "fans" spring up daily like mushrooms, enticed by the flash of color, the beauty of fin and form, the remarkable breeding habits undisturbed by captivity, and the ease with which the aquaria are maintained.

Many kinds imported into the United States are sold and shipped almost the length and breadth of North America—from Florida to Canada and from Massachusetts to California—but hundreds equally beautiful and interesting are as yet unknown to the fancier. The accompanying color plates present more than thirty kinds maintained in American aquaria, three-fourths of which have been bred in captivity.

#### WHERE THE DWARF FISHES COME FROM

The happy hunting grounds for toy fishes, explored and unexplored, range in the Western Hemisphere from the Carolinas south through Florida, and from Mexico through Central America, Panama, and South America to the most southerly point of Argentina. In the Eastern Hemisphere, Egypt and other parts of Africa, Australia, and Asia—including the island groups of the Malay Archipelago, India, China, Siam, and other countries—have been drawn upon for the supply of dwarf fishes appearing in the home aquaria of the Occident.

Their habitat is chiefly the swamp, the ditch, the rain pool, the rice field, clear mountain streams and stagnant lowland waters, ponds, brooks, lakes, rivers, and estuaries; but some either make migrations to the coasts or live perennially in brackish or wholly salt water. Oceanic species thus far kept in American aquaria have been principally gobies.

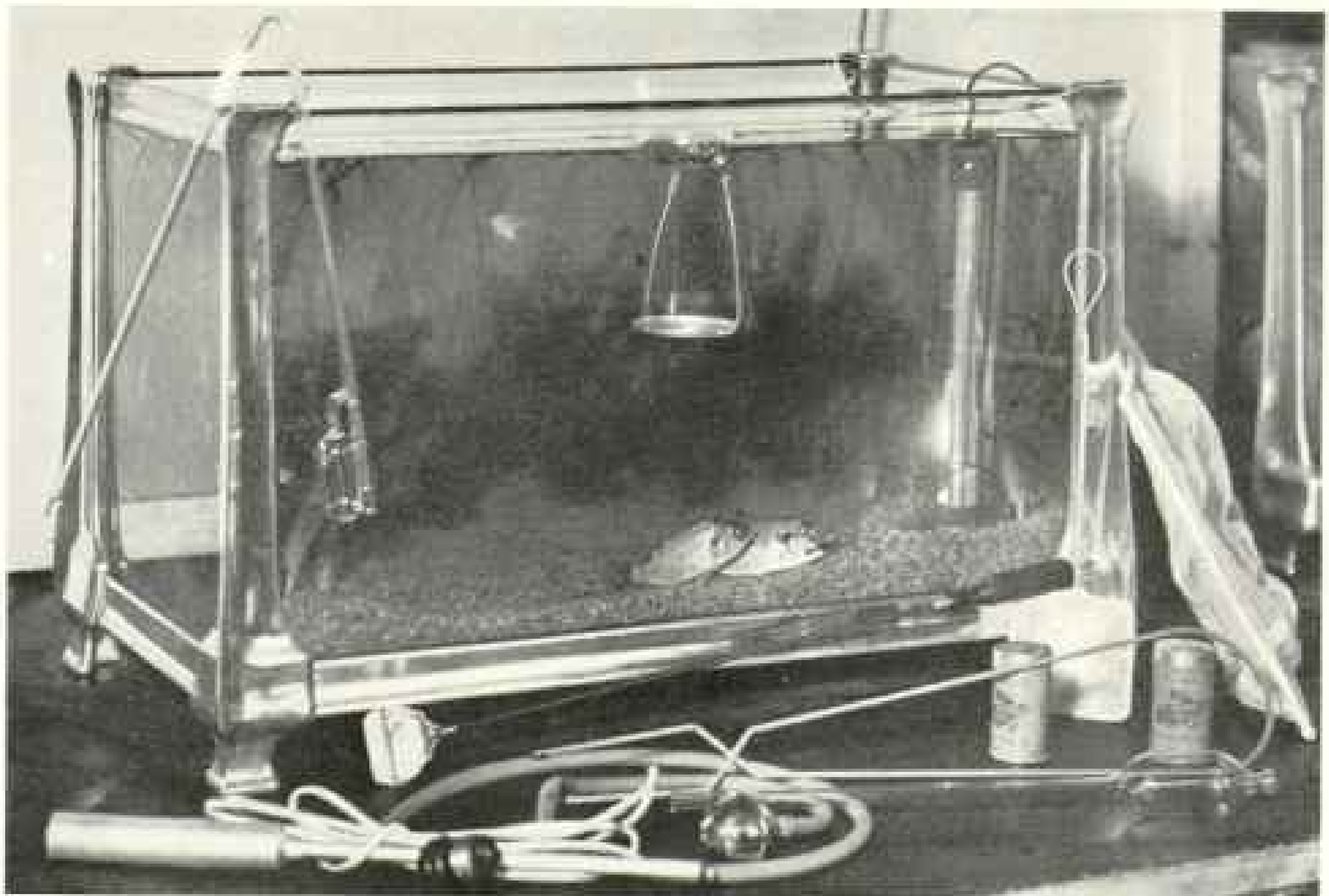
Tropical toy fishes are of many genera and species and even of many varieties—some natural, others cultivated. Their

\* See, also, "Goldfish and Their Cultivation in America," by Hugh M. Smith, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1924.



TROPICAL TOY FISHES COMPETE WITH GOLDFISHES IN POPULARITY

Goldfishes still have their devotees, of course, but the pygmies have superseded them in many of the smaller hatcheries, and some of the larger goldfish farms have built conservatories for rearing the toy varieties. The tanks in this commercial hatchery are of concrete.



Photographs by Clifton Adams

ONE OF THE LATEST MODELS OF AQUARIUM FOR THE HOME

Inside this cast-aluminum and plate-glass vessel is a heater and light combined, and a floating feeding dish. In addition, the fancier's equipment includes tank cleaners, dip-nets, planting forceps, food, electric immersion heaters, and siphons.



Photograph by Clifton Adams

#### FEEDING TOY FISHES IN A PRIVATE AQUARIUM

Though the majority of American and European homes have not yet discovered the wonders of the toy world, tiny fishes are winning increasing numbers of friends daily with their flash of color, beauty of fin and form, remarkable breeding habits undisturbed by captivity, and the ease with which their aquaria can be maintained. This private aquarium contains 60 varieties of toy fishes.

adult body length measures from one inch to five inches, the most minute of all not yet having been exported alive. These are four Philippine fresh-water gobies from Manila, Lake Buhí, Laguna de Bay, and Sitankai, in the Sulu Province, two of which reach a maximum length of one-quarter inch and two one-half inch.

#### BIOLOGICAL CURIOSITIES MAKE TITBITS FOR FILIPINOS

The impossibility of transporting alive these smallest of all known vertebrates has precluded Occidentals, both laymen and scientists, from the enjoyment of one of the world's greatest biological curiosities, the only specimens received having been forwarded in a preserving solution; and the principal use to which the Filipinos put these tiny creatures at present is a culinary one, many thousands being mixed with batter and baked into little cakes seasoned with herbs and spices.

From this we conclude that in flavor, as well as in nature and habit, dwarf fishes

are not unlike their brothers of larger growth; but from the aquarist's point of view they are separated into three diverse groups: the peaceable and quarrelsome, the carnivorous and omnivorous (few, if any, being wholly herbivorous), the oviparous and viviparous (those laying eggs and those bearing living young and called "live-bearers").

Subdivisions follow, such as the delicate and hardy, prolific and unprolific, alkaline- and acid-water species, and so on—details which may seem ponderous, but which the merest amateur masters quickly. The ichthyologist, on the other hand, recognizes the pygmies as belonging to definite species, genera, families, and orders, similar to fishes of normal size, and gives them Latin names (sometimes much longer than the little fishes themselves), which will identify them in any country of the world, for science speaks a universal tongue. This scientific nomenclature is known also to the fish fancier and even to the lad with his first pair of guppies.



Photograph courtesy of Dr. William M. Mann.

#### TOY FISHES ARE RAISED HERE TO WAGE WAR ON MOSQUITOES

Two years ago, the United States Public Health Service transplanted a small lot of mosquito-fishes (*Gambusia affinis*) from the waters of southern Maryland to the beaver pond in the National Zoological Park, Washington, D. C. They have survived the Washington winters and have increased vastly in numbers. The net "fisherman" has broken a hole in the ice and is scooping up the small fish as food for a species of Borneo crocodile known as the false gavial, newcomers to the Zoo's reptile house (see illustration on opposite page), who could be tempted to eat nothing else.

Nor is the anatomy of the pygmies unique. Swim bladders and other organs common to larger fishes are common to them, and their fins are the same—caudal, or tail, fins for swimming and propelling, fins beneath, called ventral and anal, and pectorals (behind the gills) for helping maintain the equilibrium; also, dorsal fins (on the back), which indicate moods and physical states—health and contentment when erect, illness and depression when lowered. The majority have no sort of protection against enemies except in such teeth as they may possess.

Some are so peaceable that a number of species live amicably in one tank; others so quarrelsome that two males cannot occupy the same aquarium, and a male may kill his mate.

Some subsist largely on algae, but most favor small water animals, such as entomostracans (the minutest of crustaceans), annelids, and insect larvæ; and the fish fancier may from time to time visit the

wild ponds in search of their prey, rearing for them also, in boxes of humus, or leaf mold, the small white earthworm, *Enchytraeus* of Europe and America, found from New Jersey to Maine, coastwise and along the shore, under stones and seaweeds; and whenever possible he supplies them with *Daphnia*, the tiny crustacean on which fancy goldfishes are reared.

#### SUBSTITUTES FOR LIVE FOOD

But it is obvious that, if the fancy tribe did not readily accept substitutes for live food, their maintenance in captivity would be impossible. Raw beef, cereals, roe, and shellfish, also dried shrimp and other desiccated foods, appear on their bill of fare, and many experiments have been made with concentrated foods, such as cod-liver meal and other glandular products, to ascertain their response to vitamin nutritives—experiments which have confirmed their amenability to a foreign diet and especially to substitutes for the lime, minerals,



Photograph by Clifton Adams

#### MOSQUITO-DESTROYING TOY FISH TEMPT BABY REPTILES TO EAT

The fish-feasting false gavial is a slender-snouted relative of the crocodile. The tiny mosquito-fish, which is being used to tempt the appetite of the baby gavials, lives up to its name as a destroyer of larvae of the obnoxious insect, and has been exported in large numbers to carry on the good work of mosquito control in various countries (see opposite page, and text, page 317).

enzymes, and other catalytic agents present in live food, which aid digestion, purify the blood, and keep the skin lustrous.

The majority lay eggs and leave them to their fate, but some carry their eggs in their mouth, taking no food while incubation is in progress, and subsequently caring for the young, which swim back into the mouth at the approach of danger.

Some build nests and vigilantly guard the eggs and fry; others bring forth their young alive.

#### FATHER FREQUENTLY CARES FOR FRY

Nearly always when the fry receive any care it is given by the father, but in mouth-breeding species it is usually the mother who gathers up the spawn, and among Cichlids, which include the Brazilian half-moon and *Mesonauta*, described in the accompanying biographies, both sexes guard the eggs and fry.

In yet another species, the Chanchito, the eggs are hatched in a nest scooped in

the sand by the male fish. When able to swim, the young rise and school, the mother leading the procession, the father bringing up the rear. The fishlets, allowed to swim only during the day, are stowed back in the nest at night.

In other species in which the male gives exclusive care to his progeny, his labors cease when they are able to fend for themselves. He suddenly apprises them of their independence by darting at them and eating a few, compelling the remainder to rush to cover. After that they know better than to trust any fish bigger than themselves. In aquaria, where they cannot escape, he usually eats them all, unless the mother precedes him to the feast, and the aquarist guards against this by removing either young or parents at the proper time.

Although these habits correspond in general with those of larger fishes, the latter do not breed in captivity, while a pair two inches long, in a two-gallon aqua-



rium stocked with vegetation similar to that of their native habitat, and supplied with water of the correct quality and temperature, suffer no nostalgia, and those equipped for breathing air accommodate themselves to smaller aquaria.

The only martyrdom to which the tropic fish are subjected is accidental. Some expire from the cold. Occasionally an aquarium is left uncovered and the fishes, many species of which leap like salmon, clear the rim with one jump and dry up on the floor; or an aquarist concerned for their comfort may transfer their tank to a radiator and forget it until they are completely cooked.

#### POPULAR PLANTS FOR THE AQUARIUM

Aquaria for tropical fishes are stocked with aquatic plants similar to those used in goldfish receptacles and may be of many kinds. The large-leaved *Cryptocoryne*, submerged spatterdock (Color Plates VI and VIII), and broad- and narrow-leaved tape grasses (*Sagittaria* and *Vallisneria*, Color Plates I, IV, and V) provide the best oxygenation, and for smaller aquaria the hair-grass (Color Plate II) is much in favor because of its delicate green clumps, low growth, averaging four or five inches, and habit of producing new plants from rhizomes, like tape grasses.

More commonly sold in pet shops are anacharis, fanwort, and water milfoil, all with slight roots that require weighting with stones. Anacharis (*Elodea*), a submerged herb of the frogbit family (Color Plates I, II, and III), is called "North American waterweed" in Europe, where it was unaccountably introduced and has spread with great rapidity.

Fanwort (Color Plate VII) affords a depository for adhesive spawn, and the firm, ovate leaves and floating bulbs of the water-hyacinth (*Eichhornia*), as illustrated in the same plate, provide superior anchorage for bubble nests, its feathery roots furnishing excellent hiding and foraging jungles for fry and spawning grounds for fishes that cast their eggs among vegetation. Indoors, however, the plant deteriorates, never choking an aquarium with the extensive growth with which it impedes navigation in Florida rivers.

Snails, familiar scavengers of the goldfish aquarium, figure also in the home of the toy tropical and have interesting habits.

Pond snails with pointed spirals (Color Plates II and VI) and divers kinds of ramshorns, including the showy European red ramshorn (Color Plate IV), lay eggs in gelatinous masses which are devoured by the fishes. Snails in return eat the fishes' eggs; and it is customary to remove them during the spawning season.

The Japanese viviparous snail (Plate VIII) brings forth living young with opercula, behind which they can retreat, and shells already too tough for little fishes to manipulate.

For reasons biological, psychological, and social, the lure of the fish in the aquarium for many individuals is far greater than the lure of the fish on the line. This applies particularly to the pygmy fish, a hundred or more of the smaller species of which will live comfortably in quarters not commodious enough for a dozen goldfishes. When various kinds are placed in a sufficiently capacious receptacle, each species schools, thus massing and accentuating the colors.

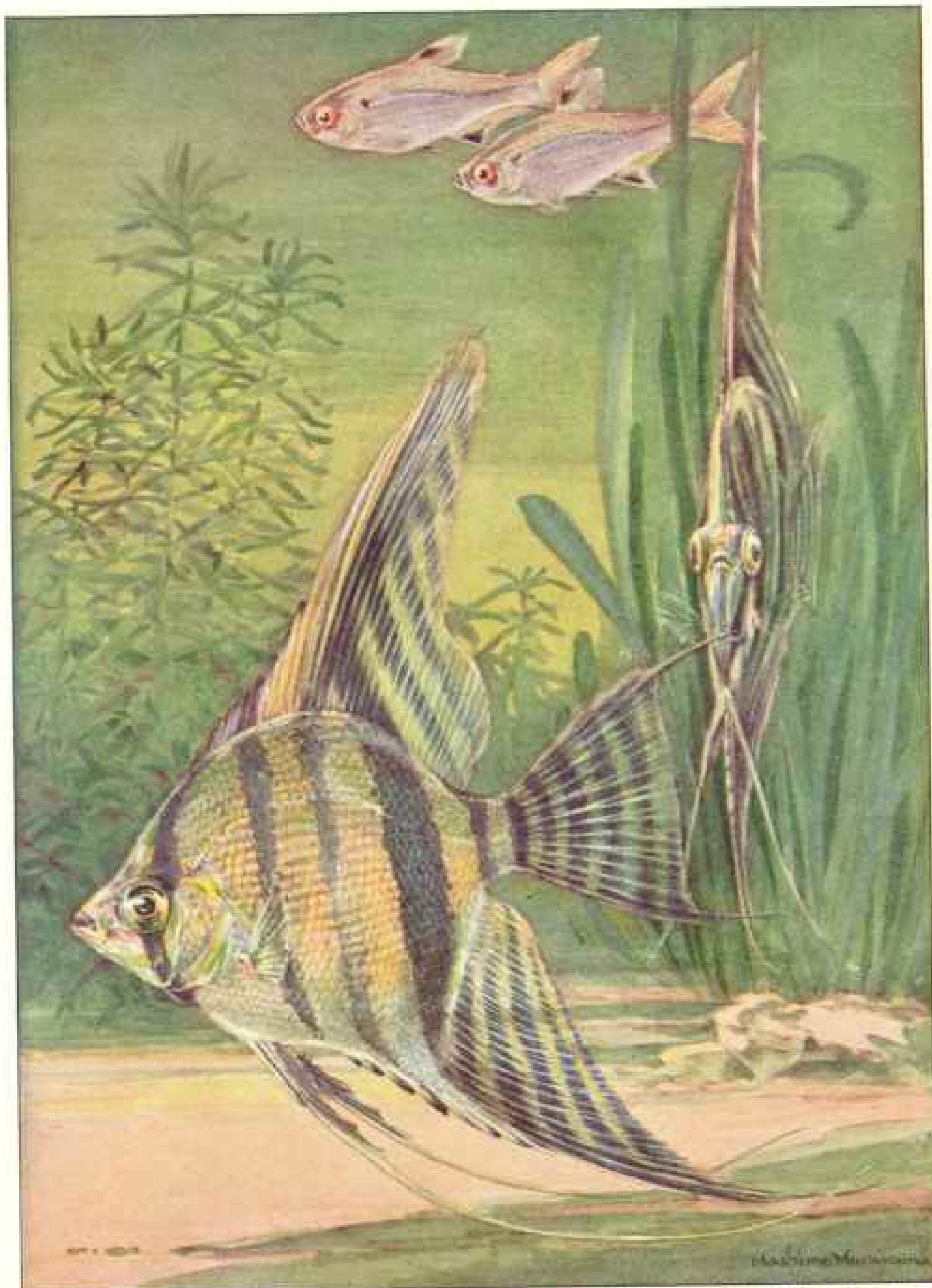
#### BIOLOGICAL SPORTS ARE NOT SOUGHT

Many facts of biological importance are to be discovered from a study of the toy fish. Abnormalities of shape and color—in other words, "biological sports"—have not yet been taken advantage of, as in the rearing of goldfishes, to propagate new strains, though variation under domestication has given rise to many new varieties.

Thus far, experiments of breeders have been confined largely to hybridization, more with the expectation of producing an oddity, salable or otherwise, than of proving or disproving any principle of Mendelian inheritance, cross-breeding having been done with allied species of fighting fishes and *Danio* and related genera of top minnows (swordtails, moons, and guppies).

These non-scientific but interesting experiments seem to show that whether the male or female of a species is selected has a significant bearing on the character of the progeny, their color and "finnage" (a word coined by breeders). The expected sterility in the offspring does not occur or is confined to the male, and hybrids, especially among the top minnows, tend to be several times larger than either parent.

The great possibilities for the study of embryology, the development of new and



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Painting from life by Hashime Moriyama.

THE BRAZILIAN HALF-MOON AND THE PRISTELLA.

Because of its dignified bearing, the Brazilian half-moon (*Pterophyllum scalare*) is called the aristocrat among pygmies, and is included among the few fishes in which both parents protect their eggs and young. *Pristella riddlei* (at top), an inhabitant of British Guiana, Venezuela and the lower Amazon, is an active species in which the colors vary with the habitat from delicate opalescence to scarlet and gold. It is difficult to breed in captivity. The fishes reproduced in this and in succeeding color plates are natural size.



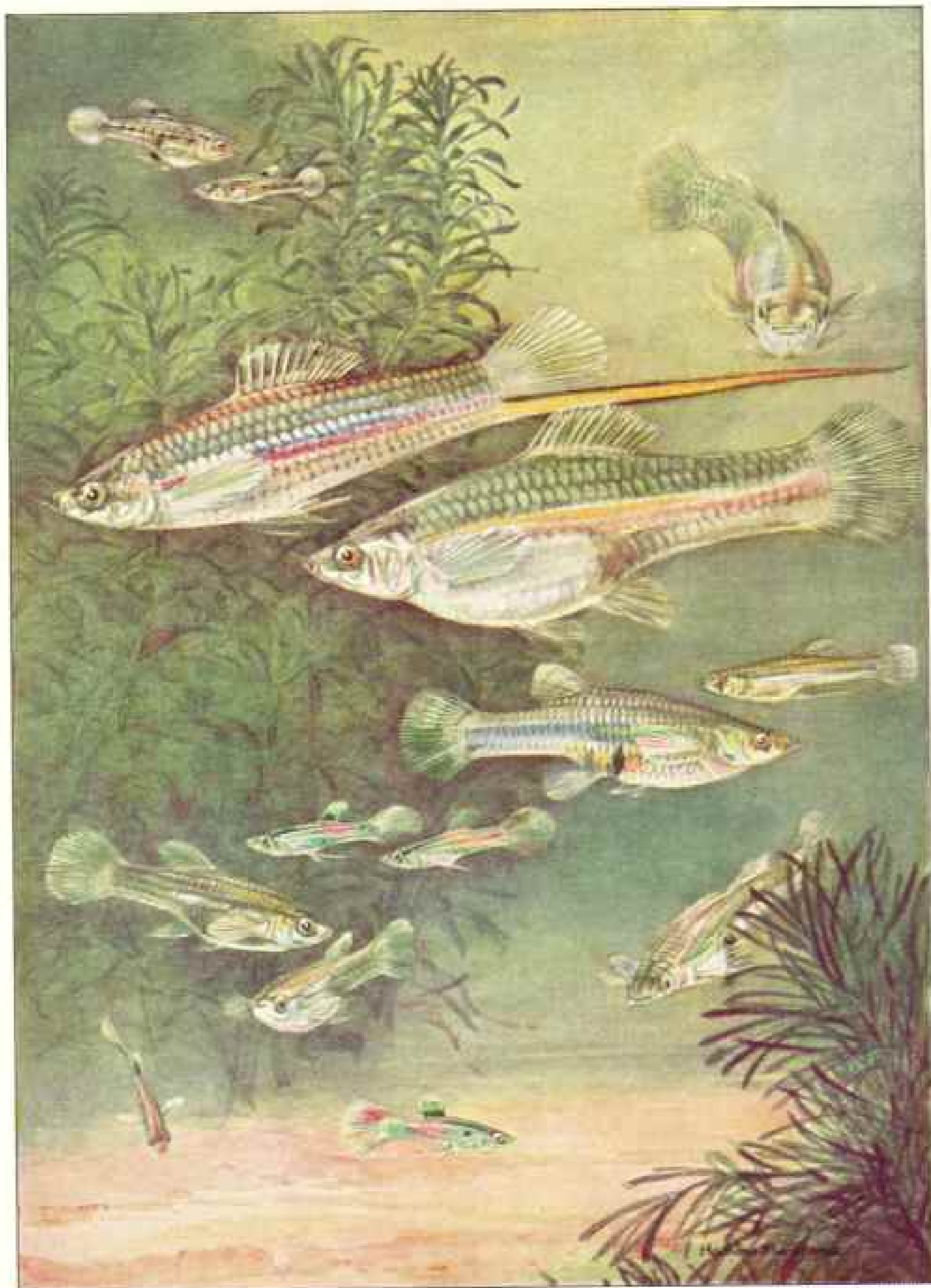
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Painting from life by Hashime Murayama

TOP MINNOWS, RAINFISH, AND ARMORED CATFISH

The Mexican top minnow, *Belontiopsis belizana* [lower], with cannibalistic, never-closing jaws, is largest of the top minnows. The rainfish, *Rivulus macleayi* [at top], leaps from the water and reposes in the surface vegetation. One of the interesting features of the tetra, *Aphyanox fasciatus* [center left] is its adipose fin (on the back near the tail). The armored catfish, *Corydoras paleatus* [center right], two inches long, is called the "most easily kept of all toy fishes."

IRIDESCENT DENIZENS OF THE MINIATURE AQUARIUM



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THESE FISHES ARE BORN ALIVE; NOT HATCHED FROM EGGS

All the species pictured in this plate are viviparous. The guppy, *Lebistes reticulatus* [lower left], has enjoyed unrivaled popularity for a quarter of a century, second in favor being the Mexican swordtail, *Xiphophorus helleri* [center]. The mosquito-fish, *Gambusia affinis* [lower right], has been transported to many countries to exterminate mosquitoes, and the American top minnow, *Heterandria formosa* [top left], is smallest of all known live-bearing fishes.



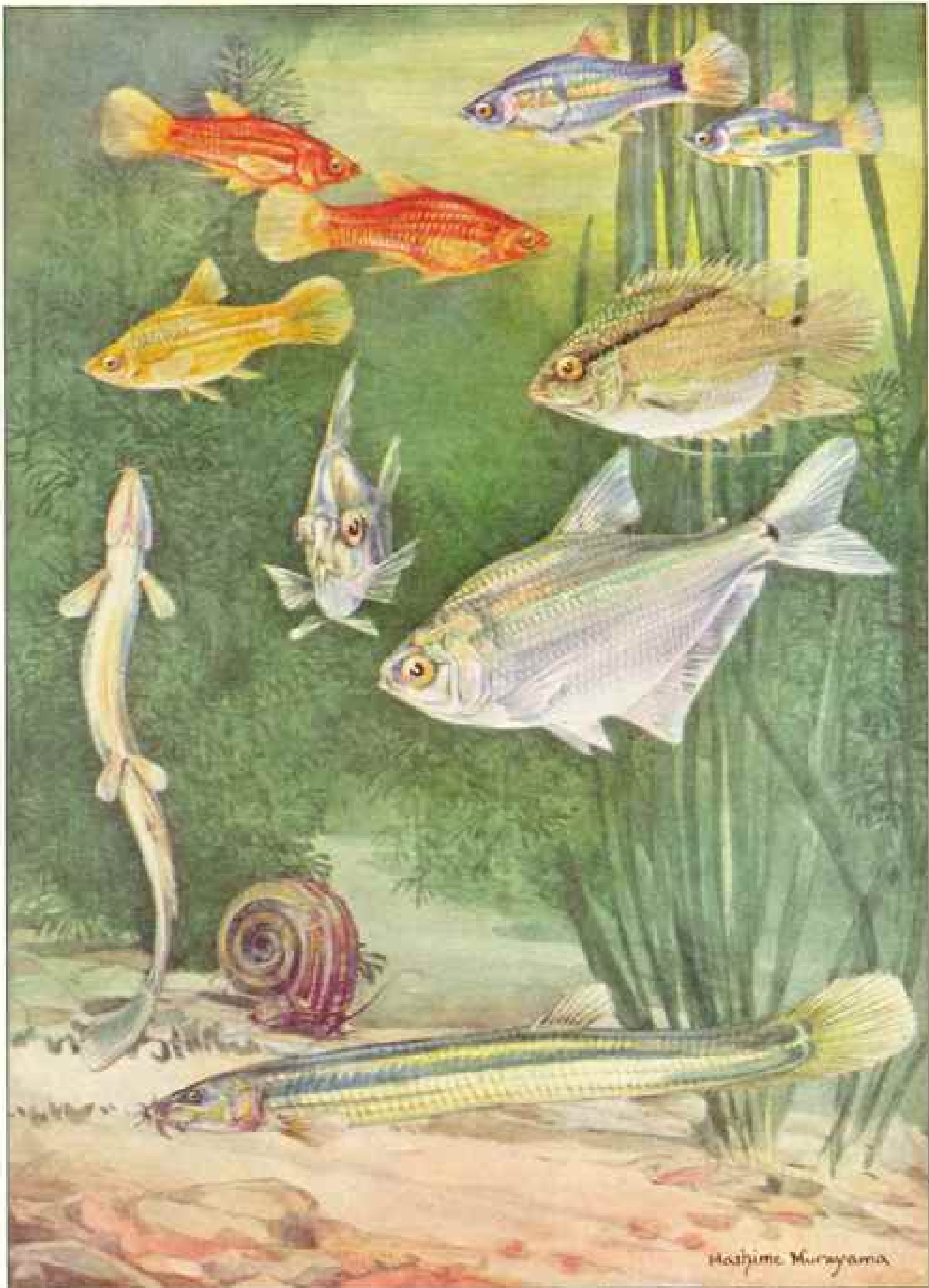
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Painting from life by Hashime Murayama

THE MOST CELEBRATED OF THE WALKING AND CLIMBING FISHES

The climbing perch, *Anabas testudineus* [lower], leaves one pond for another and ascends the rough trunks of palm trees, supported by its strong pectorals. The spotted gourami, *Trichogaster trichopterus* [center], the croaking gourami, *Ctenops villatus* [center and left], and the dwarf gourami, *Coltisa lutea* [at top] blow nests of bubbles, the dwarf gouramis mixing bits of vegetation with their nests.

IRIDESCENT DENIZENS OF THE MINIATURE AQUARIUM



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Painting from life by Hachime Murayama

AMONG THE MOST FAVORED OF PEGGY FISHES

The popular moonfishes, blue, red and gold [upper right and left], are varieties of *Platy-  
*pecilia maculata*. Familiar also is the eel like weather fish, *Misgurnus fossilis* [lower and  
 center left], which inhabits Europe and Asia and is sensitive to electricity. In *Meionantra  
 insignis* [upper center right] both parents care for the eggs and young, and thousands of the  
 fry of *Ctenobrycon spilurus* [center and center right] have been reared in captivity.*



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Painting from life by Hashime Murayama.

FIGHTING FISHES ARE GORGEOUSLY COLORED

Of the pugnacious toy fishes, *Betta splendens* [lower right] is the species used in the public fish fights of Siam, the larger variety, *Cambodia* [center] having been bred with it to produce intergrading variations of great beauty. The gentle sailfins, *Mollienisia latipinna* [top right], bring forth large living young, and the ribbon-tailed *Punchax*, *Aphyosemion australe* [center left], is identified by the male's lyre-shaped tail.

IRIDESCENT DENIZENS OF THE MINIATURE AQUARIUM



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THE BARBS ARE NOTED FOR THEIR LARGE SCALES

The male paradise fish, *Macropodus opercularis*, is pictured beneath his nest of bubbles, and of another brilliant family, the *Danios*, two are shown—the striped *Danio* (*Danio-Brachydaniorerio*) and the blue *Danio* (*D. malabaricus*) [center left and right]. *Barbus oligolepis* [lower right] is one of the smaller, and the rosy barb, *Barbus couchantus* [lower center], is the largest of the pygmy barbs.





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Painting from life by Hashime Murayama

THE RARE SCAT IS SELDOM ACCLIMATIZED

Not yet reared in captivity, the scat, *Scatophagus argus* [lower], is much sought after. *Ambassis ranga* [upper left] is another dweller in the brackish waters of the Orient. *Kribia heteromorphia* [upper right] has recently been bred successfully after years of fruitless effort, and *Budis badis* [center and center right], which is commonly reared in aquaria, is peculiar in that the ventral profile of the male (upper) is concave, that of the female (lower) convex.

desirable variations by careful cultivation of modified forms, the extent to which distribution of color and fin development are dependent upon agencies of temperature, environment, age, food, and other factors, and other biological features of the toy fish, commend themselves to the attention of the scientist, and in many a biological laboratory a collection of pygmies forms an important part of the equipment.

Lepidology, the study of the scales, in which the age of a fish is recorded, has not yet been applied to the pygmies to discover their natural term of life.

#### PYGMIES AT BIRTH RESEMBLE TWO LARGE EYES

As among larger fishes, the young hatched from eggs are transparent, very delicate, and unable to feed, the umbilical sac (yolk sac) supplying nutriment for a few days and also retarding their movements. These require rich foods—live infusoria, diatoms, *Daphnia*; also, the juices of meat and shellfish.

But pygmies born alive are as fully formed as adults, except in point of size and the development of the reproductive system. They are able to swim and feed immediately, and resemble nothing save two large eyes attached to an infinitesimal streak of animated protoplasm that can dart 25 times its own length in the minutest fraction of a second. These hardier youngsters, for whom Nature makes no postnatal provision, thrive on prepared baby-fish foods, desiccated egg yolk, cracker dust, and oatmeal broth.

Males are generally smaller and more highly colored. Interbreeding has the same deteriorating effect as upon higher animals, and exchanges of breeding stock are made from time to time and new blood introduced through importations. Runts and giants occur in every batch, the former commonly disappearing down the gullets of the latter, though as careful selection is practiced by fanciers as in the cultivation of goldfishes and valuable plants. As yet, no purely albinistic stocks have appeared.

The psychology of the fish has been barely touched upon, and almost any careful observer may have the privilege of contributing new knowledge, for every fish is

a law unto itself. Pygmies sometimes exhibit a discriminating sense of taste and an astonishing adaptability to change of environment, food, and temperature, and, when young, to the quality of the water they live in. Some are excitable; others phlegmatic; many active and playful. Some refuse to fight; others are incorrigible bullies. They learn most quickly where food is concerned and what time of day it may be expected. Some grow so tame they will swim into the hand; others never make human friends.

Exemplifying the dim dawn of vertebrate sensibilities, they display individual preferences and fierce jealousies; solicitude for their offspring or, in some cases, greater solicitude for the preservation of their own lives; some are curious and observing, showing an interest in form and color, being able to distinguish between shadows of friends and enemies and between the two ends of the spectrum—that is, between red, orange, or yellow as opposed to green, blue, or violet.

The young fish able to swim concerns itself very early with a recognition of its own species, and schooling has been observed among the fry of viviparous fishes less than a day old.

#### DEVICES FOR CONVEYING AND CARING FOR TOY FISHES

Exportations of toy fishes from Germany into the United States began about 25 years ago, numerous species having been first successfully bred in that country from parent stock captured in its tropical haunts. Though many thousands now are propagated elsewhere, a large percentage of those owned in the United States being "home grown," considerable numbers, of a value variously estimated at from \$50,000 to \$100,000 per annum, still are shipped from Germany and South America.

The typical German traveling can is of tin, with a capacity of about four gallons, heavily insulated with felt wadding and paper and with an opening in the cover to admit air. Thousands of specimens have traveled safely across the ocean and into the interior of the United States in these cans, most of the shipping being done between May and October. For conveying by hand or shipping specimens shorter distances, one-gallon thermos jugs are used.



Photograph by Clifton Adams

#### TAKING AN ARTIFICIAL SUN BATH

Pairs of breeding fishes are receiving from 10 to 15 minutes' exposure to ultra-violet rays in an experiment to determine the effect of these rays in stimulating growth.

Mechanics, chemistry, carpentry, and aquatic biology all come into play in the keeping of the toy fish, and devices for its special care are numerous. In North America the temperature of the living room is adequate for the survival of some species, and they reproduce during the summer months; but the majority require water heated to from 70° to 80° Fahrenheit, and this is usually accomplished (in the suburban or country home) either by establishing the aquaria in a conservatory or specially heated room, or (in the city) by heating the tanks individually with alcohol or oil lamps, gas or Bunsen burners, incandescent lamps suspended in

the water, or electric heaters with thermostats for automatically regulating the temperature (see page 288).

Mechanical aerators for cloudy days, when plants fail to supply sufficient oxygen, are also in use, operated by water power or electric current and releasing oxygen in streams of minute bubbles finer than the spray from a watering can.

Among species that lay non-adhesive eggs and devour them, the female is placed in a breeding cage suspended in the aquarium. These cages are constructed of sloping wooden trays with small apertures through which the eggs may fall, or of glass, one popular type being made of glass rods narrowly spaced. With such a contrivance, the eggs come to rest at the bottom of the tank, the female can be removed to another aquarium after spawning, and in a few days the fry may be seen swimming

about, secure from cannibalism.

#### PUBLIC AND PRIVATE COLLECTIONS OF TOY FISHES

More or less importance is attached to the quality of the water in which the toy fish is to live. Brazilian river fishes, like lake-dwelling species, requiring it less alkaline than those that live in or enter brackish water. With the help of chemical water testers similar to soil testers, acid sodium phosphate is used to produce the desired acidity, and plaster of Paris, calcium phosphate, or bicarbonate of soda mixed with salt to create the desired alkalinity.

Europe boasts permanent and notable exhibits of toy fishes in half a dozen of its public aquariums—those of London, Amsterdam, Antwerp, Berlin, Frankfurt, and Leipzig. The United States lays claim to two. That of the Lincoln Park Aquarium, in Chicago, consists of 58 tanks, showing many brilliant species from the Orient and South America. That of the Steinhart Aquarium, in San Francisco, consists of 31 tanks of similar species and, in addition, many brought from Samoa and Hawaii, which display the vivid colors and fantastic shapes that characterize the fishes of those waters.

When finished, the new John G. Shedd Aquarium, in Chicago, will display 65 balanced aquaria in a tropical-fish room maintained at a temperature of 80° Fahrenheit, stressing beautiful setting and plant life rather than the rarity of the collection.

Besides these permanent exhibits, various societies of aquarists interested in both goldfish and tropical toy-fish culture hold annual exhibitions at which hundreds of aquaria are shown (the public usually admitted free), and prizes, including ribbons and silver cups, are awarded to both professionals and novices.

These societies exist for the purpose of stimulating both expert and amateur to greater interest by the exchange of ideas and specimens, some publishing instructive leaflets dealing with fishes, plants, successful experiments in rearing difficult species



Photograph by Elifton Adams

#### A SHIPMENT OF TOY FISHES FROM GERMANY

Though many toy fishes in the United States are now "home grown," considerable numbers come from Germany, where various species were first successfully bred from parent stock captured in tropical haunts. The German traveling can is of metal, heavily insulated against heat, cold, and shock (see, also, text, page 301).

or breeding new varieties, and similar subjects. In the United States 25 such societies exist in Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Maryland, Illinois, Missouri, Wisconsin, Washington, California, and the District of Columbia. The largest are in Newark, Jersey City, and Philadelphia.

The Newark Aquarium Society, having a membership of 500, at a recent exhibit visited by 50,000 people, displayed 1,000 aquaria, with 160 classified varieties of tropical toy fishes (see, also, page 305).



Photograph by Clifton Adams

FILLING AN ORDER AT ONE OF THE LARGEST COMMERCIAL HATCHERIES OF TOY FISHES IN THE UNITED STATES

The fishes are being transferred from breeding tanks to an insulated container for shipment. The containers, shipping cases, and water are of the same temperature, about 74° Fahrenheit, which should be fairly constant. The wooden shipping case is lined with cane fiber-board for insulation and the container is packed inside it in sawdust.



Photograph from Newark Photo Studio

WHERE EXPERTS AND AMATEURS EXCHANGE IDEAS AND SPECIMENS

Besides the permanent exhibits in public aquariums, societies of aquarists interested in both goldfish and tropical toy-fish culture hold annual exhibitions and award prizes to professionals and novices (see text, page 303). An exhibition of the Newark Aquarium Society, the largest in the United States.



Photograph by Clifton Adams

#### A HOME FOR TOY FISHES BEAUTIFIED BY PLANTS

Aquarium-keeping draws its devotees closer to the heart of the world of water life, so different from our own, yet urged and governed by many similar impulses.

Many members of these societies, besides maintaining special rooms or conservatories for their collections, have private *Daphnia* breeding reservoirs, hatcheries, outdoor pools, and other equipment, and it is not uncommon for one person to own from 12 to 30 aquaria.

In the vicinity of such organizations are lodged numerous dealers in toy fishes, some with large conservatories and ponds for summer rearing.

The breeding of pygmy fishes for sale is an industry of steadily increasing importance in both hemispheres. Aquarium-keeping is a pursuit (called by its followers a "hobby") calculated to subvert any designs Satan may have upon idle hands, and to draw its devotees closer to the heart of the world of water life, so different from our own, yet urged and governed by such similar impulses—a pursuit in which familiarity breeds no contempt. Little fishes and the gods still are mentioned in the same breath.

Like dogs, some species are never absent, and others have their day of glory and almost disappear, with two or three

always in the ascendancy. These are mentioned more particularly in the accompanying descriptions.

#### A FISH "FAN'S" DREAM OF PARADISE

Mohammed's dream of heaven was of a place through which flowed limpid rivers and lakes cool as camphor; and the clown in *Urvashi* says, "Heaven is just a place where they never shut their eyes—like fishes!" The fish fancier's dream of Paradise is of a place overflowing with warm, placid lakes that part like the Red Sea, allowing him to walk between natural aquaria and to view on a level with his eye, which he never shuts, millions of angelic counterparts of the pygmy fishes he so loved on earth.

In the brief delineations of the species presented in Mr. Hashime Murayama's strikingly lifelike color portraits, the subjects are grouped according to their breeding habits: oviparous species of many families, which include a few that care for their eggs and young, and the labyrinth fishes, which blow nests of bubbles; and viviparous fishes of the family of top minnows,



Photograph by Clifford Adams

THE PROPRIETOR IS FILLING AN ORDER FOR A CUSTOMER.

But, as both are fanciers, this will take some time, for there is much to be talked over. Many aquaria in this pet shop are arranged in "setbacks," like the upper stories of modern skyscrapers, so as to allow each tank the maximum of light and air. This Philadelphia establishment carries in stock more than 100 varieties of toy tropical fishes.

## OVIPAROUS (EGG-LAYING) FISHES

### THE BRAZILIAN HALF-MOON: *Pterophyllum scalare*

(See Color Plate I)

Among the most prized and increasingly numerous of toy fishes is this member of the Cichlid family, the Brazilian half-moon, a name derived from the shape of the fins and not the body, which is more suggestive of the full moon and almost as compressed as the moon appears.

Less than half a dozen American aquarists have succeeded in breeding this species. It is exported in large numbers from Germany, where it is reared from parent stock captured in the Amazon, Essequibo, and other South American rivers. Formerly the half-moon—called also "fresh-water angel-fish" and "*scalare*"—was the most costly of toy tropicals. Decrease in value has been accompanied by steady rise in popularity, due not so much to striking markings and beautiful fins as to the grave and dignified bearing which gives it the name of aristocrat among pygmies. The ground color is of silver touched with yellow, and the body and fins are so strongly and evenly banded as to give rise to the specific name *scalare*, from *scalaris*, a ladder.

It is extremely difficult to distinguish the sexes of the half-moon, which are of similar size, an adult specimen covering the palm of a man's hand; but the female is a trifle more highly col-

ored, and all the fins of the male except the pectorals are drawn out into slightly longer filaments.

Half-moons subsist on small floating plants, such as *Riccia* and *Salvinia*, together with aquatic worms, beetles, and insects, but accommodate themselves to the home aquarium and its substitutes.

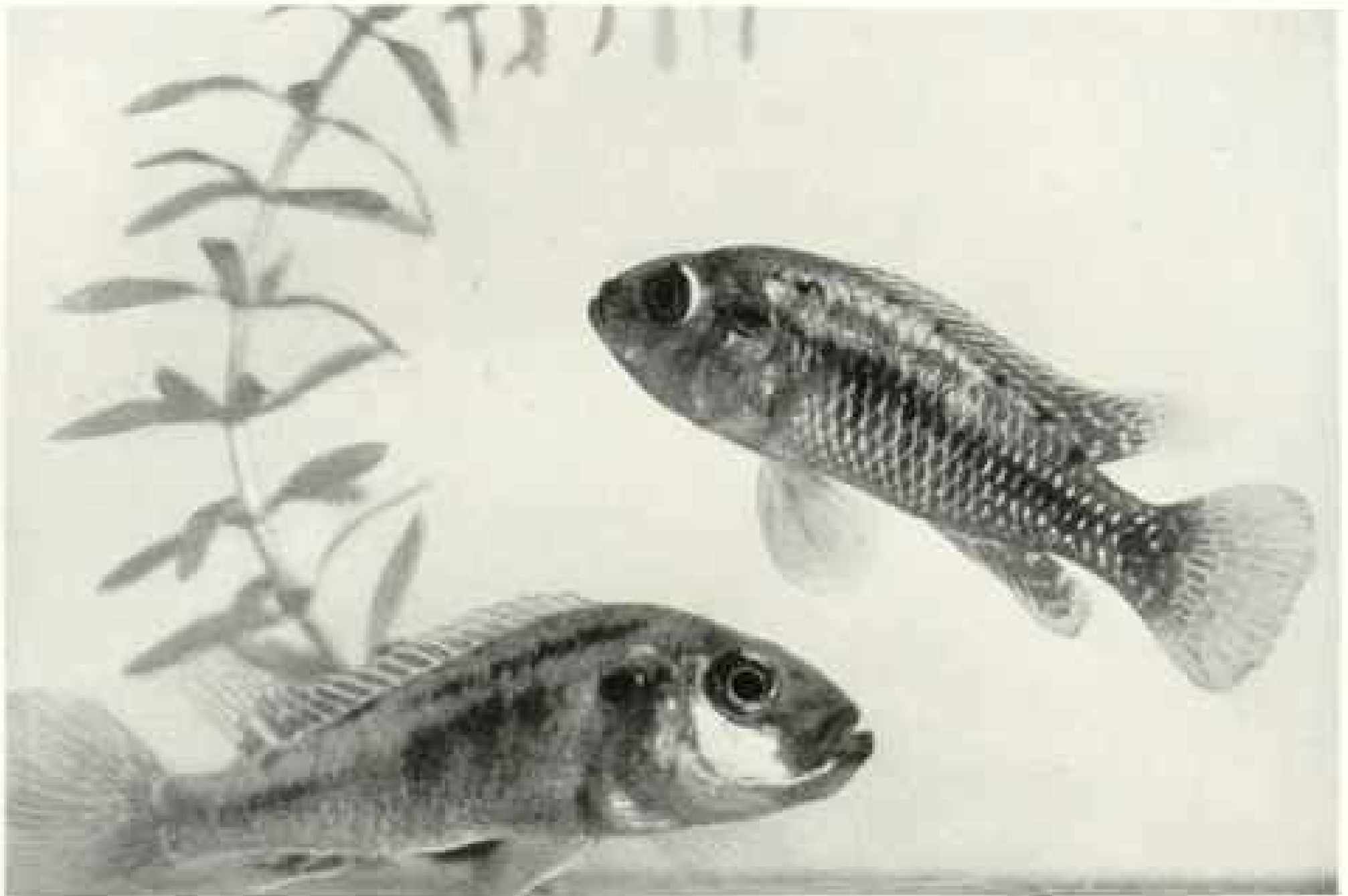
In this group, celebrated for its interesting breeding habits, both parents care for the young, the male usually scooping in the sand a hollow cradle for his brood.

On the sides of the aquarium or the leaves of tape grasses, the broad-leaved *Sagittaria* being a favorite for this purpose, the female deposits rows of 200 or more minute ova, which are immediately fertilized by the male. The parents fan them constantly, hovering over the fry when these hatch, a few days later, and transferring them from one plant to another or to the cradle in the sand.

In about a week the young begin to swim. But at this time they resemble the delectable *linchpin* too strongly to be foregone, and the fickle fancy of the adults makes short shrift of them unless they are protected. Moreover, the pair will be spawning again in another week.

In about 14 days the long fins typical of the species identify the fry as *scalares*, and they mass in silvery schools that have been likened to stars blinking in the sky.





Photograph by Clifton Adams

## A PAIR OF "MOUTH BREEDERS"

The female of this little fish (*Haplochromis strigifera*) carries the eggs in her mouth during incubation, the jaws becoming much distended for the purpose. After hatching, the young sometimes swim back into her mouth for refuge, especially if frightened (see text, page 291).

**PRISTELLA: *Pristella riddlei***

(See Color Plate I)

The late Dr. Carl Eigenmann, gathering material for his studies of the Characin fishes of South America, found hundreds of *Pristella* in the trenches of British Guiana—a species with short, deep body, especially that of the female, and of variable coloration. Those taken in the Georgetown trenches were scarlet and gold, the tail bright red, and the distal parts milk-white, but specimens transported from Venezuela and the lower Amazon tend to be less vivid.

*Pristella* is difficult to rear in captivity, the young being tender and surviving only in very shallow water.

**ARMORED CATFISH: *Corydoras paleatus***

(See Color Plate II)

The small mouth surrounded by typical catfish barbels and the gold-rimmed pupils of the armored cat are not unique, but these features associated with the overlapping bony laminae make the species impossible to confuse with any other South American pygmy. It has been transported into several countries, making many friends and acquiring the reputation of being the "most easily kept of all toy fishes"; for, though averaging only two inches, it contents itself with moderate temperature, almost any kind of food, and from early spring produces batches of

strange fry that resemble tadpoles more than fishes.

During the spawning the female clings to her mate, discharging a few minute eggs, which are held upon the anal fin to be fertilized, and from thence conveyed to some plant to hatch, this phenomenon being repeated a dozen times or more at every spawning.

**THE RAINFISH: *Rivulus harti***

(See Color Plate II)

This strong little South American killifish inhabits the rain-water pools and mountain streams of Trinidad and Grenada, the entire genera to which it belongs being characterized by ceaseless activity and a capacity for springing from the water. The rainfish, for hours at a time, lies among the surface flora with half its body exposed and exhibits an extraordinary flexibility of musculature, sometimes taking the bowed shape of a swimming eel. But it evidences no interest in the fate of its progeny, leaving the eggs to hatch as best they may.

Orange shades predominate, the green tints of the male being set off by horizontal rows of scarlet dots.

**TETRA: *Astyanax fasciatus æneus***

(See Color Plate II)

Placid-looking little creatures though the tetras are, they have made much work and worry for the ichthyologist, innumerable variations and



Photograph by Clifton Adams

#### SUPPORTING OBSERVATION WITH KNOWLEDGE

A young Washington fish fan's aquarium rests on a bookcase dedicated to the bound volumes of the family's NATIONAL GEOGRAPHIC MAGAZINE.

singular changes occurring with age, sex, season, food, habitat, and water temperatures, which affect not only the outline of the body, but even the number of scales and fin rays. Eigenmann, who named the present variety as an inhabitant of Mexico and Central America, said it was "impossible to assign any character that would at all times distinguish it from the typical *Astyanax luscianus*," though he thought the body thicker and observed that it usually has two maxillary teeth.

The interesting adipose fin (the minute dorsal fin near the tail) is always present, and the coat is sometimes delicate blue and orange, with horizontal rows of bright green scales, though variable colors also reflect the habitat.

The species lives in swamps and ditches and has been observed laying its eggs on water plants, to which they adhere; but beyond this little can be said of its habits.

#### THE CLIMBING PERCH: *Anabas testudineus*

(See Color Plate IV)

Most celebrated of the walking fishes, the climbing perch is also most widely distributed, making its home in the lakes, rivers, marshes, estuaries, and brackish waters of India, Africa, the Malay Archipelago, Siam, Singapore, Tonkin, and southern China. Those imported into the United States usually measure about four inches, though in their native habitats they are said to reach ten inches.

Sly fishes, these, lurking in vegetation in search of prey, the sense of smell luring them from their hiding places when food is introduced into the aquarium. They are noted for an eccentric habit of leaving the water and traveling about on land and, it is said, are able to live for several days entirely out of water.

Numerous short spines arming the opercula (gill covers) and fins assist in these terrestrial adventures, for by hooking them around tufts of grass and plant stalks the fish secures a leverage and makes slow but definite progress toward its goal. This may be a muddy pool sought during the rainy season or the rough trunk of a palm tree, up which it has been observed to climb to a distance of six feet (see, also, page 316).

Accessory breathing organs equip it for storing air in the gill chambers, and when removed from the water it rears itself on its strong pectorals and walks awkwardly about.

The eggs of the climbing perch are buoyant and hatch at the surface, but, apart from this, no observations have been made of its breeding habits and no distinguishing marks have been noticed in the sexes.

#### WEATHER FISH: *Misgurnus fossilis*

(See Color Plate V)

One of the strangest of fishes, this strictly fresh-water loach of Europe and Asia, of the family Cobitidae, is eel-like in form and has scavenging habits; is slimy and long-lived, and noted for its peculiar sensitiveness to electricity, mani-



Photograph by Clifton Adams

#### TOY FISHES RAISE PROBLEMS IN MECHANICS, CHEMISTRY, CARPENTRY, AND AQUATIC BIOLOGY

They make special demands as to air, light, temperature, housing, food, and handling. Here a shipment is being carefully transferred from a trap in a large breeding tank to a transport tank (see, also, illustrations pages 303 and 304).

fested by an increased restlessness before and during a thunderstorm. Scientists who have studied its physiology believe this to be caused by a change of function in the air bladder, which is connected with the skin and appears to serve as a sensory organ, conveying thermo-barometrical impressions to the auditory nerves.

Sometimes brown and orange, with a lateral black band from gills to tail, and again, as pictured here, a mixture of yellow, blue, and green, this species has ten barbels about the mouth and rises frequently to the surface for air, which is carried below and released from the gills in large bubbles. It conceals itself under stones in fair weather, but also enjoys wallowing in sand or mud. A favorite pastime is to fill the mouth with sand and squirt it backward through the gills, many hours being spent at this simple diversion.

It lives on all sorts of small aquatic fauna and decaying vegetation and, though not reared in captivity, is said to protect its young, which swim in schools with both parents.

#### SPILURUS: *Ctenobrycon spilurus*

(See Color Plate V)

In British Guiana, Dr. Eigenmann found these little Characin fishes living nowhere except in the trenches of Georgetown, where he took hundreds of them, along with *Pristella* (see page 308); but in Dutch Guiana, particularly in the Surinam River, and in Paraguay and the Amazon River, they are a plentiful and hardy species, making ideal aquarium denizens.

Thousands have been bred in captivity. The young, which may number 500 at a single spawning, make rapid growth after the first fortnight, and as they mature their smooth scales become ctenoid—roughened, with comblike margins, the sides and breast of the adult being covered with these pectinated scales.

The female, deeper-bodied and larger than her mate, is distinguished also by a reddish anal fin.

Both sexes have a golden iris flecked with red and an iridescent ground color touched with blue.



Photograph courtesy O. C. Bellé

THE TROPICAL TOY-FISH EXHIBIT AT THE MISSOURI BOTANICAL GARDEN IN ST. LOUIS

Many members of aquarium societies not only maintain special rooms at home for their collections, but also have private *Daphnia* breeding reservoirs, hatcheries, pools, and other equipment.

**MESONAUTA: *Mesonauta insignis***

(See Color Plate V)

Though not exported as numerous in recent years, *Mesonauta*, indigenous to the Guianas, the Amazon River, and the great estuary of the Rio de la Plata, is another interesting species of Cichlid, formerly called "the pretty Cichlid," from Heckel's name of *Mesonauta festiva*.

It is as if an artist, with one bold stroke, had fancifully painted a band of velvety black across the little fish from the snout to the end of the spiny rays of the dorsal fin, and finished by touching the base of the upper caudal rays with the tip of his brush, leaving an ocellus as a mark of further distinction. The iris and ground color are usually brassy yellow, and the long streamers of the ventrals sometimes reach beyond the tail.

Its disposition is not of the best, but the species exhibits the Cichlid habit of caring for its offspring, both parents engaging in fanning the eggs and guarding the embryos until their yolk sacs are absorbed and they rise to swim and feed.

**RIBBON-TAILED PANCHAX: *Aphyosemion australe***

(See Color Plate VI)

In this group of Cyprinodont pygmies (formerly called *Panchax*), principally of African and Indian extraction, the ribbon-tail of the Dutch East Indies and Africa is smallest, most gayly colored, and most favored by the aquarist. Its active little body flexes like that of *Rivulus* (see page 308) into an almost crescentic shape. The female is plain fish-green, with rounded dorsal and caudal fins, but the gorgeous green and blue body of the male, spotted with rows of scarlet scales, is trimmed with elongated dorsal and anal fins of blue and orange. His lyre-shaped tail is striped, and its inner curves doubly dyed with black.

The adhesive ova, spawned like those of goldfishes among aquatic plants, are abandoned unless the parents discover and devour them, and it has been found expedient to remove the adults to another aquarium after spawning has taken place, and to sort the fry early, that larger may



Photograph by C. H. Adams

#### THE BUBBLE NEST OF THE PARADISE FISH

In making its peculiar nest, the male carries a mouthful of air below, coats it with a sticky secretion, and releases it as a bubble. Hundreds of bubbles, loosely joined together, form the floating nest, to which the eggs adhere. If a bubble bursts, he blows another, patching the nest continually (see text, page 315, and Color Plate VII). This is one of the first of toy fishes to be introduced into this country, where it has won great popularity.

not feast upon smaller. After this they are fed and cared for much the same as goldfishes.

#### THE DANIOS

(See Color Plate VII)

The artist here introduces us to the largest and smallest *Danios* imported into the United States—the striped *Danio* (*Danio-Brachydanio-errio*) of Ceylon, averaging about one and one-half inches, and the blue *Danio* of Malabar (*D. malabaricus*), nearly three inches. The former, called also "zebra-fish" because of its intensely blue stripes running from the gill covers to the extreme end of the caudal, is characterized by hairlike barbels about the mouth, while mala-

*baricus*, considered the most beautiful of this brilliantly colored Cyprinodont family, is blue-bodied with lateral stripes of salmon-yellow.

As in many other species, the males are smaller. The nonadhesive, heavy eggs drop to the bottom, where they lodge and hatch among pebbles and vegetation; but in an aquarium, unless salvaged, they are soon eaten by the parents.

#### THE BARBS

(See Color Plate VII)

The ocean tarpon's reputation for large and silvery scales is shared by the little barbs of India—a robust, alert, and playful genera of Cyprinodont fishes. More than a dozen of the smaller species have been cultivated in the home aquaria of Europe and America.

The rosy barb (*Barbus conchunius*)—the name is due to the deep rose flushing the males in the breeding season—is largest of the pygmy barbs, peaceable and hardy. It spawns throughout the summer, and the several hundred adhesive eggs in every batch attach themselves to the vegetation they fall on. The fry are easily reared.

*B. oligolepis*, though not the smallest of the barbs, measures less than two inches, and might appropriately be called the green barb, for it is dressed in a gray-green and grass-green jacket deeply spotted with black.

Its nature is mild, physique robust, like that of its congeners, and its breeding habits like those of the rosy barb.

#### RANGA: *Ambassis ranga*

(See Color Plate VIII)

*Ranga*, a very active species, sometimes called "the Lilliputian bass," is indigenous to the brackish waters of India. In the female the fins are translucent and the male is splashed with red, a gaudy stripe running to his tail. The nuptials begin when the female, selecting her mate, invites him to follow, while she chooses a suitable spot among the roots of plants for the deposition and fertilization of the eggs. These are extremely minute and laid in clusters of five or six.



Photograph from Crescent Fish Farm

## INDOORS OR OUT, THE PYGMIES ARE CAREFULLY HOUSED

At this fish farm there are 108 of these part-glass pools. In winter they are covered and heated to 70° Fahrenheit. The small globes, of which there are 1,500, contain one male each of the Siamese fighting fish (see Color Plate VI and text, page 315). These are separated before sexually mature and put in small bowls to develop the large tail and fringe. Movable shades (left) protect the globes from too much light and heat.

In 24 hours they hatch, and the embryos, clinging to the plants for a few days, receive very little attention from their parents.

**BADIS: *Badis badis***

(See Color Plate VIII)

Of the family Nandidæ—fishes with transparent tails—this diminutive and variously patterned species is taken in eastern India. Some individuals are striped with yellow on a ground color of brown and blue; others have blue stripes laid upon yellow, the blue dorsal of the male being edged with red.

The sexes are immediately distinguishable by the ventral profile of the body—concave in the male, convex in the female. During the summer spawning occurs frequently, the eggs being laid on stones and guarded with great fidelity by the male, who, however, discloses the usual inconsistency of fish devotion when the offspring are able to shift for themselves.

**RASBORA: *Rasbora heteromorpha***

(See Color Plate VIII)

At the present time *Rasbora* is much talked of among fish fanciers. After many years of fruit-

less effort, three people in the United States and one or two in Germany have succeeded in breeding this species in captivity.

The compressed body, its small size—the maximum length is one and three-fourths inches—the variations in form indicated by the specific name, and also the varying colors, have long made it a general favorite for the tropical aquarium. Sometimes all the fins are rose, and again the colors are a mixture of rose and blue; but the striking blue-black funnel-shaped spot that largely covers the posterior half of the body is ever present.

In the male a richer red borders the upper edge of the funnel. The female is deeper-bodied and, like the female *Ranga* (see opposite page), takes the initiative when her eggs are ripe, choosing her own mate and urging him under the leaves of such plants as she may select. Here an interesting sex play takes place, the female reversing her position and the two rising and intertwining as the tiny amber eggs are laid and fertilized in clusters of four or five until there are thirty or forty.

The parents have not been observed to eat the fry, many of which were successfully reared in shallow water.



Photograph from Crescent Fish Farm

#### OUTDOOR PONDS HARBOR. NUMEROUS TINY DENIZENS IN SUMMER

The fancier begins to put out his young fishes in April. All of salable size are culled for shipping during August and September, smaller sizes being carried over winter in hothouses. The overhead covering is a wooden frame with a strip of screen wire, which lets in the proper amount of light and air and keeps out injurious insects (see, also, illustration, page 313).

*Rasbora* is an inhabitant of the shallow waters of Malacca, Singapore, and east Sumatra.

#### THE SCAT: *Scatophagus argus*

(See Color Plate VIII)

"The scavenger with a hundred eyes" has been greatly sought after, but rarely acclimatized, though if a pair survive for a few weeks they may live for years in a warm saline solution. Several collections were quickly reduced to one or two pairs, and these grew rapidly until they

were large as saucers. In their native habitat they attain still larger proportions. Their home is in the Indian Ocean and in the brackish waters of Australia, China, the Philippine Islands, India, Malacca, and Ceylon, those living at warmer temperatures being most gaudily marked. The blotches sometimes disappear and the body loses its salmon and gold, becoming sea-green.

Though fond of animal food, the scat consumes much vegetable matter and is not averse to fresh-water plants and garden lettuce. As yet, it has not been reared in captivity.

#### BUBBLE-NEST BUILDERS

In fishes of this group—*Osphromenidae*, or labyrinth fishes—accessory breathing organs developed in conjunction with the branchial arches constitute a happy provision for drawing oxygen from the air.

They not only visit the surface frequently, but during the breeding season the males remain there with their nests. A mouthful of air is carried below, coated with a sticky buccal secretion, and released

as a bubble. Hundreds of bubbles thus loosely joined together form the floating nest to which the eggs adhere.

When spawning is over, the females are driven away from the nests with great ferocity, and murdered if they prove too inquisitive or persistent.

### THE GOURAMIS

(See Color Plate IV)

India and the Malay Peninsula have provided the Occident with some of its most treasured toy fishes, including the dainty, full-bodied gouramis, three of which are pictured here—the dwarf, the spotted, and the croaking gourami. Besides these, there are the striped, thick-lipped, purring, kissing, and other species; also, giant gouramis too large for home aquaria. The ventral fins are modified into long, sensory filaments, trailed after the fish or thrust out before like arms.

The croaking gourami (*Ctenops vittatus*) is so called because it utters a croaking sound when removed from the water. This species and the spotted gourami (*Trichogaster trichopterus*) wear coats of gray-green or bottle-green touched with gold, the dwarf gourami (*Colisa lalia*), with a total length of about two inches, being the most brilliant of the family. The blue body of the male is marked with vertical bars of orange-red.

When the water reaches a temperature of 75° Fahrenheit, the gouramis are prompted to reproduce their kind. The males, selecting an appropriate place in the midst of floating plants, blow nests of bubbles for the reception of the eggs, which they gather and blow into the nest as rapidly as they are laid and fertilized. There may be several hundred eggs. The dwarf gourami is exceptional in that it clips off bits of fine floating vegetation and mixes these with the bubbles of its nest.

When the minute fry begin to wiggle about like mosquito larvae, the entire brood will disappear down their father's throat unless he is removed. In a state of nature they no doubt succeed in hiding for a time and gradually move out of the range of his vision.

### THE FIGHTING FISHES

(See Color Plate VI)

Although the King of Siam derives substantial revenues from licenses granted for public fish fights, he has thus far raised no objection to the exportation of a considerable number of the finny combatants that inhabit the shallow waters of his kingdom. This may be because the wild fishes are not as commonly used for fighting. They do not attack as viciously nor as tirelessly as cultivated specimens, and those who stake large sums on the outcome of these aquatic combats between the males of *Betta splendens* prefer the most bloodthirsty contestants.

At sight of each other the two fishes change color, passing through various shades of green, red, purple, and blue, and the battle begins when one seizes the fin or jaw of the other. Dr. Hugh M. Smith, who has studied the *Bettas* in Bangkok, says the male that is willing to fight after

his opponent is ready to quit is adjudged victor. The fights are not necessarily fatal, but though the participant recovers and his wounds heal, his beauty may be permanently marred, and thereafter he is reserved for breeding.

The species is a prolific one, each nest containing about 200 eggs, but females are not safe with the males except while spawning.

A male confined by himself exhibits intense excitement when a mirror is placed against the glass of the aquarium, expanding his gills, spreading his fins, and darting about with flashes of gorgeous colors; and a similar phenomenon may be observed in the case of *Cambodia*, a larger variety of the fighting fish, many specimens of which are so nearly white that, were the eyes as pink as the fins, we should call them albinos.

The advent of *Cambodia* in the United States a few years ago was a memorable step in the history of the home aquarium. In the words of a fish fancier, "it caused a sensation in aquatic circles." The large, flowing, scarlet fins, contrasting with the flesh-colored body, rendered it an object of great curiosity and admiration. It has been bred with *Betta splendens*, producing intergrading forms that combine the prismatic colors of *B. splendens* with the trailing fins of *Cambodia*, though in some the body and fins are of one color—solid blue, or green, or largely red.

### THE PARADISE FISH: *Macropodus opercularis*

(See Color Plate VII)

It would be difficult to state whether the paradise fish is noted more for its beauty or its quarrelsome nature, but its dashing colors and interesting nest-building habits have led to a wide dispersal of the species, whose home is in the swampy rice fields of Africa and south-eastern Asia.

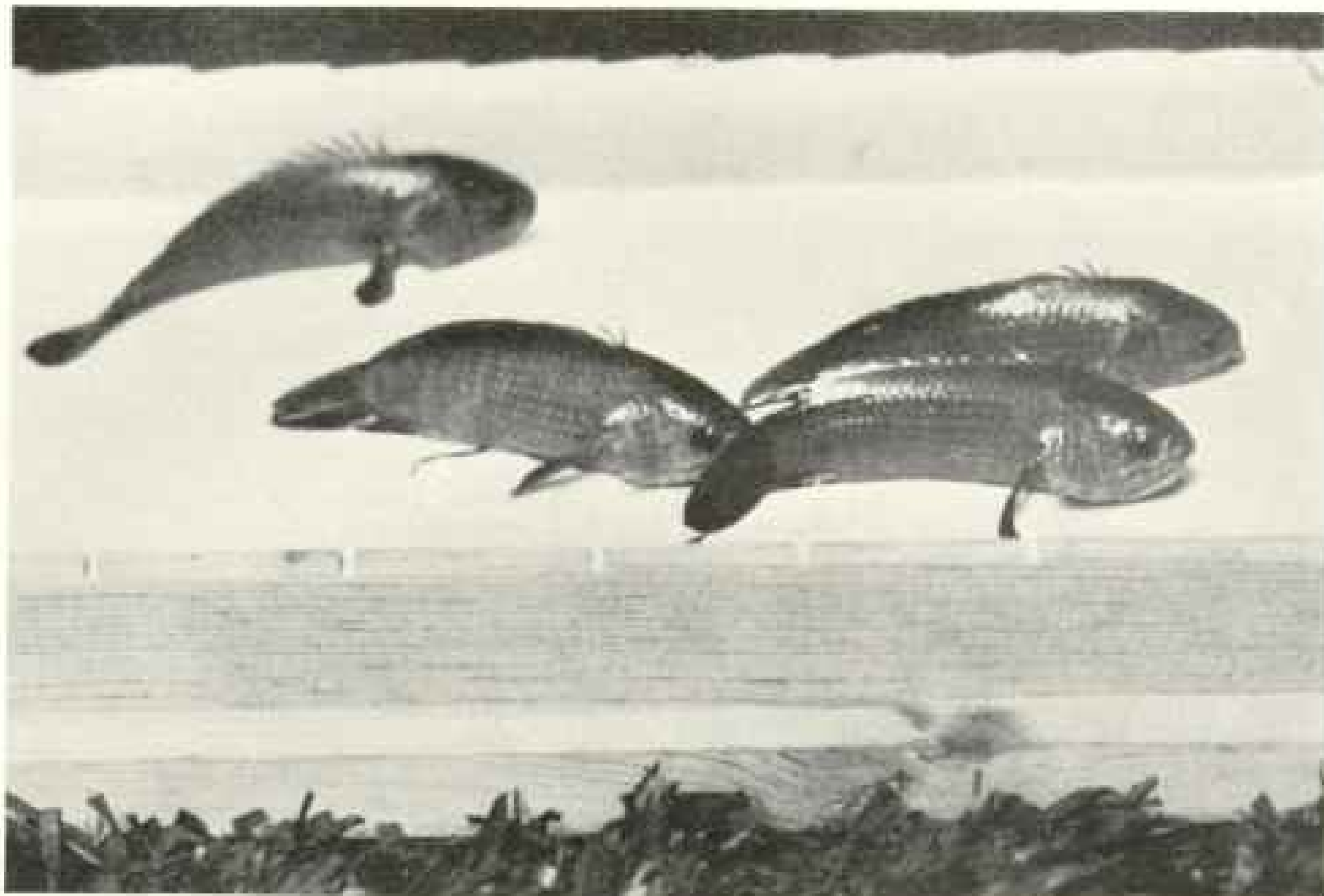
In the United States few pygmies except guppy and *helleri* (see page 317) have been sold in larger numbers, and few toy fishes can withstand such drastic changes of temperature and such rough handling. Paradise fishes have survived in ponds at near the freezing point and have lived with apparently as little discomfort at 90° Fahrenheit. Foul and crowded quarters are not fatal, the fish rising often to the surface for a fresh supply of air. Specimens have survived eight years in captivity.

The introduction of food or of a mate into the aquarium, or other exciting circumstance, is sufficient to effect a complete and rapid change of dress, the customary warm brown of the vertically striped body giving place to flesh color, red, green, blue, and other splendid hues.

The male sometimes measures more than three inches in length and is identified by his flowing fins. He is ferocious toward other males, and females cannot be trusted with him except when spawning. This occurs at frequent intervals throughout the summer, with many interesting courtships, in which the male, when his nest is complete, urges his mate under it. The pair intertwine, and the eggs are expelled and fertilized, and by their own buoyancy rise into the nest, which may be more than one-quarter inch thick and six inches in diameter. The artist pictures a nest among water-hyacinths.

The fish secures the nest to the plants with the same gluey secretion used to coat the bubbles. If





Photograph by Herbert Photos, Inc.

#### FISH THAT WALK ON LAND

Numerous short spines enable the famous "climbing perch" of the Orient to ascend the roots of trees growing on the water's edge or the trunks of trees that have fallen into the water. It can also hook them around tufts of grass or plant stalks, thereby securing a leverage when it wants to get from one watercourse to another. Contrary to its popular reputation, it does not go out on dry land to climb trees and rob bird nests (see, also, Color Plate IV, and text, page 309).

a bubble bursts, he blows another, patching the nest continually, extending it here and contracting it there, so that the several hundred eggs under his care may be properly oxygenated.

With a magnifying glass the embryos may be seen squirming in their frothy nursery, for in less than two days they have hatched and a few days later are trying their fins.

The male fish is shown beneath the nest, and

the female is included only to illustrate their differences. Were he to find her in such close proximity he would kill her, though his own vigilance is but transitory.

Gladly would the female divide the labor, taking half the eggs or as many more as she could filch, but her tyrannical mate will not countenance it, and if she succeeds in making a start he thrashes her and tears her nest to pieces.

### VIVIPAROUS (LIVE-BEARING) FISHES

The viviparous fishes pictured here are all of the family Poeciliidæ, top minnows, and all native to the Western Hemisphere.

#### MEXICAN TOP MINNOW: *Belonesox belizanus*

(See Color Plate II)

An inhabitant of the fresh waters of southern Mexico, Honduras, and Guatemala, *Belonesox*, reaching five inches in length, is the largest of top minnows. It reveals a bronzelike luster in reflected light and at night appears banded with black. The scales are fine and inconspicuous and the large eye has a luminous golden iris; but its most notable features are the garlike contour and never-closing jaws, thickset with teeth that betray an appetite for substantial things to crunch—crustaceans, mollusks, and small fishes.

Though mature at six months, the Mexican top minnow is subject to miscarriage and produces very few young in captivity.

#### THE GUPPY: *Lebistes reticulatus*

(See Color Plate III)

Günther, a noted ichthyologist, who believed he had discovered this pygmy fish of Trinidad, Barbados, and Venezuela, named it *Girardinus guppyi* in 1866; hence its name of "guppy." Earlier it had received another name, which accounts for the change to *Lebistes reticulatus*. In its native waters it is known as "the million fish" because of its great fecundity, and the colors of the male have given rise to another popular name, "the rainbow fish."

Inexpensive and among the hardiest of toy fishes, the guppy for a quarter of a century has enjoyed unrivaled popularity. The plain green-

ish-gray female rarely exceeds one and one-half inches, the smaller, colorful male one inch. No two males are precisely alike, their rainbow hues being intermingled with black spots and bars irregularly dispersed, and, as most of their time is given to foraging for food and actively courting the elusive female, their prismatic little bodies constantly flash before the eye of the observer.

They live peaceably with most other small fishes, but prey on their own young, which number 25 or more at a birth. The fry seek security among dense vegetation, and many survive. However, it is customary to watch for their arrival after the gravidity of the female is indicated by a darkened area anterior to the anal fin (the eggs being fertilized and developed in the ovarian cavity), and to remove the young until too large to tempt their parents, or to place the female in a breeding cage and remove her after the fry are born.

#### AMERICAN TOP MINNOW: *Heterandria formosa*

(See Color Plate III)

When *Heterandria* was named by Agassiz in 1853 it was the smallest known vertebrate, a reputation since yielded to the Philippine gobies (see text, page 289). However, it is the smallest known viviparous fish, the gobies being oviparous. The shorter, more slender body of the male seldom exceeds three-fourths of an inch, the female attaining to one inch. Though the sexes are similarly marked, the disparity in size and the intromittent organ of the male of this and other species in which internal fertilization occurs, distinguish them at once.

A distinctly American species, the top minnow is common to swamps and ditches of the United States coastwise from the Carolinas to Florida, and frequently swims in the same schools with the larger top minnow, *Gambusia affinis*. Its habits are similar to those of the guppy.

#### MOSQUITO-FISH: *Gambusia affinis*

(See Color Plate III)

In recognition of its importance as a destroyer of the mosquito, the United States Government has transported this species in large numbers from its home in the lowland waters of the South Atlantic and Gulf States into California, South America, Hawaii, the Philippine Islands, Spain, Italy, Germany, Russia, Palestine, Jugoslavia, and other countries. It is found also in the fresh and brackish waters of Cuba and Mexico and has been planted in the United States as far north as Delaware.

Though *Gambusia* prefers clear brooks, ponds, and lagoons, dirty ditches and foul marshes form no bar to its contentment, for there also its prey resides.

Colors vary somewhat with habitat, specimens from dark swamps being darker-bodied, some spotted with black. But often both sexes are of an inconspicuous fish-gray, some with dusky bands on the sides; or, as shown in Plate III, they may be varicolored, the female marked with four or five permanently black scales anterior to the anal fin. In shape and size the sexes differ, as among guppies and top minnows. Females, which are in the large majority, rarely exceed

two inches, though they are twice the size of their infrequent mates.

Next to mosquitoes, they favor a fish diet, gulping down their own brothers and sisters along with filamentous algae, but, like most fishes, readily adapt themselves to a complete change and accept aquarium substitutes.

The young of a single spawning are expelled, a few at a time, over a period of minutes or hours, and measure  $\frac{3}{7}$  of an inch. They expand their microscopic gills, swim into hiding, and presently cast about for their first meal. Normally the mosquito-fish spawns the year round, specimens in captivity having produced 50 young within 10 weeks.

#### THE SWORDTAIL: *Xiphophorus helleri*

(See Color Plate III)

In the males of the Mexican swordtail, or *helleri*, a species second in popularity only to the guppy, though of more delicate constitution, part of the caudal fin is produced into a swordlike appendage of orange or green edged with black—a striking feature, which may compensate for the fact that his mate, frequently more than twice his size, is also richly colored. The flattened skull and upturned, prognathous snout indicate the surface feeder.

Sometimes very old females take on the characters of the male and develop a sword, just as old female trout and salmon occasionally grow hooked jaws.

The swordtail has been employed successfully in hybridization experiments, a cross with the red moonfish resulting in a large golden-red hybrid called "the red *helleri*," a cross with the spotted moon giving a green and blue-black hybrid with shimmering, satiny scales.

#### THE MOONFISHES

(See Color Plate V)

Half a dozen varieties of moons, or platys (*Platyplatys maculatus*), have been exported from Mexico and South America and bred in great numbers. The gold platy originated in American aquaria, and the species is extremely popular because of its rich coloration and hardihood. Eighteen or twenty young are numbered in every hatch, the females of this, as of other viviparous species, remaining fertile until four families are born, though intervals of many weeks may elapse between broods. The maximum length is one and one-half inches.

#### THE SAILFIN: *Mollienisia latipinna*

(See Color Plate VI)

Always attractive in liveries of silver and black, the high dorsal of the male sailfin becomes in the mating season a beautiful blue edged with gold and spotted with black. By reason of the generic name and the matronly aspect of these graceful little fishes, they are also affectionately known as "Mollies." Their range is from the Carolinas through Texas and into northern Mexico. They attain to nearly four inches, and are at home in either fresh or brackish water.

The fry, which may number 100, measure three-eighths of an inch and exercise their infant fins in safety under the very mouths of their parents.



WEAVERS OF KHOTAN'S CARPETS RECEIVE ONLY A FEW CENTS A DAY

They are not original artists, but work from cardboard patterns. The different-colored yarns hang near the top of the loom and are drawn down, knotted, and cut as the pattern decrees. Khotan rugs are for the most part heavy-piled and large-knotted (see, also, Color Plates X and XI).

# ON THE WORLD'S HIGHEST PLATEAUS

## Through an Asiatic No Man's Land to the Desert of Ancient Cathay

BY HELLMUT DE TERRA

*With Illustrations from Photographs by W. Bosshard*

**B**EYOND the Himalayas, that grand wall of giant mountain peaks which guards the north Indian plain, lies a country where three empires meet: India, China, and Russia. It is the most rugged and desolate alpine region known to man, a country where grim mountain ranges 26,000 feet high look down on barren, storm-bitten plateaus on which no human being has ever dared to settle. Farther toward the north this highest upland on our globe slopes down to the vast desert of Chinese Turkestan, the western continuation of the great Gobi and a part of ancient Cathay, as China was called in the diaries of Marco Polo. This region was the goal of our expedition, and the fact that great portions of the country had never before been explored lent added interest to the undertaking.\*

In 1926 our plans had crystallized, and we applied to the Government of India for permission to use the "high treaty road" which leads from Kashmir to Leh, the capital of Ladakh, or western Tibet. Dr. Emil Trinkler, of the University of Munich, hoped to find traces of the last great Ice Age in the mountain ranges of this country and remnants of ancient civilizations hidden away in the vast deserts.

### CHINESE TURKESTAN IS A GRAB BAG OF HISTORY

The desert of Chinese Turkestan offers all the excitement of a giant grab bag, for ruins of ancient cities and Buddhistic temples lie buried there under a sea of sand, and trails worn by migrating races, prehistoric as well as historic, are waiting there to be discovered.

The third member of our Central Asian Expedition, Mr. W. Bosshard, of Zürich, joined our expedition in order to obtain a pictorial record of human life in this part

\* See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "By Coolie and Caravan Across Central Asia," by William J. Morden, October, 1927, and "Desert Road to Turkestan," by Owen Lattimore, June, 1929.

of the world, where the Orient still eludes the contagion of modern civilization. We were more than delighted to have him with us, for he was well known to us as one of the outstanding photographers of his country and as a man experienced in Eastern travel. I believe the material which Chinese Turkestan provided for his insatiable lenses—strikingly beautiful murals painted hundreds of years ago on the walls of forgotten monasteries, the picturesque qualities of the natives, and the majesty of the mountain ranges themselves—more than recompensed him for the hardships he was to undergo.

Problems of mountain structure and regional geology of this locality appealed to me, especially in view of the fact that it was practically pioneer work. I knew, however, from the outset that my work would have to be more in the nature of a geological reconnaissance than a detailed study, as this was made practically impossible by the nomadic caravan life which we were to lead for 18 months.

Trinkler and I landed in Bombay the end of April, 1927, and the Indian Government was kind enough to release us from heavy customs duties. Our baggage was dubbed "central Asian merchandise," and, as this is duty free, we were able to leave Bombay immediately, traveling across the Indian peninsula with the Frontier Mail Express.

Perfumed by vast pine and cedar forests, the cold, pure air of the Himalayas, sweeping through the Vale of Kashmir,\* quickly made us forget the 110-degree (Fahrenheit) heat which prevails in the Indian lowland. Here, at Srinagar, Bosshard had for two months been busy with preparations. We came upon him in his hotel bedroom literally buried under heaps of woolen blankets, gloves, fur boots, and fur coats, kitchen and tent utensils, things

\* See, also, "House-Boat Days in the Vale of Kashmir," by Florence H. Morden, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1929.



THE KASHMIRI COOK PREPARES DINNER OVER A CAMPFIRE

Habiba, whose business it was to keep members of the expedition well fed, proved himself most adept at producing good meals under difficult and trying conditions. A camp on the shores of Pangong Lake, near the Tibetan frontier (see text, page 332).



THE POST OFFICE IS A SOCIAL CENTER, EVEN IN THE HIMALAYAS

An efficient and reliable mail service is maintained between Kashmir, northern India, and Ladakh. Although post-office buildings along the mountain roads sometimes look as if they were about to fall apart, they nevertheless serve as informal clubhouses for certain of the male population.

which the foreigner had best not bring from abroad, as they can be purchased much more advantageously through native agencies.

#### THE SERVANT PROBLEM IN KASHMIR

This first glance at our outfit was exciting, and the next two weeks passed quickly in various preparations, such as buying tents and provisions, paying official calls, and settling the complex problems brought us by our native servants, which demanded the combined psychological and financial efforts of their masters.

There was our tent servant, Hakim Abdullah Khan, whose ancestors had lived near the troubled Afghan frontier and who invited Bosshard to act as judge in his divorce case only a few hours before we mounted our ponies.

Our cook, Habiba, who was leaving his wife and children behind him, was a more reliable character than are most Kashmiris.

He passed his final test in cooking on the balcony of our home, where he prepared a spicy camp dinner on a small alcohol stove. We gave him orders to buy chickens, eggs, dried fruits, and vegetables, but his first purchase was a huge bag filled with Indian spices. When we protested at the quantity, he replied that he was going to buy a second bag from his uncle at the next opportunity, for he was afraid that he would find nothing fit to eat, once he had left his native land.

The local government, encouraged by the help of the British authorities, secured us transport for "as long a time as our travels should keep us in Kashmir territory."

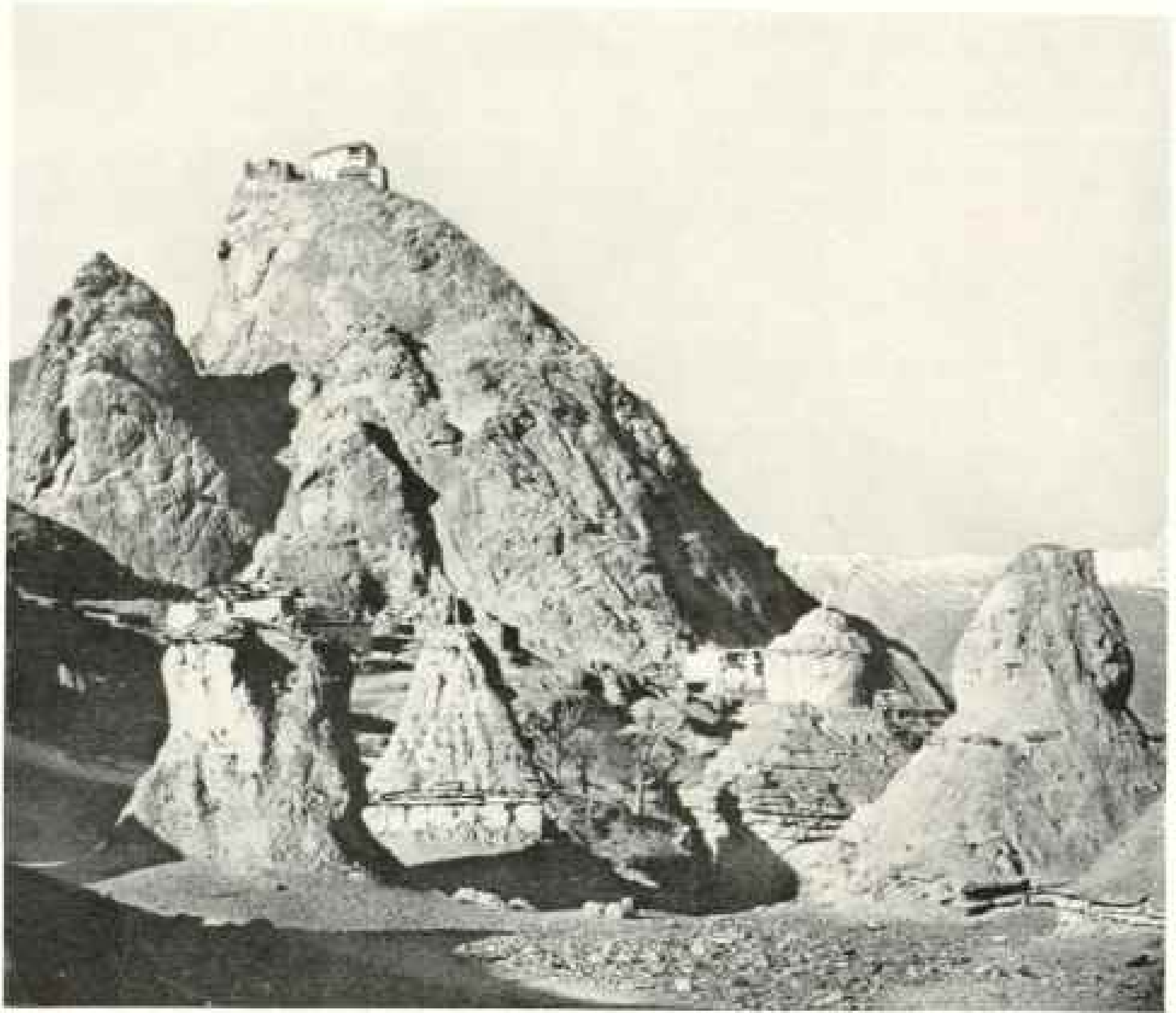


TO CARRY THE MAIL, HE SMILES AT DANGER

Despite risks incurred from avalanches, cold, storm, etc., the mail runner pursues his lonely way. He, perhaps, knows nothing of the airmail, but its famous slogan, "The mail must go through," is his creed, too (see illustration, opposite page)

"But where are your boundary posts?" we asked the Hindu official. He made a heroic effort to collect his geographic knowledge, but evidently in vain, for he advised us not to worry over such minor difficulties.

But, alas! This was no minor difficulty, for we had to sign an agreement with the Indian Government promising to stay out of Tibetan territory. As the boundaries between Kashmir, Tibet, and Chinese Turkestan were so manifestly vague, this promise seemed difficult of fulfillment. Even the British officials smiled at our dilemma, as a veritable no man's land exists beyond the Himalayas.



MULBEKH MONASTERY, ON ITS LOFTY PERCH, RESEMBLES A MEDIEVAL CASTLE

Lama ranks are constantly recruited from among the younger sons of Tibetan families. The boys enter the monasteries at an early age as acolytes and study under lamas. After a number of years they are questioned on their knowledge of the sacred books, and are classified as scholars or working lamas after this examination. Mulbekh is 80 miles northeast of Srinagar.

At any rate, we understood—or at least believed we understood—what the agreement meant, and departed thankfully from Srinagar on May 24.

Heavily laden, our caravan approached the Zoji Pass, much to the concern of our Indian servants, who had heard from former travelers that the crossing of this pass was a very hazardous undertaking, on account of the frequency of avalanches.

Proceeding along the winding road on the south side, we found the ascent, contrary to expectations, as pleasant and easy as a mountain tour along alpine slopes. The fine birch and cedar forest made us completely forget our lofty altitude.

But we were soon brought back to reality by a terrific snowstorm, which completely enveloped our party as it swept over the pass. Soon only the cries and

whistles of our men, urging on the transport animals, could be heard above the storm, and we were more than glad to take refuge in a small telegraph hut on the farther side of the pass. Remarkably enough, wires still connected us with the outside world, for even the Himalayas offer no obstacle to British enterprise.

#### IN THE VALLEY OF THE "KING OF RIVERS"

Some days later we were in the Indus Valley, and to our eyes, already eager for a sight of trees and vegetation, this hot mountain valley proved disappointing. Even the "king of rivers," which flows along banks on which stand hundreds, perhaps thousands, of monasteries, could do little to enhance the picture. Soon we had joined the crowds of pilgrims who were traveling toward a common goal, the mon-

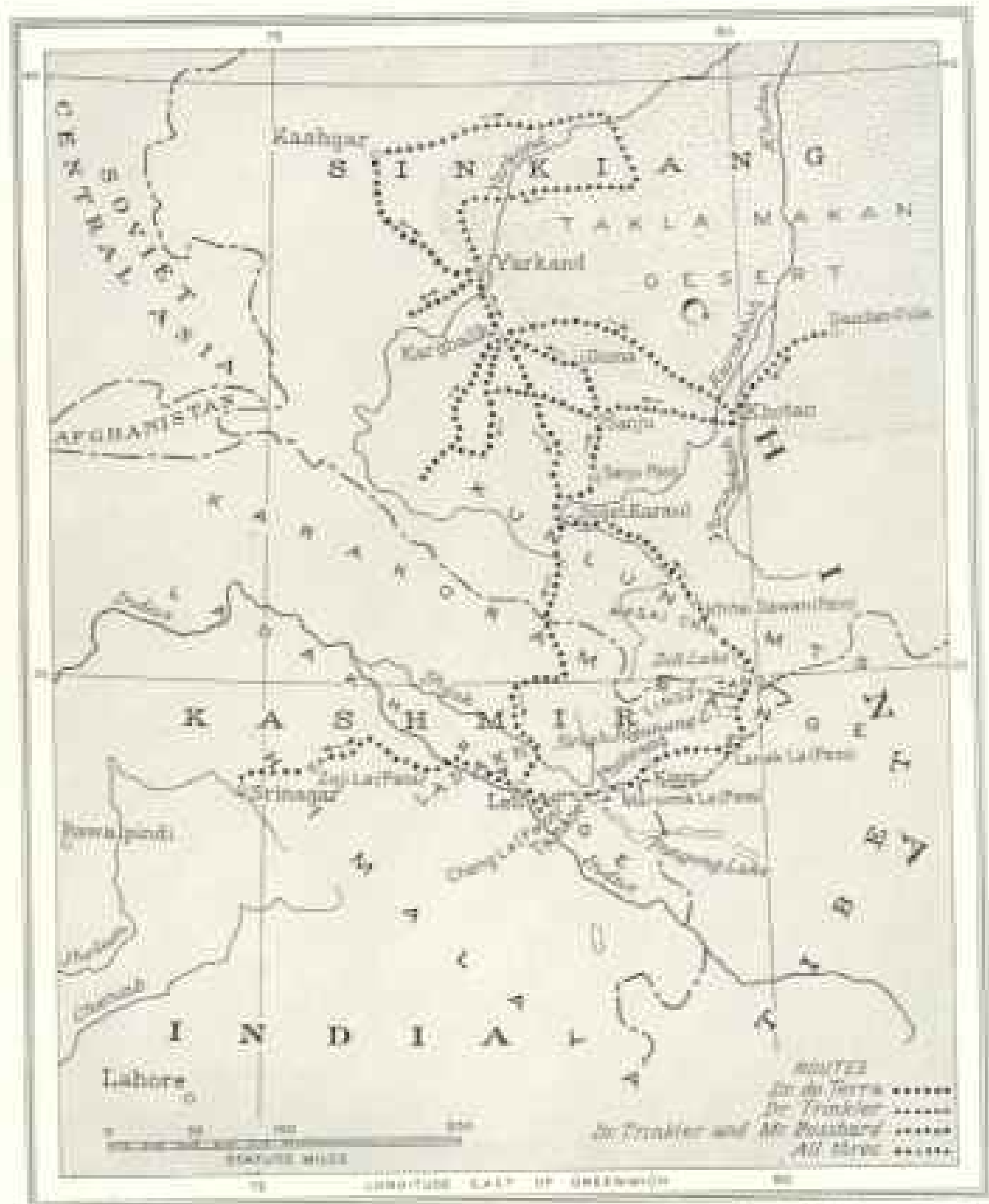
astery of Himis. This monastery, the most powerful as well as the most sacred in western Tibet, was in a few days to be the scene of the famous mystery plays.\*

On our way lay the ancient residence of the former kings of Ladakh, where our friend, Bishop Peter, head of the Moravian Mission at Leh, had arranged a visit for us. He himself was with us as we rode up to the castle of Stok. At a distance its dull, towering walls looked impressive enough, but as we rode nearer to the small village which surrounds the royal building our illusions vanished.

As we entered the old stone house we noticed that it had been partly demolished by weathering and age. With its windows inadequately patched with native paper, its stairs perilous to climb, and its empty, dust-covered rooms, it was a perfect expression of utter poverty.

His Majesty the ex-King, Cha-Sking-Rnam-Gyal (The Ever-glorious Protector of Religion), the queen and her charming little daughter, and the old queen mother received us in a spacious and rather well-furnished room on the second floor (see page 329). Their royal highnesses greeted us according to the Tibetan custom by sticking out their tongues. After formalities had been exchanged, we sat down—the Europeans on chairs, the royal family cross-legged on pillows.

\* See, also, "Life Among the Lamas of Choni," by Joseph F. Rock, in the NATIONAL GEOGRAPHIC MAGAZINE for November, 1928.



Drawn by A. H. Bunstead

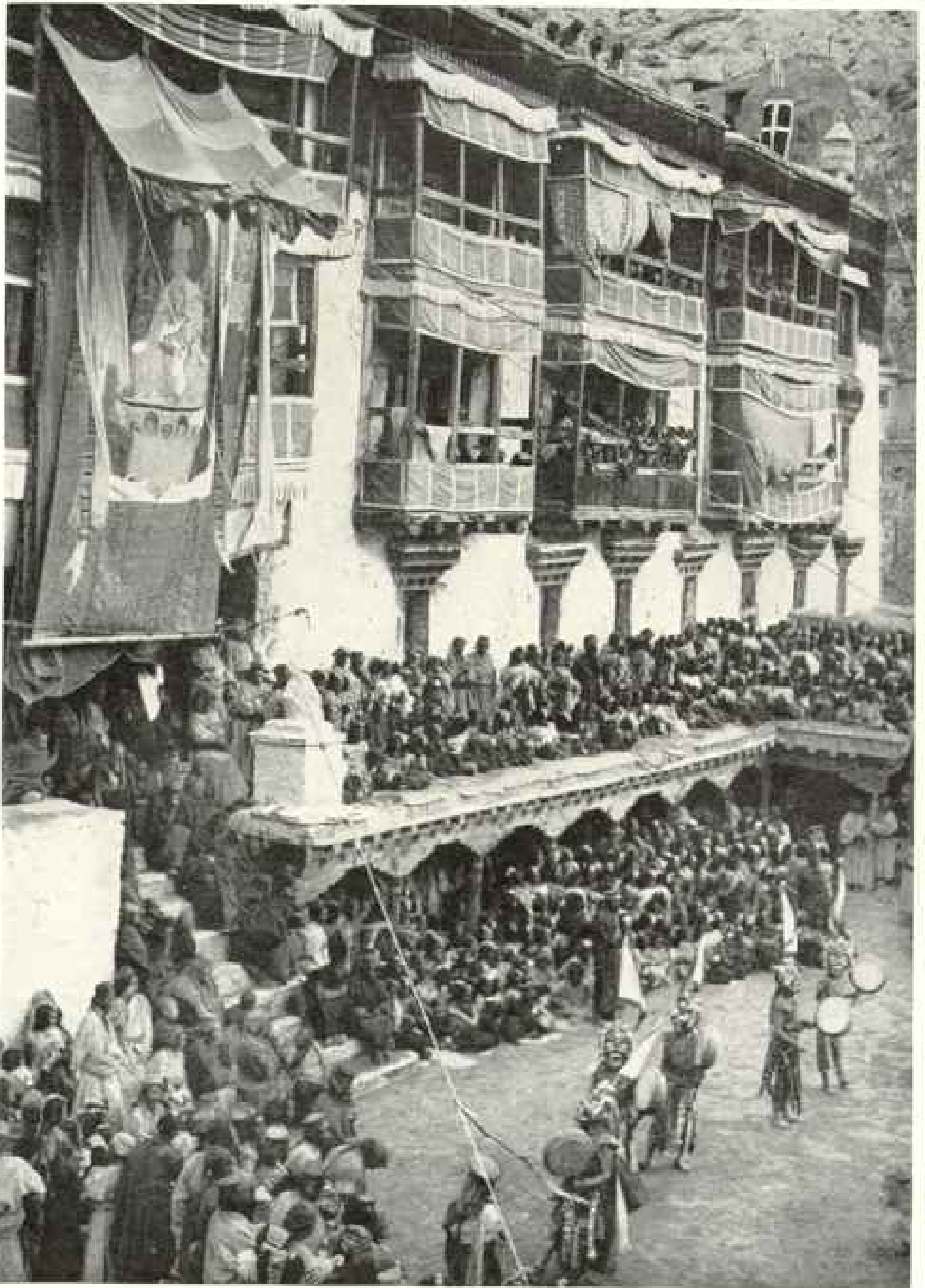
### THREE EMPIRES MEET IN TURKESTAN

Russian, British, and Chinese territory and interests converge in this middle land as Asia. It reaches from the shores of the Caspian Sea on the west to the borders of inner China on the east. The western portion belongs to Russia, the eastern part to China. Immediately south, in British territory, and closely bound by racial, religious, and commercial ties, is Kashmir State, with its province of Ladakh. The Central Asian Expedition, whose work the author describes, had as its starting point Srinagar, capital of Kashmir. Thence the party proceeded to Leh, the Kailun Mountains, Yarkand, and on to Kashgar.

The 31-year-old ex-king, in a gorgeous Chinese robe of yellow silk, earrings, and a small cap with a crown of corals, made an almost feminine impression. The queen, seated at his left, wore her most precious jewelry, nine rows of large turquoise stones, in a complicated-looking hairdress. Her 4-year-old daughter already wore a nun's cap, as the royal parents were too poor to promise her the requisite dowry.

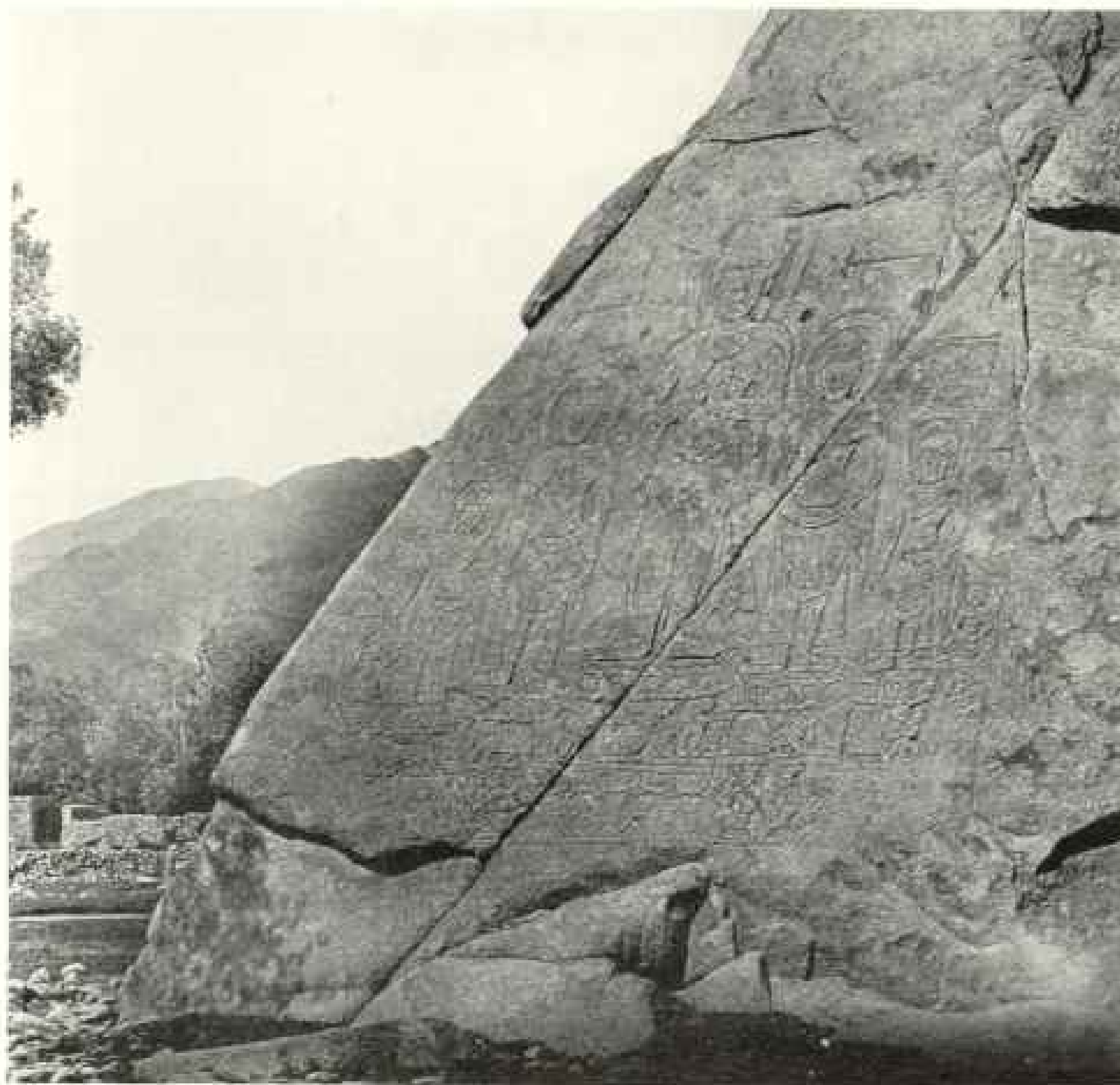
The old queen mother seemed still to dominate the household, for she refused to have us introduced to the infant prince, whom we wanted to photograph. She





LAMAS REHEARSE ALL YEAR FOR THE MYSTERY PLAYS AT HIMIS

Thousands of people from all over Ladakh, Tibet, and some from India and Chinese Turkestan each June come to see the lamas of Himis Monastery enact the journey of man's soul through a universe of evil demons (see, also, illustrations, page 327).



PIOUS LAMAS CARVE SYMBOLS ON THE ROCKS NEAR THEIR MONASTERIES

Great merit is believed to be acquired by spending one's life in traversing the land, chiseling holy symbols and religious figures on rocks by the wayside. These pictographs, which have not been completely deciphered, are near the monastery of She, eight miles southeast of Leh. They represent Buddhas in various attitudes of prayer.

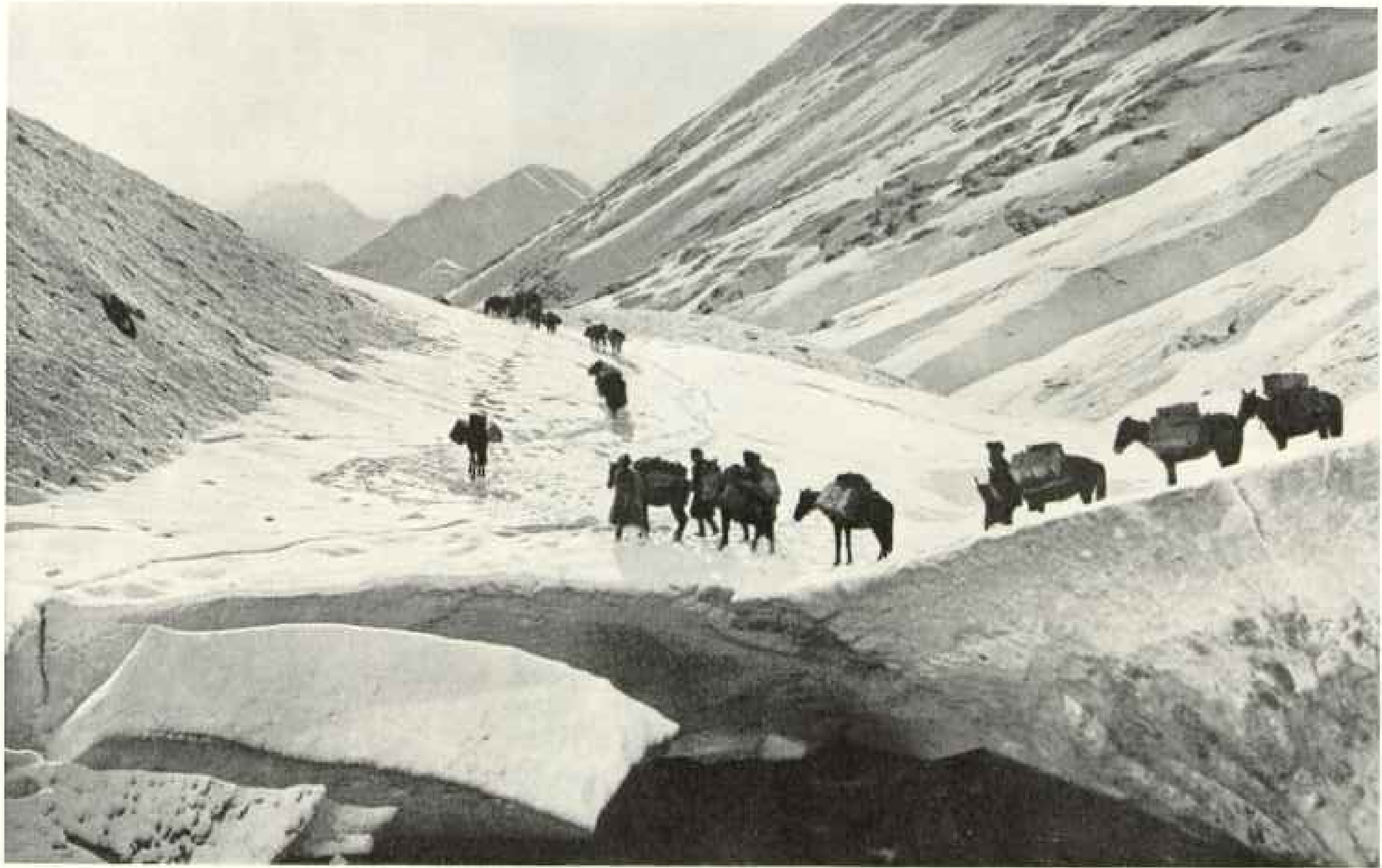
was afraid of the "evil eye" of our cameras, as the house minister explained to us. Once before she had saved the prince from demonic influences by keeping his birth secret for several months, in order that the wicked spirits should not capture his defenseless soul.

#### ROYALTY WELCOMES A GIFT OF INSECT POWDER

While our conversation proceeded slowly, we looked around the reception room and found it most artistic, with its ancient wall paintings, temple flags, Buddha statues, and incense bowls, out of which sweet, overpowering vapor arose.

Before saying good-bye to our royal hostess, we were informed that it was customary to leave a present. While we were still puzzled by this problem, our companion interpreter told us that her royal highness would be most pleased with a present of European insect powder for the protection of her young son!

During our stay at Himis we formed quite a friendship with Stakzan Raspa, the abbot, or *Skushok*, a man interesting not only as a prototype of a Tibetan saint, but also as a highly obliging and friendly human being. On the first day of our visit, when we told him of our plans, he displayed great interest in us, and soon we



A CARAVAN DESCENDING FROM THE ZOJI LA, FIRST PASS IN THE HIMALAYAS TO BE CROSSED ON THE WAY TO CENTRAL ASIA. Although by no means the highest of the Himalaya passes, Zoji La has a bad reputation for avalanches and sudden blizzards. One of the latter overtook the author's party (see text, page 322).



THE SKUSHOK, OR ABBOT, OF HIMIS

He is one of the most influential men in western Tibet and the fifth incarnation of the founder of the monastery where the famous mystery plays are held each year (see illustration, page 324). Himis is the largest and richest monastery in Ladakh.



HE DIRECTS THE DEVIL DANCES

Much of the significance of the mystery plays and devil dances was lost centuries ago, but the lamas still go through all the outward motions of the ceremonies. The performance consumes two full days at the Himis Monastery.



#### THE POPULATION OF LADAKH'S CAPITAL VARIES WITH THE SEASONS

In winter Leh has between two and three thousand inhabitants, but during the summer months, when trade can move through the high passes to the north, the population doubles and the bazaar becomes a meeting place for the races of central Asia. The palace of the deposed Rajahs of Ladakh dominates the city from its craggy height (right background).

found that we had two common ties—geology and photography.

The Skushok was a keen collector of minerals and rocks. Crystals of amethyst and turquoise, as well as a few fossils, lay on his desk among holy books and religious paraphernalia. His interest in technicalities was most amazing. He couldn't gather enough information about our motion-picture cameras and gave us his old kodak to repair.

In the course of some geological field-work near Himis, we discovered plant shales, which indicate that some 65,000,000 years ago the northern portion of the Himalayas was covered by swamp forests, long before the mountain-making processes which finally resulted in the world's grandest mountain structure had begun.

The Skushok, although at first disappointed at the lack of material value of our finds, finally became deeply interested in my work. Long after we had left his religious residence, he sent special messengers to overtake us and to bring us rock specimens to be examined "for the pleasure of His Holiness."

#### STRIKING OUT FOR NO MAN'S LAND

Now we were to leave traveled paths and strike out for no man's land. At Leh, when we were assembling the caravan which was to take us over the high and unknown plateaus which lie between the Karakoram and the Kunlun ranges, we met with some obstacles. It was not only difficult to find the right type of transport animal, but also the right caravan men.



LADAKHI ROYALTY RECEIVED THE AUTHOR AND HIS PARTY

Although the country is now a province of Kashmir, the old royal family still keeps up some semblance of its former mode of life. From left to right, the Queen Mother, King, Queen, and a young Princess (see text, page 323).



LADAKHI WOMEN WEAVE DURABLE CLOTH ON THEIR PRIMITIVE LOOMS

The wool of sheep, goats, yaks, and camels is the raw material, and they convert it into practically everything they and their families wear. The biting winds of their lofty home land make wool clothing an absolute necessity.

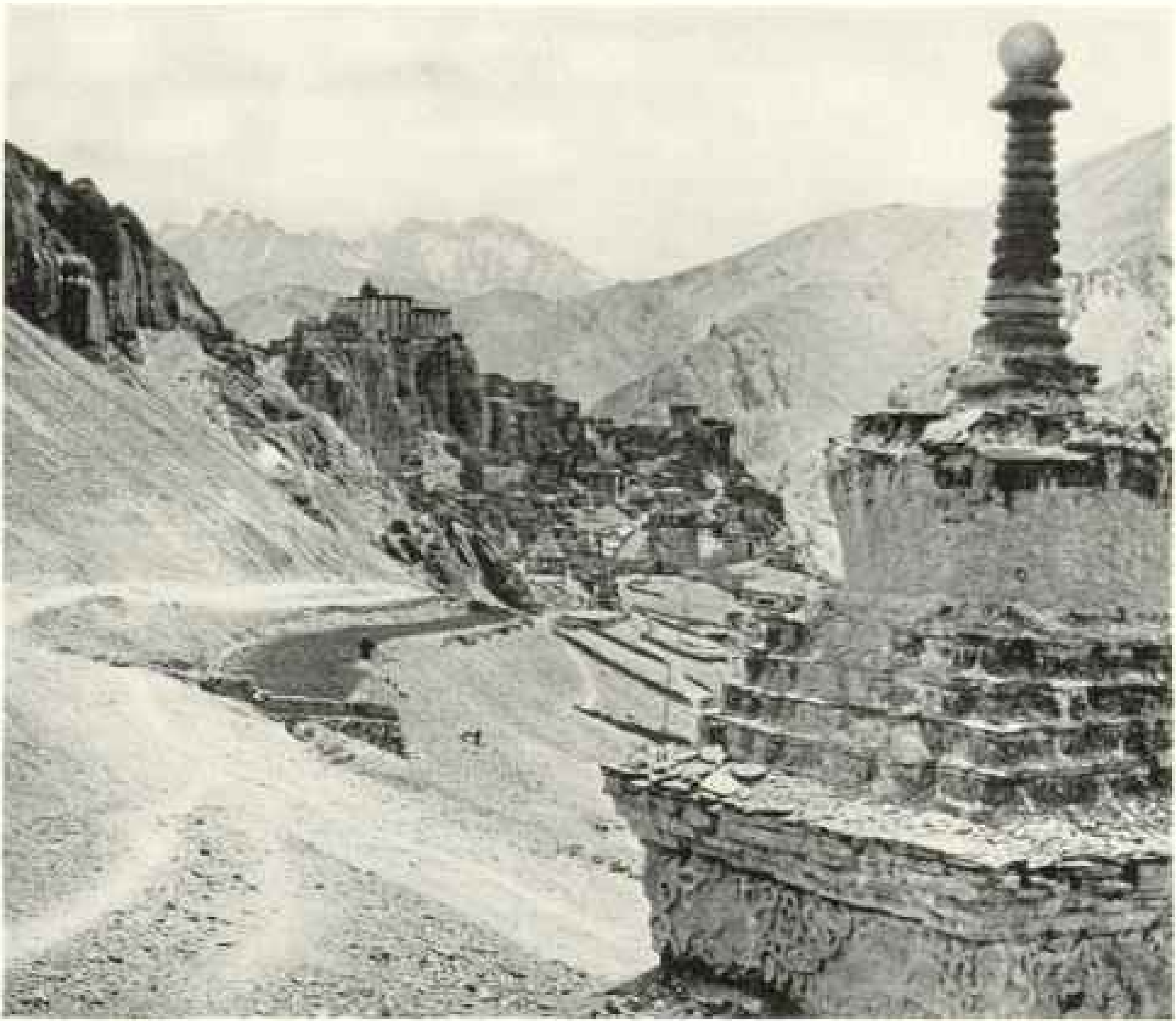


LOADING THE YAKS FOR A DAY'S MARCH ACROSS THE TIBETAN PLATEAU



PIGEONS FLUTTER ABOUT THE RESTHOUSE OF A MOHAMMEDAN SHRINE

Kum-Robat-Mazar, where the birds congregate, is located on the caravan road from Khotan to Yarkand, about 35 miles west of the former city. Many travelers, as they pass, throw a handful of corn to the birds, much as visitors feed the far-famed pigeons of St. Mark's in Venice.



SHRINES RESEMBLING HUGE CHESSMEN LINE THE ROAD TO A TIBETAN MONASTERY

After the lamas have burned the corpse of a believer, they mix some of his ashes with clay and mold a small image. If the deceased had been a man of importance or wealth, his image is placed in a shrine to itself. If he had been an ordinary individual, his image must share a shrine with others of his kind. The shrines contain Buddhist relics in addition to mortuary images.

Throughout the city it was known that we were going to no man's land, and nobody wished to risk his life for a monthly salary of eight dollars, the usual wage for an ordinary caravan coolie in western Tibet.

After one month's salary had been deposited in advance with the relatives of our new coolies, we could at last depart from Leh. We had hired a pony caravan to take us as far as the Pangong Lake, 30 miles north of the Indus Valley, where we intended to meet our own animals.

In early July we ascended the southern slope of the Ladakh Range. Fortunately, the weather was perfect; otherwise the crossing of the Chang Pass would have been perilous to our ponies, which suffered considerably from the high altitude. Look-

ing southward, we saw the glittering ranges of the Himalayas stand out like gigantic waves of rock against a blue summer sky. Our coolies seemed only to see the dangerous side of the undertaking; for, in accordance with an ancient custom, they led their ponies around the sacred pile of stones which surmounts almost every high pass in central Asia. While doing this they murmured prayers or added supporting stones to the monument which is built to ward off the demons of the air.

Near Tankse, a hamlet dominated by a fine old monastery, we came upon traces of earliest Christianity. Here rock inscriptions bear witness to a settlement of Christians which existed around A. D. 800, evidently a mission station of an ancient



Nestorian sect whose adherents once spiritually conquered great parts of central Asia and China.

At Tankse we saw the last pleasant orchard until, three months later, we came upon the oasis of Chinese Turkestan.

In another two days the Pangong Lake came in sight. A hundred miles long and two to three miles broad, it lies embedded, like a huge belt of melted cobalt glass, between wild mountain slopes and glacier tongues, belonging to a vast region of inland lakes, all located in one deep topographic depression.

The Pangong is one of the largest mountain lakes north of the Himalayas. Its water is almost fresh. Its northwestern portion contains a considerable number of fish and little crustaceans, which the wild geese and gulls feed on.

#### THE TIBETAN STORM ROARS AND RAGES

Here it was that the notorious Tibetan storm for the first time paid a visit to our camp. We had already gone to sleep when we were suddenly awakened by the hissing of waves, which the first onslaught of the gale whipped against the sandy shore. Some seconds later I found myself in the midst of the flapping ruins of my tent. Outside I heard the cries of the frightened servants and Bosshard's commanding voice: "Rope the tents, get our boxes and some stones, and drive in the pegs."

The whole camp seemed to be in the same state of uproar as the elements around us. Long, yellowish-blue flashes of lightning crossed the black storm clouds, and by their weird light I saw the lake raging furiously. Our big tent, Bosshard's home, resembled a sailing boat, its huge outer fly blown out by the wind. Blasts of sand and gravel rushed in a whirling mass between the flattened tents.

With a sudden crash the outer fly of Bosshard's tent tore loose from the pegs. It hung for a moment like a huge sail in the roaring air, ready to carry the whole tent into the lake. While all of us were busy keeping the big tent from flying away, a shower of icy rain poured down upon us. It was one o'clock when we finally crept into our sleeping-bags, wondering how long it would be till we should take these storms as a matter of course.

It was here that we met our servant, Sabur Malik, who had come with 50 yaks,

of which we chose 20 of the strongest. In addition to these, we acquired 7 ponies and 11 more yaks. This was to be the last settlement which we were to meet in Ladakh on our march across the plateaus.

#### SHEEP MADE GOOD TRANSPORT ANIMALS

The camp looked like a cattle market, with bleating sheep and grunting yaks grouped around our tents. It was by accident that we hit upon the idea of choosing sheep as transport animals; for, in spite of the Skushok's help, we could not assemble a sufficient number of strong yaks, and on account of the advancing season we could not afford to linger any longer in Kashmir. We therefore decided to buy 75 sheep to help us out of our difficulties.

Each sheep could carry 32 pounds, and we packed 75 pairs of small provision bags with flour, rice, butter, and tea, and with fodder for the ponies. It was amazing to find that 75 sheep could carry sufficient food and grain to provision 14 people and 7 ponies for a period of three months! More promising was the fact that the sheep would not need special fodder and grazing grounds, but could live on the scanty shrub, or *burtse*, which grows everywhere in this country (see, also, page 343).

On the 3d of August we were ready for the start. Forty yaks, 75 sheep, and some of the ponies were heavily laden with equipment, which still looked bulky enough in spite of all our efforts to carry only the most necessary provisions and instruments. Part of our luggage had been sent straight on to Turkestan via the Karakoram road with an Indian caravan.

A rainy, misty morning saw our party start. The sheep went ahead, bleating triumphantly, as if they knew that they were to be the only animals to survive the march across the highlands. As we turned back in our saddles, we saw the six stone huts of Phobrang disappear in the cold fog and heard the inhabitants shouting their blessings after us. Suddenly we realized that we were starting on our great adventure to the world's highest plateaus. The fog around us was like a curtain which had dropped between us and the outer world.

Crossing the Marsimik Pass, 18,420 feet high, we sighted the first herd of wild asses, which the Tibetans called "kiang." The animals looked quietly at our party,

LIFE ON THE STEPPES AND OASES OF CHINESE TURKESTAN



A VARIATION OF THE PEKING CART DOES TAXI DUTY

High-wheeled vehicles drawn, by sun-shaded horses, frequent the streets of Kashgar. Be the journey a short dash about town or a more extended trip overland, this vehicle serves. Automobiles are practically unknown.

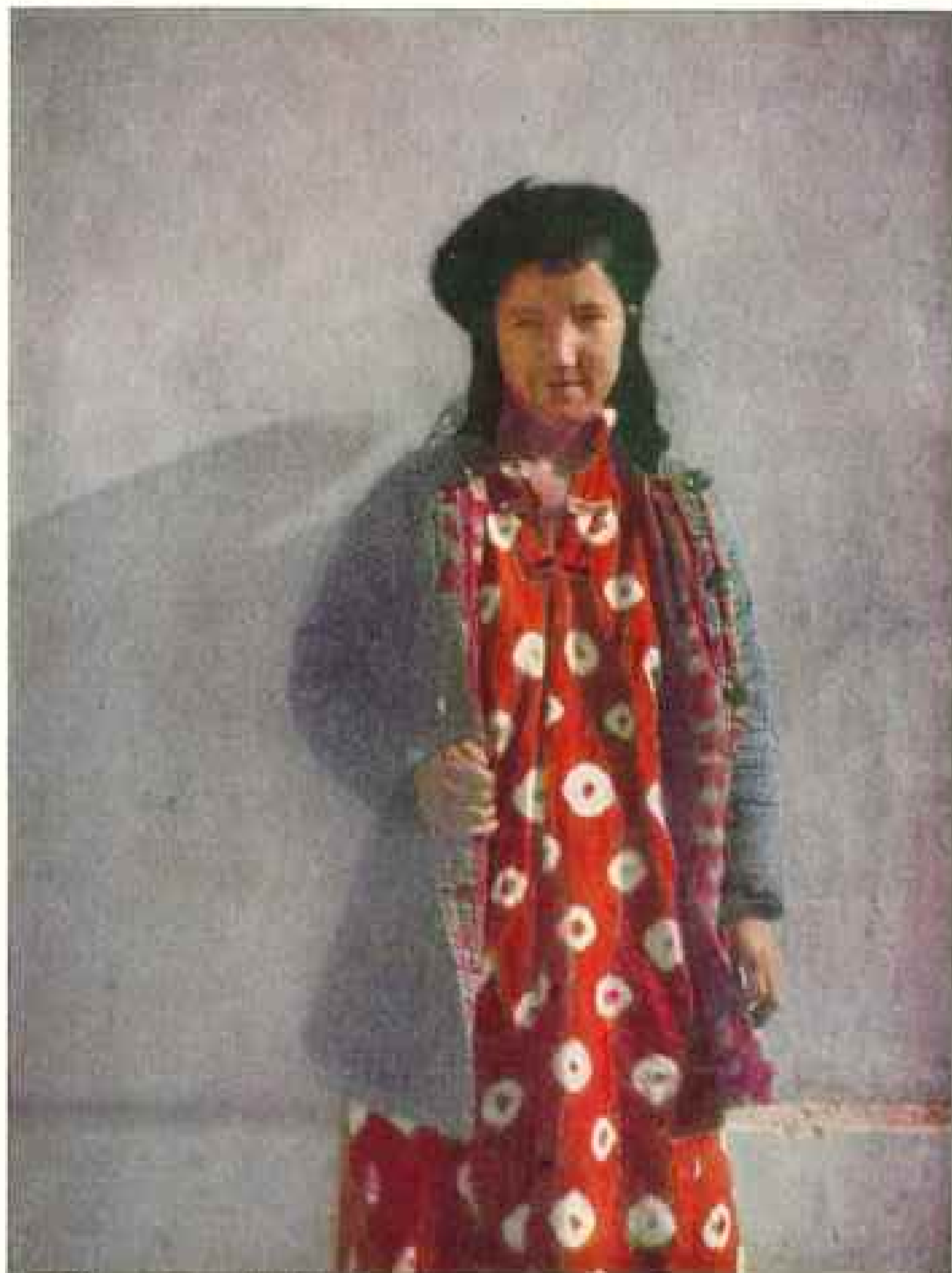


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Natural Color Photographs by W. Densford

MECCA-BOUND PILGRIMS REST BY THE WAY

The greater part of Chinese Turkestan's population is Mohammedan and every man of that faith regards a pilgrimage to the Holy City as a step along the road to Heaven.



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Natural Color Photographs by W. Bushard

FEW WOMEN OF CENTRAL ASIA CAN READ OR WRITE

At the left is the wife of a school teacher of the Swedish Mission at Yarkand. She is a person of note among her sisters because she has mastered the intricacies of the first two of the famous "three Rs." At the right, she and a friend are wearing handmade, heavily embroidered silk robes, costumes which are gradually disappearing before the competition of cheap, machine-made, imported cottons.



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**TURKESTAN'S SHIFTING SANDS HIDE MANY A WORK OF ART**

Excavations have revealed the ruins of lavishly decorated temples and palaces that bear mute witness to the glory of nearly forgotten civilizations and the futility of their struggle against the encroachments of the merciless desert.



Natural Color Photographs by W. Reinhard

**HE WRESTS HIS LIVING FROM THE DESERT**

Equipped with heavy boots, water bottle and small food rations, adventurers dig about in the sand wastes in search of valuable antiquities. Among their finds are remarkable manuscripts in old Brahmī, Khotanese, and other native tongues.



KIRGHIZ NOMADS OF THE KASHGAK MOUNTAIN REGION



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Natural Color Photographs by W. Bonshard

ONLY IN WINTER CAN ONE TRAVEL SAFELY THROUGH THE DUNES OF TAKLA MAKAN

At other seasons terrible sand storms sweep across the desert and make it impossible for man or beast to survive. The camel in the foreground carries the caravan's iron water tanks.

LIFE ON THE STEPPES AND OASES OF CHINESE TURKESTAN



SAND-ENTRUSTED MURALS AT DANDAN OILIK (See Below)



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Natural Color Photographs by W. Boushnel

PAINTINGS THAT HAVE SURVIVED NEARLY TWO MILLENNIUMS

Precious examples of Greek-Buddhist art at Dandan Oilik, an ancient shrine northeast of Khotan, give evidence of a former cultural exchange between the classic West and central Asia.



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#### WOMEN OF KHOTAN

The principal article of dress among the lower-class women is a kind of kimono made of coarse, hand-woven material. A bit of embroidery on the close-fitting cap is the sole attempt at adornment.



Natural Color Photographs by W. Bonbard

#### A YOUTHFUL LIVING BUDDHA

The little Skushok (Abbot) of Spitok and Sancar Monasteries is an amiable and intelligent boy. Under direction of his tutor he is expected to reabsorb all the earthly knowledge acquired in his former incarnation.



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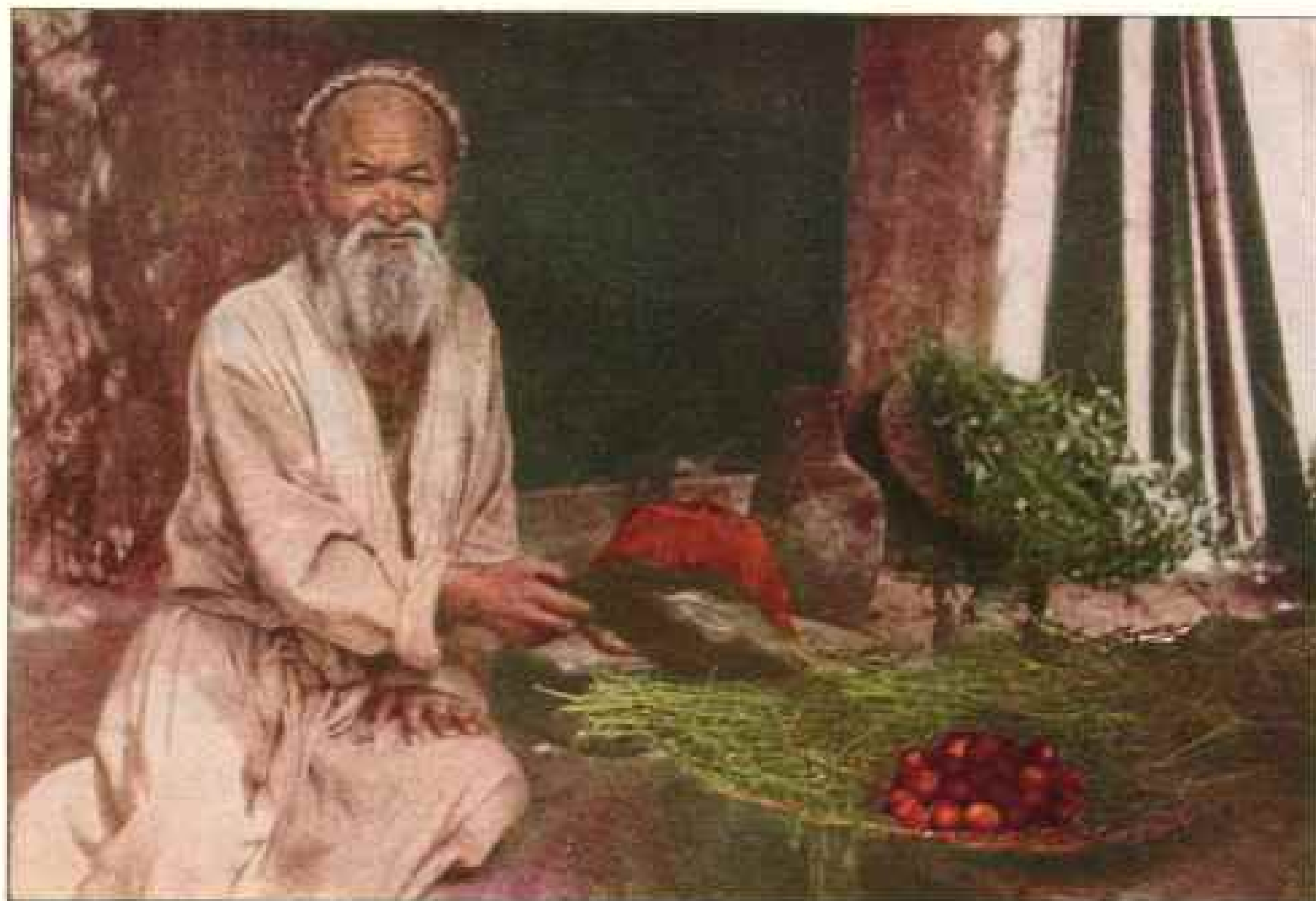
YARKAND DAUGHTERS OF A CHINESE FATHER AND  
A TURKI MOTHER



Natural Color Photographs by W. Boushard

CHINESE OF KASHGAR WORSHIP THIS GROTESQUE  
FIGURE OF AN ANCIENT WAR HERO





FINE FRUITS GRACE KASHGAR MARKETS

Apples, pears, peaches, apricots, grapes and melons of excellent quality grow in the oases of Chinese Turkistan.



© National Geographic Society

Natural Color Photographs by W. Dörsnerd

WOMEN OF YARKAND IN ANCIENT HAND-EMBROIDERED SILK ROBES

They represent the Christianized, well-educated type of Turki women. Their husbands help in the work of the Swedish Mission at Yarkand.

but when one of us slowly approached them they galloped away. The full-grown kiang is as large as a strong mule or pony and wears his yellowish-brown coat, flecked with lighter spots, most effectively. He is one of the rare representatives of the wild ass family who seems to have adapted himself perfectly to this high altitude, for we never met him below 16,000 feet.\*

Thermal springs at a grazing ground called Kiam gave us our last opportunity to enjoy a hot dip. Bosshard constructed a bathtub out of an upper tent fly, and while we were having a luxurious medicinal bath at an altitude of 17,200 feet our Ladakhis preferred to clean their faces with rancid butter.

This place offered our animals their last good grazing grounds.

Following the valley eastward, we crossed the first wintry snow fields, which even the summer sun was not strong enough to melt, and three days after leaving Kiam we reached the Lanak La, the frontier pass to Tibet proper.

#### SOUNDLESS GLORY ON TOP OF THE WORLD

Now we were actually on the "top of the world," for we were advancing through valleys 18,000 feet high. Snowy, unnamed ranges arose before our eyes, the towering boundary posts of no man's land. In the midst of the soundless glory of this untouched mountain world we marched and worked silently, as if afraid of our own human voices.

The weather here would have upset any forecast of meteorologists, for broiling sun alternated with icy hail and snow showers several times a day and terrific winds blew from the west every afternoon, as if the air demons, to whom our coolies prayed, wished to hasten our progress. The advance of our caravan was not very rapid—eight to twelve miles a day; sometimes only six. As a matter of fact, this was speedy enough, for we needed time to pursue our individual studies. During the longer halts we packed and registered our scientific trophies—plants, fossils, and rock specimens, or sometimes even animals—and developed our films or wrote in our diaries.

Occasionally these halts were also utilized for special explorations into the

\* See, also, in the National Geographic Society publication, "Horses of the World."

neighboring country. Thus Bosshard and I once climbed a peak, somewhat over 20,000 feet, from which we had our first glimpse of the world's most desolate plateaus.

It was a fine day, ideal for geographical and botanical studies. The air was so pure that even the most distant peaks and glaciers appeared in all their topographical detail. We first ascended through patches of edelweiss and beautiful alpine flora, but at 19,000 feet even the flowers left us and we were alone, for the coolies refused to climb higher. "The air has been taken out of me," said one of them, and indeed it was hard for us to climb the last 400 feet, as we were loaded with knapsacks and cameras.

Near the Lanak Pass three of the natives from Phohrang, who had accompanied us with nine yaks, left us. We asked them to take our Indian servant, Abdullah, and one of our shepherds along with them, as both were suffering severely from mountain sickness. They refused, as they feared the responsibility of taking two sick men on the fast return journey.

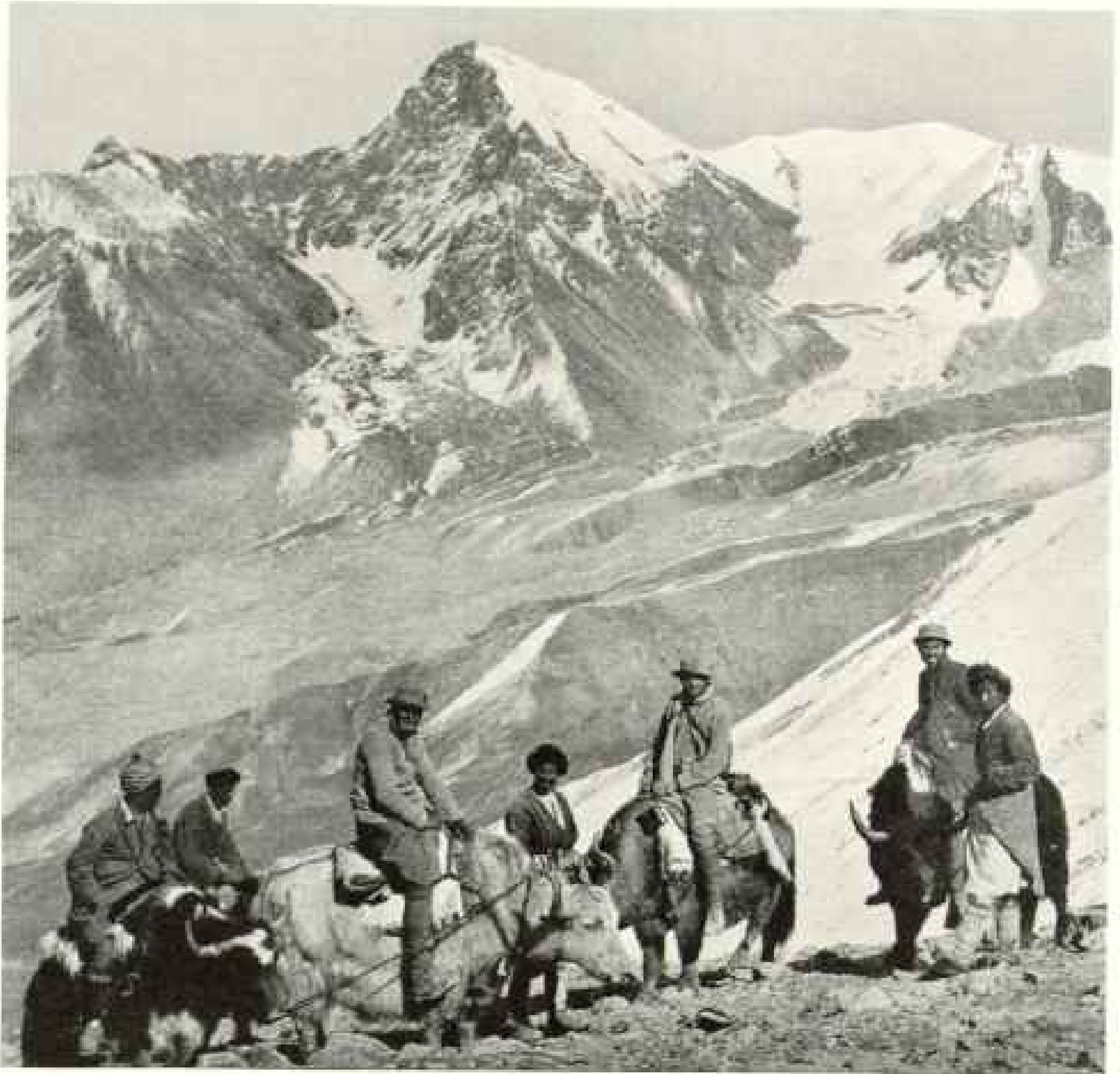
Because of the weakness of our two servants, we rested for a couple of days, but as this failed to strengthen them we pushed on in the hope of finding a lake which we believed to be located on a plateau known as the Lingzi Tang, where we intended to establish a base camp.

Murmuring prayers, in which they commended their tired souls to Allah and his almighty prophet, the two men, who had lost all hope of recovery, were tied on yaks by the Ladakhis, and we were under way once more.

After two days' march through undulating hills and mountains so utterly barren that even our sheep could not find a blade of grass for sustenance, we reached the lake, Sirigh Jilganang Kōl (the Lake of the Yellow Valley). This wide expanse of turquoise-colored water seemed to mirror the distant peaks of the Karakoram Mountains, which rose in the west as a jagged skyline of incomparable grandeur (see Color Plate XIII).

#### THE CAMP OF DEATH

Sabur Malik, the assistant caravan leader, discovered some grazing grounds a mile and a half from our camp, and, as our animals had been without grass for two days, we ordered the ponies to be led



YAKS CARRIED THE EXPEDITION SAFELY THROUGH THE TREACHEROUS, ICE-COVERED KUNLUN MOUNTAINS (SEE PAGES 346 AND 348)

These sure-footed animals provide the safest transport in the high mountains of Tibet and Chinese Turkestan. They are native to this region of cold, dry air, and when properly nourished are unaffected by the altitude.

there. The following morning the servant appeared at my tent, his face twitching with dismay, as he said in Hindustani, "Sahib, your horses have run away." Doubtless the coolies in charge had slept during the night and had forgotten to tie the animals in the usual way. Discouraged by their small rations and by the hardships of the march in that high altitude, our ponies had fled in search of a better life.

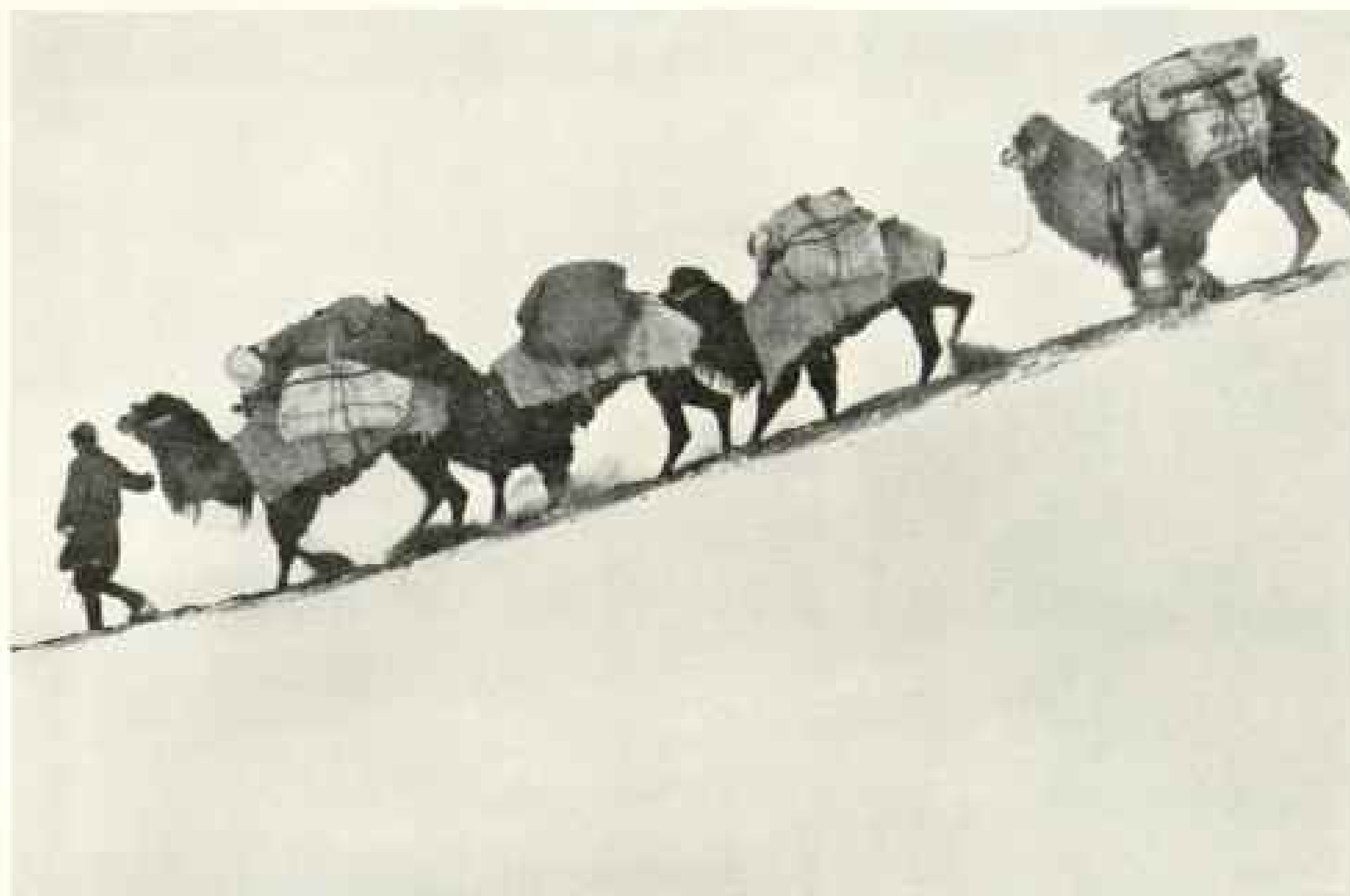
Our servants were divided into three parties and were sent out after the run-aways; but, as fresh snow had covered the animals' tracks, there was little chance that they would bring them back to camp. In

the meanwhile we were busy surveying along the eastern shore of the lake, which we found to be fresh.

The neighboring mountains proved to be a rich hunting ground for invertebrate fossils of the Jurassic and Cretaceous periods.

Several times while I was working in the field enormous flocks of birds passed by. They were wild geese and partridges coming from the north and flying south, bound for Kashmir and India. Their cries, ringing out over those barren plateaus, sounded like a triumphant call.

We earthbound folk soon found ourselves in a still more difficult position when



CAMELS DESCENDING SAND DUNES IN THE TAKLA MAKAN DESERT (SEE PAGE 357)

The place occupied by the pony among the Indians of the North American Plains and by the yak with the mountain folk of Tibet is held among desert dwellers by the camel.



SHEEP SAVED THE EXPEDITION FROM A TRANSPORT BREAKDOWN

After the ponies were lost and nearly all the yaks had died as a result of insufficient forage, sheep, loaded with all essential equipment and supplies, surmounted the difficulties of altitude and sparse pasturage to see the party safely into the inhabited regions of Turkestan.



A CAMEL CARAVAN CROSSING THE RIPPLED SANDS OF TAKLA MAKAN INTO THE HEART OF ASIA



WHEN SOME OF THE EXPEDITION'S YAKS DIED THEIR LOADS HAD TO BE CACHED BY THE WAY

The largest tents, motion-picture cameras, provisions, scientific collections, and private luggage were packed under a huge tent fly, secured with heavy stones, so that destructive wild animals could not reach them (see text, page 347).



#### PROSPECTING FOR WATER

In some places the water level is not very much below the surface, and it often was possible to refill the expedition's tanks from wells which the coolies dug in the deserts of Chinese Turkestan.



PHOTOGRAPHER AND COMPANION LOOK OUT OVER THE LAND OF THE GREAT SILENCE.

The solitude and complete absence of sound in the uninhabited regions of central Asia made a deep impression on members of the expedition. So accustomed did they become to the deep silence that when they returned to camp, near human settlements, they experienced difficulty in sleeping.

our yaks began to sicken. One morning two of them were found dead, and on examination we saw that their stomachs had been pierced by worms. Evidently the animals had been attacked by some pestilence, and we were prepared for further losses.

Now death began to attack our own ranks. Our shepherd, a friendly Ladakhi, had felt sick for a couple of days, and in spite of our medical care his condition took a turn for the worse. Pneumonia complicated his mountain sickness and he died. The returning search parties saw his stony

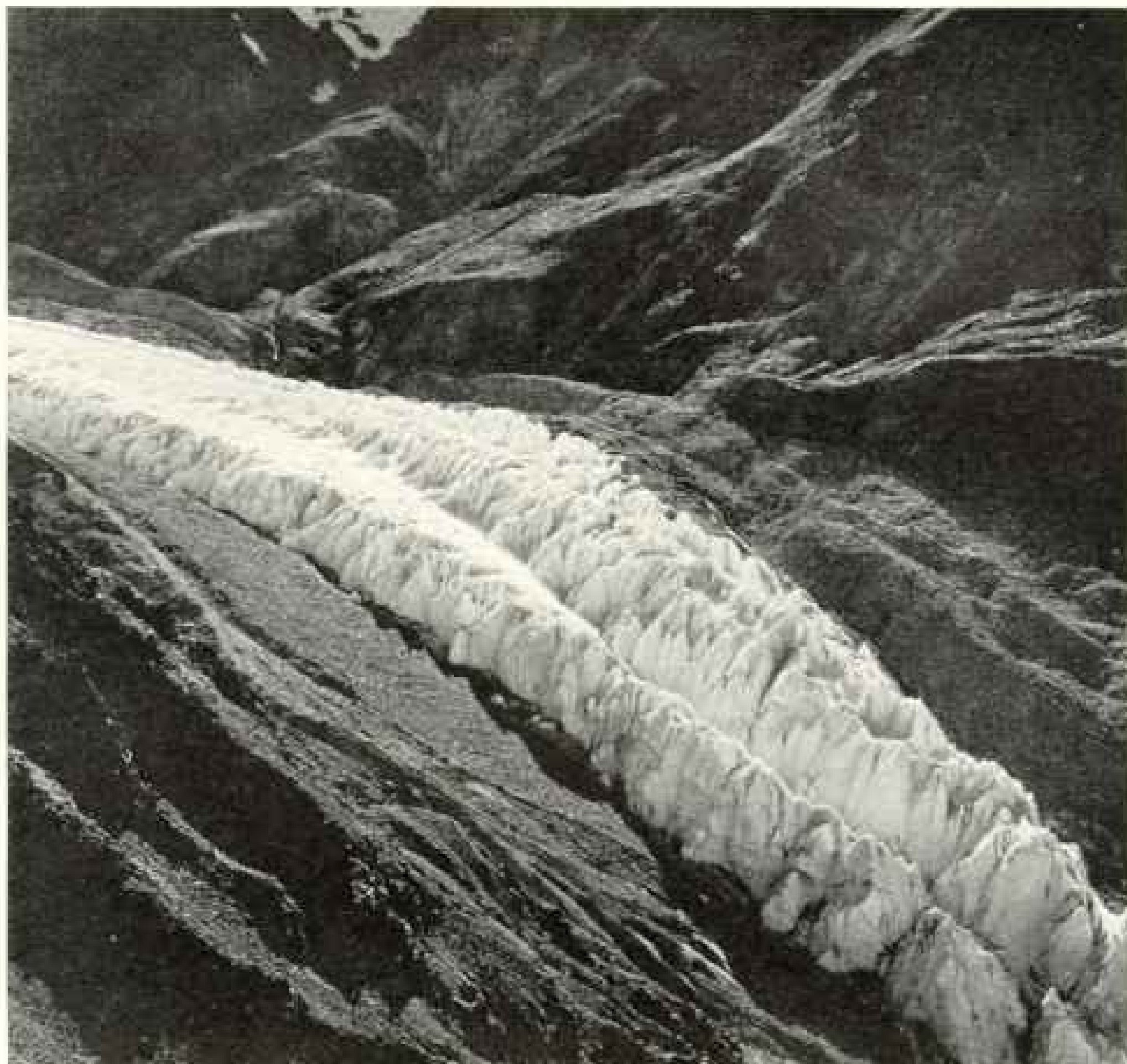
grave on top of the lake terrace, and as they came home without the ponies a general depression began to settle on our camp. We now had to face the prospect of advancing with a reduced and pestilence-stricken caravan.

A few gazelles and antelopes witnessed our start from this "camp of death." We marched through the soft soil, along the eastern shore of the lake, past some brightly colored limestone massifs, and entered the hilly country, where no vegetation and hardly any water could be discovered.

Several of our yaks had succumbed when we reached the great salt lake of the Aksai Chin Plateau. Nineteen yaks were left out of 31, and it seemed like a trick of fate that, now that we had found grass and good water, we should not have a sufficient number of animals left to carry out the original plan and proceed eastward along the Kunlun.

From the Lanak Pass up to here we crossed country which had never before been seen by white men. A new mountain world had been mapped by Dr. Trinkler, and the first geologic records of this region, which previously had been left blank on geologic maps, were made.

We decided to leave these high, hostile deserts and descend across the Kunlun to the oasis of Chinese Turkestan. The quickest route would lead us through the salt marshes of the Aksai Chin to the Karakash Valley, where we could expect to encounter human settlements again. This plan, however, had to be kept a strict



GLACIERS STRETCH LIKE GREAT WHITE TONGUES INTO VALLEYS OF  
THE KARAKORAM

Much was added to the world's knowledge of the geological history of these remote regions by the author's extensive observations (see text, page 366).

secret from our non-European companions. We had engaged them at Leh and intended to keep them with us as long as possible; but, as we had good reason to blame our servants for the unfortunate events of the last weeks, we decided to send them home to Leh as soon as we reached the Chinese frontier post.

On the other hand, our caravan leader figured that if we couldn't reach Chinese Turkestan before the winter, his masters would have to keep him and the others in service for another season, as the return journey to Leh was possible only between June and November. He tried to employ secret sabotage against our quick advance to the frontier post, and when we started

from the lake some of the coolies suddenly simulated sickness, while others refused to work. Our combined efforts helped to overcome the dangerous situation, and as Bosshard shot a wild yak in these days, our pots were filled with fresh meat again—a fact which brightened the mood of our companions considerably.

We realized that it was hopeless to carry our luggage and tents any farther, for if we wished to reach Chinese Turkestan via this new route it was essential that we march as quickly and as unhindered as possible. Our largest tents, motion-picture cameras, provisions, scientific collections, and private luggage were packed together under a huge tent fly and secured



with heavy stones, so that destructive wild animals would be unable to get at this valuable depot (see page 344).

#### THIRTY-SIX HOURS WITHOUT WATER

We left the camp with our 14 yaks and our waterbags filled, hoping to find an additional supply of fresh water at the northwestern corner of the salt lake. To our great surprise, however, we found the river beds totally dry and, our coolies having used up our small water supply, we were for 36 hours without a drop of water.

The forced march to a spot where we hoped to get some water by digging caused a further loss of nine yaks. This put our servants into a frenzy of excitement, and their loud prayers and religious songs rang out strangely in that cold, starlit night.

The march of 12 hours at an altitude of 17,500 feet, without any refreshment whatsoever and with eyes constantly straining for spots of moisture, had exhausted our strength. In addition to this, we felt considerable anxiety for Bosshard, whom we had lost during the search for water, but who finally returned late at night, after a trying, fruitless quest.

We hurried back to the old base camp off the lake, loaded our last yaks with blocks of ice, which originated in frozen underground water, and started once more toward the Kunlun Mountains.

I am certain that the Tibetan plains had never seen such a strange caravan as ours had grown to be. The sheep carried the provisions for two weeks, some photographic material, and the kitchen equipment. The tap of their little hoofs on the gravel and the chattering of the coolies, who were now forced to carry their personal luggage or leave it behind them, were the only sounds to be heard from our silent party. We now covered between 12 and 16 miles a day.

On the fourth day we crossed the frontier pass into Chinese Turkestan, the Khitai Dawan, 16,505 feet, and two days later we encountered the first sign of human habitation. It was only a roughly built shepherd's hut, but at the sight of it the faces of our coolies became radiant. They were so excited at the idea of meeting people within the next few days that they mistook the reflection of moonlight in the river for the campfires of shepherds and swore that rocks in the distance were the tents of nomads.

It was a thrill for all of us when one gay October morning we caught sight of the round felt tents of the Kirghiz nomads. There they stood, hidden amid the small bushes on the river's bank, and in front of them men and women were assembled, their bright-colored robes signaling a welcome, as they pointed in excitement at the strange party which was approaching their settlement. Not only was it a pleasant thing to come across human beings once again, after our 70 days' isolation, but it also meant the possibility of getting new transport supplies and fresh provisions.

The head of the settlement, accompanied by his son, came to meet us before we reached the yurts and welcomed us, shaking hands cordially and leading us to the largest tent, where a crowd of women and children cast curious glances at the dirty, bearded Europeans. We sat down in the yurt and received the official welcome of the chief and his wife. Milk and butter were now delicacies for us, and it was especially thrilling to listen to the melodious murmuring of a stream again.

#### AMERICAN JAZZ VS. BEETHOVEN

The only thing we could think of doing to express our appreciation was to give our hosts a gramophone concert. Seldom have I seen people so pleased with American jazz and seldom, I must add, have I seen people so disgusted with Beethoven's sonatas as were these gentle Kirghiz. When we played "The Moonlight Sonata" they all disappeared, smiling politely but sadly, as if we had hurt their feelings.

On October 7 we arrived at Suget Karaul, a lonely Chinese frontier post in the Karakash Valley. Considering that this post is the gateway through which caravans coming from India enter Chinese Turkestan, it has, with its mud walls and tiny garrison of six soldiers, a somewhat insignificant appearance; but from here we could send a camel caravan to rescue our abandoned luggage and bring it down to Yarkand, and here it was that we released our coolies. We ourselves now started with a newly hired pony caravan for the oasis of Chinese Turkestan.

We traversed our last high pass on yaks, as ponies are not sure-footed enough to negotiate this exceedingly difficult crossing, which led us downward over a frozen snow field 450 feet long. One of the pack ponies missed his step and rolled down,

LIFE ON THE STEPPES AND OASES OF CHINESE TURKESTAN



Haji Hashim Beg enjoys the royal sport of falconry

Pride in his family is matched by pride in his hunting bird, which is used for bringing down small game. Haji Hashim is a Chinese customhouse interpreter and a widely traveled man.

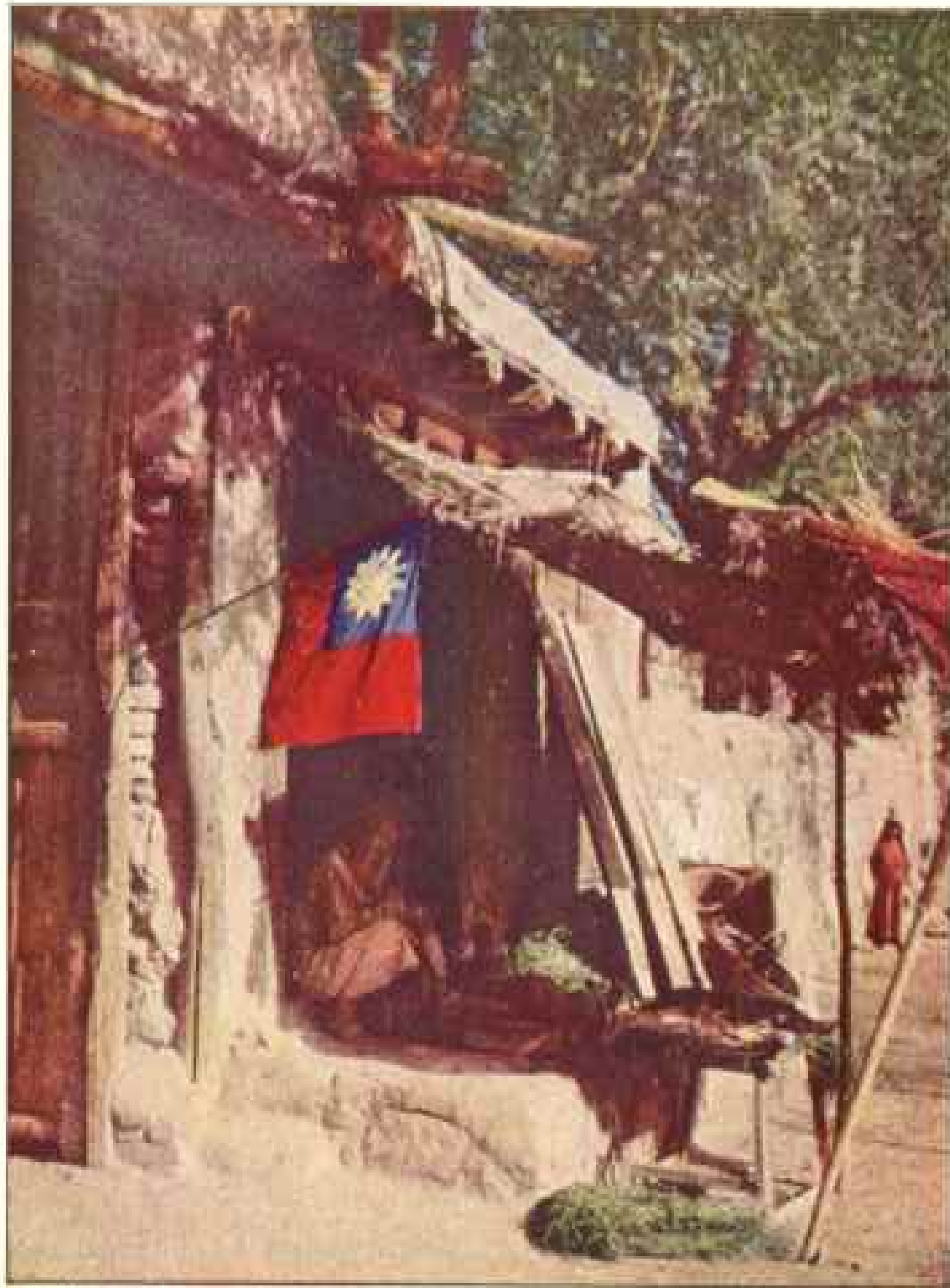


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Natural Color Photographs by W. Bushard

THE KARAKORAM RANGE PRESENTS A JAGGED SKYLINE NORTHWEST OF PANGONG LAKE

The mighty glaciers which once filled this and other similar broad valleys have dwindled away, but their residue has built up the valley floors and carpets their slopes.



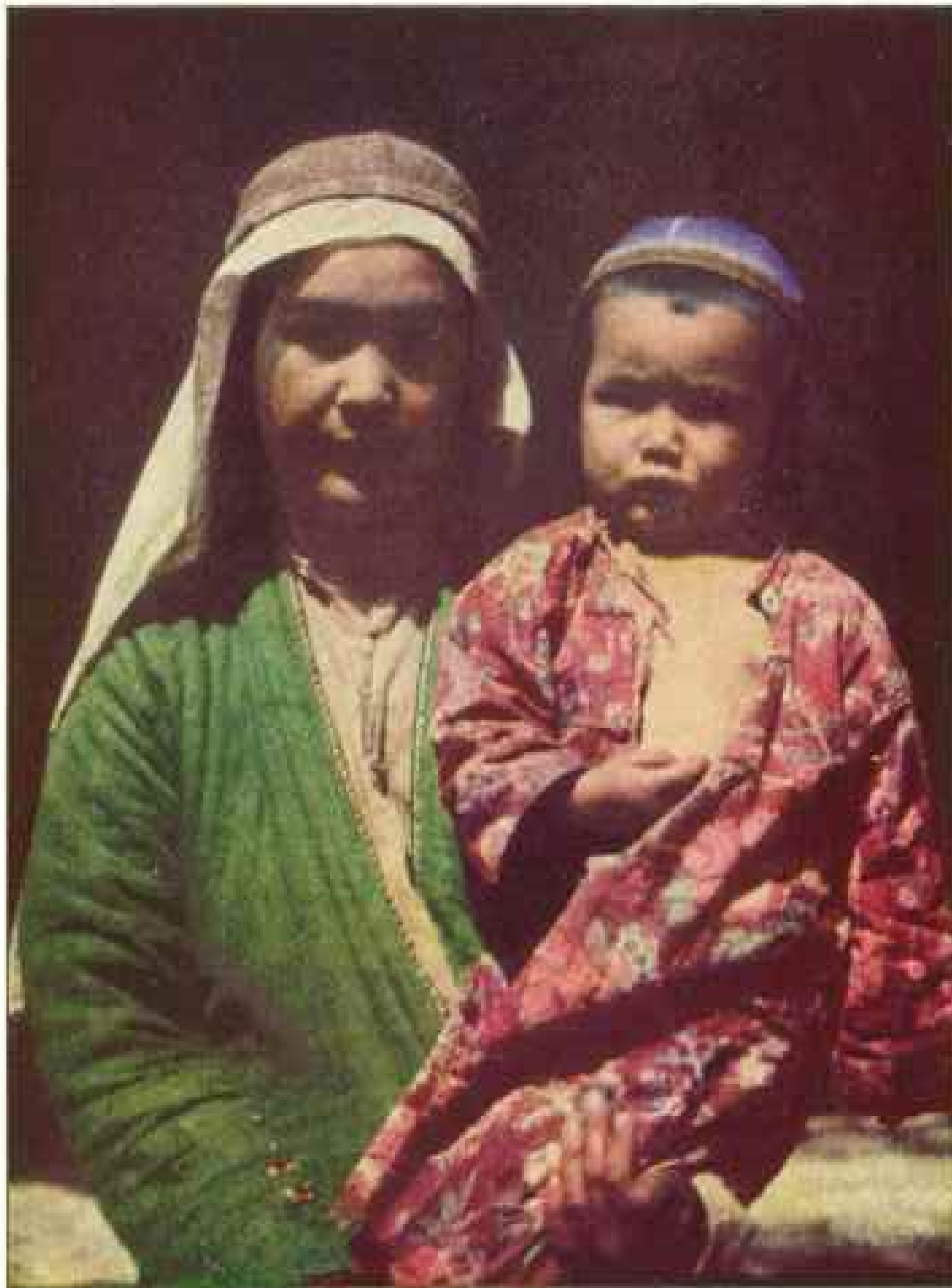
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**VENERABLE KASHGAR PAYS ALLEGIANCE TO A NEW FLAG**

After the fall of the Peking Government in June, 1925, shopkeepers of Kashgar made their streets gay with the blue, red and white of the Nationalist flag. By order of the new régime, the banners were displayed throughout the city for three days.



Natural Color Photographs by W. Bosward  
**A GEM FROM A KHOTAN WEAVER'S LOOM**

Prayer rugs are patterned not only to produce a pleasing effect but also to express some symbolic meaning. The design of the arch frequently serves to identify the region in which a piece has originated. Khotan was formerly a center of the rug industry.



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TWO GENERATIONS OF TURKESTAN LADIES

The mother's dress is a product of her own skill but her little daughter is clad in machine-made cotton cloth imported into Khotan from Russia.



Natural Color Photographs by W. Bosward

MODERN APPLICATION OF AN ANCIENT ART

There are still families which pass on from one generation to another the secrets of color, design, and weave which have made Turkestan's rugs world famous.



FELT REPLACES CANVAS IN A KIRGHIZ TENT

The framework is circular, made of willow sticks latticed together. Over this are placed large pieces of felt made from sheep and goat wool. Carpets are spread about on the ground inside.



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Natural Color Photographs by W. Bouchard

TEMPORARY EXILES OF HIGH ESTATE

Although these administrative officials bring their families with them, the term of service in Chinese Turkestan is regarded as a period of exile.

LIFE ON THE STEPPES AND OASIS OF CHINESE TURKESTAN



"LAKE OF THE YELLOW VALLEY"

Its turquoise waters, set high in the Tibetan plateau, mirror distant peaks of the lofty Karakoram Mountains. The rock in the foreground is rich in marine fossils.



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Natural Color Photographs by W. Boshard.

WHERE SITTING IS A MANLY ART

Kirghiz men and boys are not addicted to overexertion. Sometimes they look after the cattle, but more often they are content to let the women do the work while they go visiting male relatives.



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Natural Color Photographs by W. Boushard

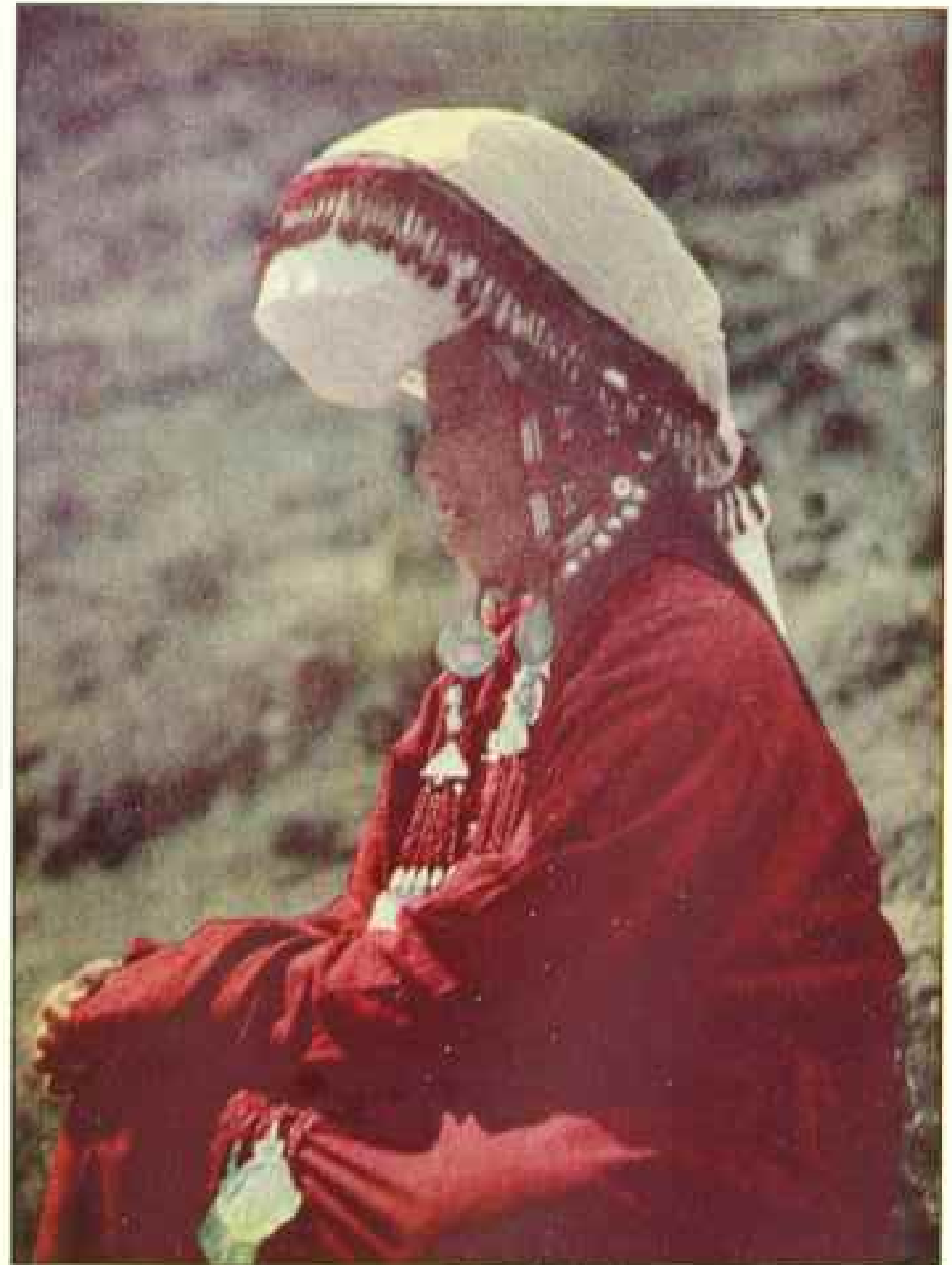
MANY RACES HAVE MET AND MINGLED ON THE STEPPES OF CENTRAL ASIA

The peoples and cultures of China, India, Tibet, Persia, Turkey, and Russia have intermixed with the indigenous tribes of Chinese Turkestan, and traces of all of them are to be found in the present-day inhabitants with their strange admixture of Aryan and Mongolian features and traits. The young girl is a Turki with distinct traces of Mongol blood. The man, holding an excavated Buddha's head in his hand, is an Aryan type.



© National Geographic Society  
 GULAM MOHAMMED HAS BEEN THIRTY YEARS IN TURKISTAN

Long residence has made the veteran headman of the British Consulate at Kashgar so thoroughly conversant with the country's ways that he is of inestimable value to His Britannic Majesty's local representative.



Natural Color Photographs by W. Bonhard  
 HER HEADDRESS SERVES AS HAT AND PARASOL COMBINED

Kirghiz women are proud of these elaborate creations, which frequently contain as much as 20 yards of cloth. They also are fond of displaying silver and coral ornaments on special occasions.





STRONG ARMS AND STURDY BACKS TAKE THE PLACE OF PERAMBULATORS

Kirghiz mothers carry their babies for long distances either in arms or pickaback. They are less self-effacing than most Moslem members of their sex, and when their husbands are not about to interfere, they offer no objection to being photographed.



© National Geographic Society

Natural Color Photographs by W. Brantford

YOUNGER TURKI WOMEN SELDOM WEAR THE VEIL.

Matrons of the old school still cling to the ancient Islamic tradition, but their daughters have for the most part abandoned it. Eyebrows painted straight across the forehead now represent the last word in feminine fashion.

and I noticed some Turkis waiting like vultures to swoop on the fallen animal and rob him of his hoofs, horseshoes, and skin, which they sell on bazaar days in the neighboring town. I have been told that they make a very good profit out of this business during the four months that the pass is open for caravan travel.

Once across the pass, a guard of honor sent by the Chinese magistrate of the next city surrounded us and led us with surprising speed down the Sanju Valley. As every village through which we passed added at least two officials to our party, we soon had about 24 riders with us. Another six officials greeted us a mile before we reached the city of Guma, or Pishan, and our party, galloping at top speed, arrived in a most theatrical manner, wrapped in a cloud of dust.

The Chinese magistrate, or *amban*, offered us a delicious dinner: beans in sugar water and a strong native liquor are all I can remember of this meal, which lasted several hours. Soldiers accompanied us home, and a sentinel was placed before our door, for the *amban* wanted to keep us here until he had received word from the Governor General; but, as the Governor was some 800 miles away and as a telegram from Kashgar (which is six days from Guma) to the capital, Urumtsi, requires two weeks, we protested energetically against our imprisonment.

Finally we succeeded in starting from Guma to Yarkand, a great city on the caravan road which runs to Kashgar along the southern edge of the Takla Makan Desert.

#### DUNES OVERLAP THE ROAD TO YARKAND

On this ride we first became acquainted with the desert. The road to Yarkand is locally overlapped by migrating sand dunes, which stretch in endless waves northward up to the Tien Shan and eastward to the Gobi. This desert has been advancing for at least 1,500 years, and where the monotonous dunes now spread were once flowers and orchards and rich human settlements, the ruins of which pierce through the shifting sands.

A short stay at Yarkand was a pleasant break in our journey to Kashgar, for it was here that we were welcomed by members of the Swedish Mission. They were the first white people we had seen in four and a half months, and to be received with

open-hearted hospitality naturally meant a great deal to us.

In this remote corner of central Asia the Swedes have established a number of schools and dispensaries which do a great deal to relieve the sufferings of the native population. No matter what one's opinion of mission work may be, the idealism and courage with which these small communities pursue their difficult task deserve full admiration.

This westernmost territory of China seems only slightly touched by the rapid development which has enabled neighboring countries, such as India and Russian Turkestan, to outgrow some of their primitive standards. It is a country without any industry in the modern sense, without any higher native schools—a country where harmless bicycles are smashed by an infuriated mob, which is proud of having killed these "messengers of hell." For more than two thousand years it was a playground for Asiatic imperialistic powers. Mongol emperors, Chinese and native potentates, and even generals of Alexander the Great's army, conquered its fertile oasis.

The population of Chinese Turkestan reflects the racial intermingling of the once conflicting tribes. It would be a mistake, however, to think that this country throughout its history was dominated by half-Mongolian and half-Turkish or Tibetan tribes, for there is ample evidence that its ancient inhabitants were nomads of Aryan stock. Relics of their ancient culture are scattered all over the country, whether in the form of highly artistic wall paintings, or in ancient documents written in Uiguric Sanskrit dialect, or in the form of some few living descendants of the blue-eyed, fair-complexioned race. Nowadays, only a small percentage of the population is Chinese, but these hold the important offices (see Color Plate XII).

At Kashgar, the Chinese Governor received us cordially and promised us his help in carrying out our future plans.

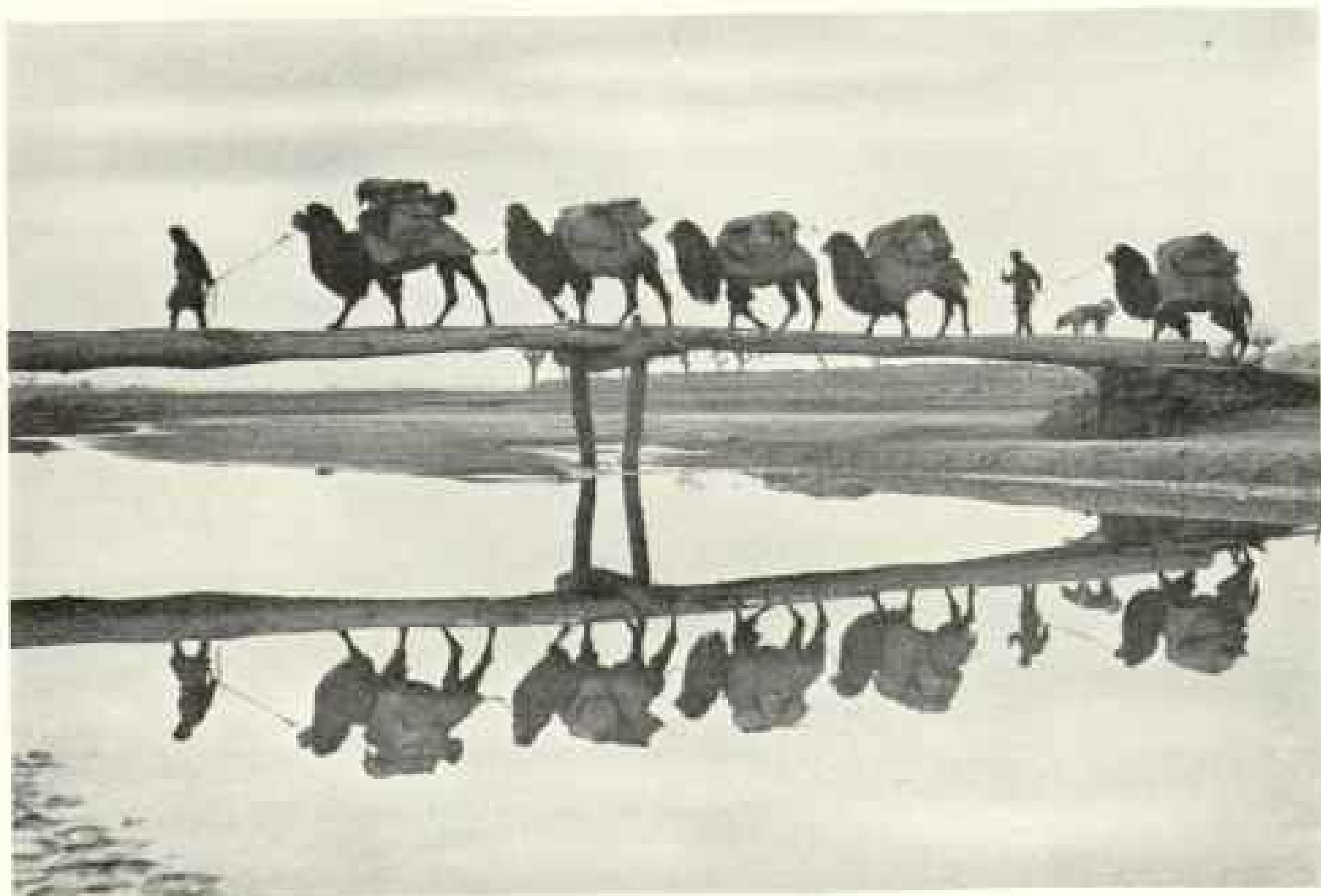
We now decided to divide into two parties. While my two companions wanted to cross the southern part of the desert, between Kashgar and east of Khotan, a journey of about 300 miles, in quest of geographic and archeologic data, I set out for geographic and geologic exploration in the western Kunlun Range. But March had arrived before I could cross the higher



RAWAK STUPA'S WHITE BRICK PILE RISES AMONG THE DUNES OF TAKLA MAKAN. This ruined Buddhist shrine, in the vicinity of Khotan, is thought to belong to the period between the fourth and seventh centuries of the Christian Era.



A BRIDEGROOM LENDS MUSICAL ENCOURAGEMENT TO HIS WEAVER. Kirghiz custom decrees that the women shall do practically all of the work, but this young man lightens his wife's burden by singing to her as she toils.



ON THE ROAD TO KHOTAN

The Karakash River here dwindles to an unimportant-looking brook and soon perishes, absorbed in the sands of the desert.



PHONOGRAPH MUSIC HELD THE KIRGHIZ SPELLBOUND

It was the first time any of them had ever heard "canned music," and they displayed a marked preference for jazz rather than the classics (see text, page 348).



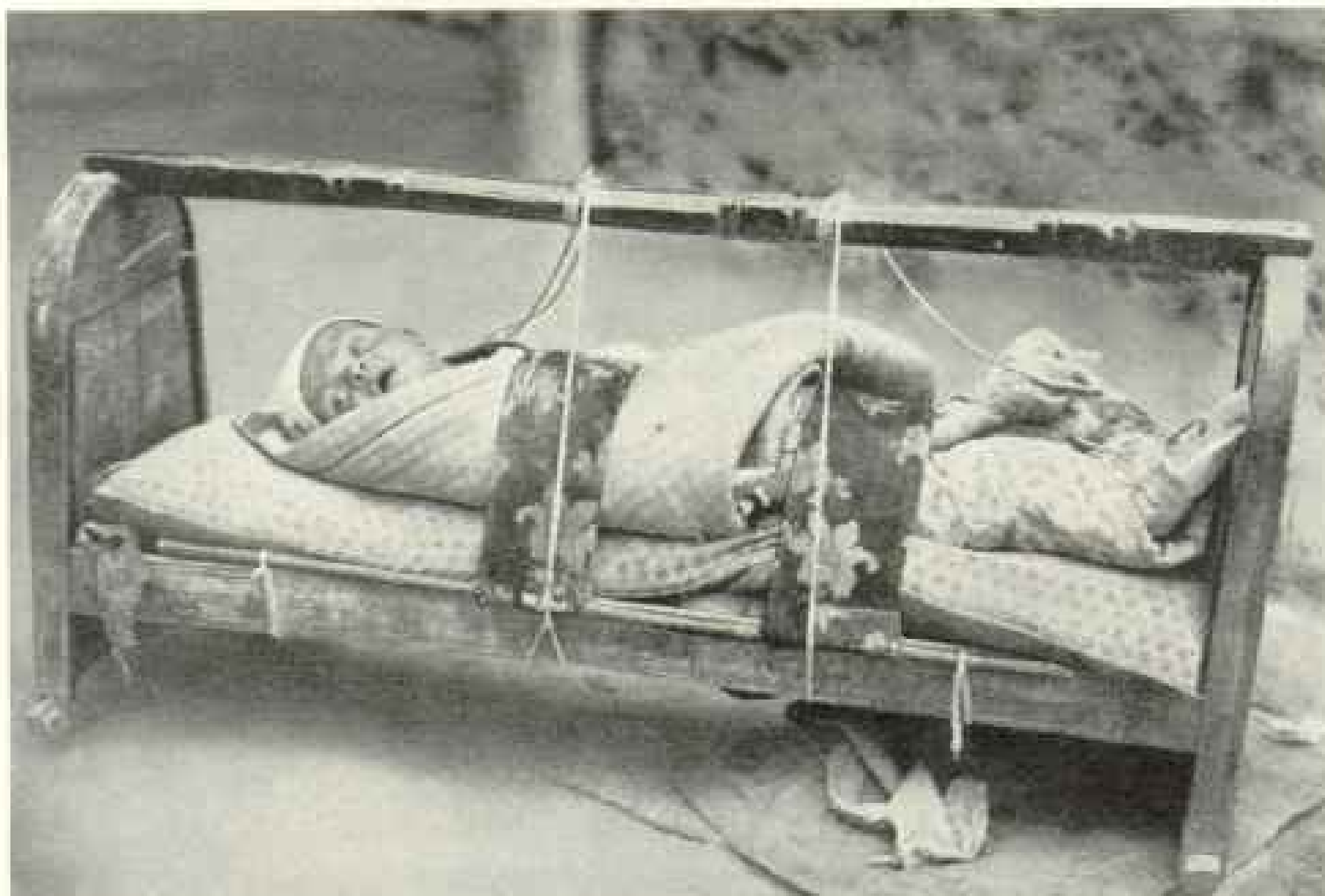
A COURT SCENE AT KARGHALIK

The administration of justice throughout Chinese Turkestan is in the hands of the ruling race. Tribal chiefs are allowed some authority in small matters, but questions of importance must come before the Chinese governors.



YARKAND STREET SINGERS PERFORM FOR ALL WHO WISH TO LISTEN

Their stage a street corner or a clearing in the park, these musicians manage to make a living from the generosity of their musically minded fellow townsmen.



SNUG AS A BUG IN A RUG IN A TURKESTAN CRADLE

The ropes enable mother or sister, working at a distance, to set the cradle in motion when baby gets restless. As soon as the child can walk, a robe is woven for it, which is made to last for years by the addition of piece after piece to the hem.



BABY'S DINNER DOESN'T INTERFERE WITH THIS YARKAND MOTHER'S WORK

Her duties are too numerous to permit her to do only one thing at a time, so while she feeds her youngest she spins out yarn to be used for the family wardrobe.



#### HOSPITALITY IS A CARDINAL VIRTUE AMONG THE KIRGHIZ

The homes and resources of even the poorest of these nomads are ever open to the peaceably disposed traveler. Their yurts are warm and waterproof and are often furnished inside with fine old rugs and soft, warm felts.

mountains, as the snow does not melt till that time.

#### A FORGOTTEN TRIBE

A week's ride from Karghalik, a smaller town 40 miles south of Yarkand, brought me and my four native companions once more into alpine regions. Here lie the grazing grounds of the almost forgotten race which two thousand years ago ruled over central Asia. The Pachpooos, or Pakhpuluks, as this tribe is called—red-haired, stockily built, and fair-complexioned—reminded me in appearance of Tyrolean peasants. Their mode of life, however, bears more resemblance to that of the cave-man, for they inhabit rock caves or roughly built stone huts and live by hunting and sheep-raising. Their language is different from the eastern Turkish dialect, and it was therefore difficult for us to under-

stand their motives when, armed with old matchlocks and clad in big sheepskins, they appeared in our camp.

We arranged an ibex hunt with them, for this wild mountain goat wanders in large herds over the alpine meadows of the Kunlun. This proved to be a successful trip, and when we returned to camp I wanted to reward our two guides and offered them a fair share of the meat and some money besides; but they refused to take the Chinese silver coin, the first money which they had ever seen in their lives; instead, they asked for the skin of the ibex, which they needed urgently for shoes.

These hunters are so poor that they consider sugar as the most extravagant delicacy, and we were told that when they shoot a goat with their matchlock they carefully extract the bullet in order to use it again.



MARCHING INTO THE SKY

When winter reigns in the central Asian desert and fogs cover the ground, all the lines of the landscape, the dunes, and the horizon disappear. Seen from a short distance, the camels look as if they were marching into the blue.

A few weeks later one of the men guided me to a cave which proved to be a very ancient settlement of probably prehistoric age. Its walls were covered with rock inscriptions and peculiar petroglyphs, which even our Pachpoo man could not decipher. The cave was partly filled up with a clay deposit which covered the lower part of the artistically ornamented walls. Stylistic figures of men and animals here bear witness to the existence of another vanished race, which may have lived long before the ancient Aryan people invaded central Asia.

#### DESERT YIELDS TRACES OF ANCIENT CULTURE

Dr. Trinkler and Bosshard had in the meantime searched for traces of ancient culture in the desert region. Fighting the sea of sand with a camel caravan for ten

days, they discovered an ancient site some 20 miles north of the present caravan road, which runs along the southern edge of the desert. Ruins of Buddhistic shrines containing a number of painted statues, Chinese coins of the third century of the Christian Era, and several implements pointed to one of the old settlements already mentioned in the annals of the Tang period. At that time a silk-trading road existed which connected this far-away land with eastern China, and it was along this road that an exchange not only of merchandise, but subsequently an interchange of Western and Eastern civilization, took place.

Through Alexander's famous campaign to Bactria, Greek influence came into this country and some time later became strong enough to mold the cultural character of the then more civilized races. Especially around the city of Khotan my companions





THE AUTHOR CURED MANY NATIVE ILLS

His medicine was in great demand and people came from far places to be treated by the "white magician." Many of the cases were infections resulting from neglected and dirty cuts or wounds. For the most part, these responded readily to antiseptic treatment.



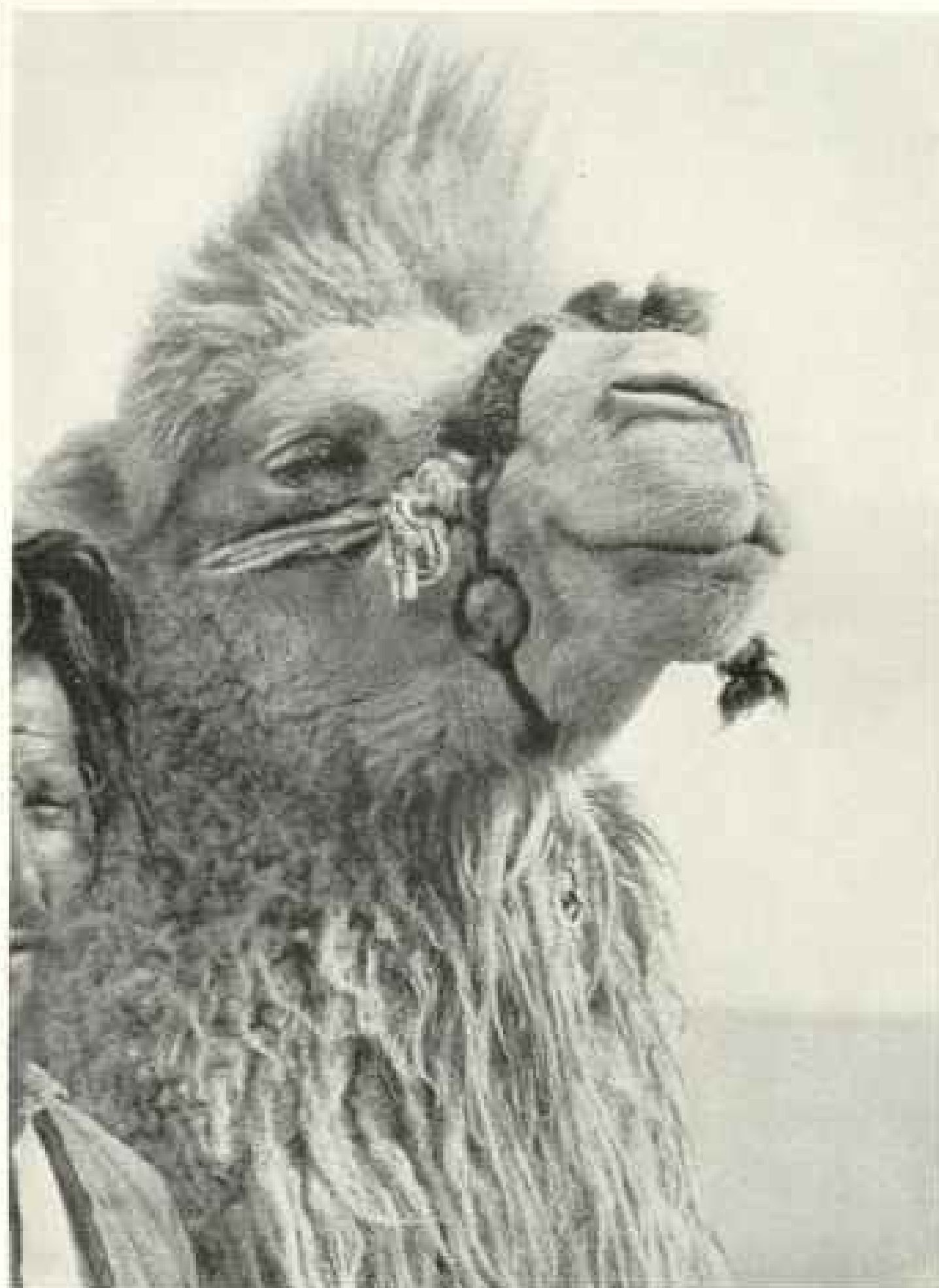
A DANCING DERVISH OF KHOTAN

He is what might be termed a Mohammedan sacred tramp, who travels from place to place with a group of other religious enthusiasts, giving performances of mystic dances. The old dervish's huge turban of green cloth (the color of the Prophet) is surmounted by tufts of black yak hair.



THE MAIN SQUARE OF KASHGAR ON A BAZAAR DAY

This city of 80,000 inhabitants occupies the largest oasis in Chinese Turkestan and has been an important trading center for many years. As the mosque suggests, the population is largely Mohammedan.



THE LEADER OF THE CARAVAN

A fine white camel, purchased at Karghalik for the equivalent of \$45. It is a Bactrian, a species especially well suited to the rigors of travel in central Asia.

were successful in excavating some ancient Greek-Buddhistic shrines, and the statues and fresco paintings which had been preserved under the soft sand showed all the marks of classic Greek art, especially in the style of Buddha figures.

Even a Greek gem showing the head of Pallas Athene was among their finds, and this successful work spurred my companions to search for more ruins; but, unfortunately, the Chinese officials, obedient to the new laws which prohibit scientific research work in China unless it is done in cooperation with Chinese institutions, frowned on our plans.

Difficulties of various kinds, fantastic rumors about our scientific work, and wide-

spread suspicion created insurmountable obstacles. We were obliged to return to Kashgar, and after fruitless negotiations with our influential friend, the Governor, we decided to leave the country and return to Kashmir.

Bosshard alone stayed at Kashgar, continuing our efforts to have our valuable collections freed from confiscation. Finally, after four months' effort, he succeeded in rescuing the fruits of our labor, and so he was able to return with them via Russia back to Germany.

Dr. Trinkler and I left Kashgar at the end of June, 1928, parting from our friend and from the British consuls, with whom we had spent many delightful hours in their restful and beautiful home.

#### BACK IN KASHMIR

After having re-crossed the Kunlun Mountains, we at last regained the rocky ground of those high plains which spread out south of this range. Here we were back on Kashmir territory, and could study in peace and complete our main work concerning the former glaciation and the geologic history of this region. From the shore of the Pangong Lake in the south to the farther slope of the Kunlun in the north, Dr. Trinkler had followed the traces of the Ice Age, which in the former period of our earth must have covered great portions of northwest Tibet and Kashmir. Two geologic cross-sections across the highest mountain belt in the world and invertebrate fossils from various formations were among the results of my own work. Through the discovery of new Buddhistic



A CRUMBLING SENTINEL STANDS GUARD IN THE DESERT

The natural rock formation, an eroded remnant of ancient clay deposits, serves as a landmark along the road between Kashgar and Yarkand. The fort on top of it was built by the Chinese a century or so ago, at a time when banditry was rife.

shrines along the southern edge of the Takla Makan Desert, new light had been cast on the distribution of Greek-Buddhist culture in central Asia.

On September 18 we looked down from a lofty pass north of Leh, the twelfth over 17,500 feet in height which we had crossed within 16 months. Almost 3,000 miles of

travel lay behind us. The green oasis of Leh seemed to us, after our long caravan trek, like the gateway to civilization. The first motor-car which I met, in the Sind Valley, near Srinagar, brought me with a sudden jump back to an age from whose spirit I had for so long a time been completely removed.

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*Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE should be received in the office of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your May number, The Society should be notified of your new address not later than April first.*



Photograph by American Colony Photographers

THE GOAL OF THE CRUSADERS: THE ENTRANCE TO THE CHURCH OF THE HOLY SEPULCHER, IN JERUSALEM

Inside this sacred structure, Godfrey de Bouillon, the Crusaders' first ruler of Jerusalem, refused to assume the title of king, but took oath to be a just "Baron of Jerusalem and Advocate of the Holy Sepulcher," and to maintain the laws. Here, too, he and his brother, Baldwin I, the first king, and other leaders were buried, but their tombs were later destroyed. The Crusaders displayed great zeal in beautifying this church, which, according to tradition, shelters the rock tomb of the Savior.

# CRUSADER CASTLES OF THE NEAR EAST

BY WILLIAM H. HALL

AUTHOR OF "ANTIOCH THE GLORIOUS," IN THE NATIONAL GEOGRAPHIC MAGAZINE.

TO MOST of us the word "Crusader" brings a vision of a wandering knight in armor clad, with sword and shield and war horse. We think of Richard the Lion-hearted, with broadsword and battle-ax, and of Saladin on an Arab steed charging, curved scimitar in hand. It is "Ivanhoe" and "The Talisman" and chivalry. It is the Holy City of Jerusalem, the Holy Sepulcher, and castles with towers and turrets and streaming banners. In other words, the name Crusader is a synonym for the age of medieval romance.

And it is true that into the two hundred years when armies from western Europe were battling for a kingdom in the East, there was breathed a spirit of romantic fervor—religious, social, commercial, and military—that has never ceased to challenge the admiration and wonder of succeeding centuries.

What matters it to you and me if delving scholars have unearthed unseemly quarrels arising from bitter jealousies between Count Raymond of Toulouse and Bohemond, the Norman prince? That Saladin gained Jerusalem because King Guy, with headstrong obstinacy, refused the wiser counsel of Balian and Raymond of Tripoli, descendant of the great count of Toulouse? That the knightly orders were largely engaged in banking operations, and that in reality there was more of commerce than of fighting?

Most of us will still be thrilled with the story of Peter the Hermit, Pope Urban's call to the holy war, the army of children marching across Europe or sold as slaves in the Orient. We shall still regard the period from 1098, when Antioch was captured, to 1291, when the Western knights finally sailed away into the glow of the setting sun, as *par excellence* the age when knighthood was in flower. We shall still love to hear the names of Godfrey de Bouillon, the hero of Jerusalem; of Baldwin, the first king; of Raymond and Bohemond and Tancred; and shall always believe that the Saracen Saladin was, perhaps, the noblest knight of all.

It is the land where these heroes lived, the castles they constructed for the maintenance of their feudal power, the methods of defense which they established, and how those splendid memorials may be seen to-day, that here concern our thoughts. We wish to outline the boundaries that divided Crusader from Saracen, to know where and why their castles were built. We want to see the outer walls and inner moats, to thread the dark and winding passageways. We wish to place in imagination the banner of the Knights Hospitalers to wave over the chatelain's tower of Margab or Kalat-el-Husn (see pages 372 and 382).

Hence my purpose is not to give a history of the Crusades, except just enough to refresh one's mind on the main outline and to furnish a background against which to picture some of those works of military architecture that still exist, not as ruins, but almost intact to-day, six hundred years after the Crusades closed.

## ANTIOCH WAS THE CRUSADERS' FIRST GOAL

Numerous causes are cited for the call of the First Crusade. The one most popularly given, and doubtless the one that was most prominent in the people's minds, was the treatment to which pilgrims were subjected, both on the roads of Palestine and in Jerusalem itself. The dangers of the highways are pictured by Moslem and Christian writers alike. But, be that as it may, great armies were assembled, noble leaders presented themselves, and in 1097-1098 they marched over the Amanus Mountains, in northern Syria, swarmed through the so-called Syrian Gates at Balian, and laid siege to the city of Antioch.

After many hardships, the walls were scaled and the citadel taken. Antioch remained throughout the whole period of the Crusades the capital of a Christian principedom and the possession of the families of Bohemond and Tancred, the Norman princes.

In the meantime Baldwin, brother of Godfrey de Bouillon, had turned toward the east to carve out for himself a king-



Photograph by L. Bender

#### NEAR ABSUF RICHARD OF THE LION HEART RAISED HIS BATTLE CRY

In the campaign to recover Jerusalem, which the Moslems had retaken in 1187, Richard crushed Saladin here in 1191—his greatest achievement in Palestine. Amid shouts of "God and the Holy Sepulcher aid us!"; amid hailstorms of darts and arrows, and the ear-splitting din of pipe and timbrel, drum, rattle, gong, and cymbal, the Frankish host thundered down on the Saracens. The Crusader monument is gradually crumbling.

dora. He captured Edessa, the modern Urfa, and there established a stronghold that for more than 40 years was the eastern bulwark against Moslem attack from the Mesopotamian Valley.

The year following the fall of Antioch the Crusading army, princes and knights, the rank and file of soldiers, together with Italian ships along the coast, moved on to the supreme goal of the expedition, Jerusalem.

The Crusaders were inflamed with holy zeal when they beheld the walls and towers, the mosque on the Temple Area, and the dome of the Church of the Holy Sepulcher. Immediately the siege began. The various leaders attacked from different sides. With bows and arrows, with cata-

pults that hurled huge stones, and with battering rams to break down the masonry walls, they pressed the fight.

Finally, on the north wall, whence the army of the Roman Emperor Titus had gained entrance a thousand years before and where Godfrey de Bouillon had erected a wooden siege tower, the first entrance was effected. When, at length, the other leaders saw Godfrey's banner floating over a captured tower, they, too, pressed the battle, and soon the whole Crusading army had burst into the city (see page 387).

We shall not here recount the disgraceful story of massacre and plunder that ensued, nor contrast it with the more humane and Christian behavior of the Sultan Saladin and his Mohammedan soldiers 88 years

later; but the city was won, a government established, and the Crusader Kingdom of Jerusalem became a reality.

Godfrey de Bouillon was, of course, the hero of the siege. The Crusaders wished to make him king; but, like Raymond of Toulouse, who was first proposed for this honor, he is said to have replied, "God forbid that I should wear a crown of gold where my Master wore a crown of thorns." He ruled for a year as a military leader, and after his death his brother, Baldwin of Edessa, was crowned first King of Jerusalem.

Then followed some fifty years of organization, and the erection of castles all along the seacoast and the boundaries to protect the frontier.

Besides the Kingdom of Jerusalem, the Principality of Antioch, and the County of Edessa, already founded, a fourth division, the County of Tripoli, lying midway between Jerusalem and Antioch, was established by Raymond of Toulouse. This County of Tripoli existed to the end of the Crusades, and it is in this territory that we find to-day the largest castles and the best-preserved examples of the military architectural genius of the age. Jubail, Tripoli, Tartous, Safita, Margab, and the queen of all, Kalat-el-Husn, or the "Krak des Chevaliers," are all within the boundaries of this district (see pages 372-3-4, 381-2).

#### SALADIN TAKES UP THE PROPHECY'S CAUSE

Eighty years after the establishment of the Kingdom of Jerusalem, there arose the Moslem hero, Sala-ud-din ibn Ayyub, or Saladin of our English histories. He and his immediate predecessors had gradually succeeded in uniting the various city principalities—Aleppo, Hama, Homs, Baalbek, and Damascus—together with Egypt. Once this Syrian Moslem power could present a united front under such an able leader as Saladin, the very existence of the Latin power was threatened. Besides, there were serious jealousies among the Western leaders.

At last, in midsummer of the year 1187, Saladin led his army to the plain west of the Sea of Galilee. The Crusader army assembled near the rocky points known as the Horns of Hattin, pointed out to-day as the scene of Christ's Sermon on the Mount. Finally, surrounded on every side, cut off from all water supply, and suffo-



Drawn by A. H. Bumstead

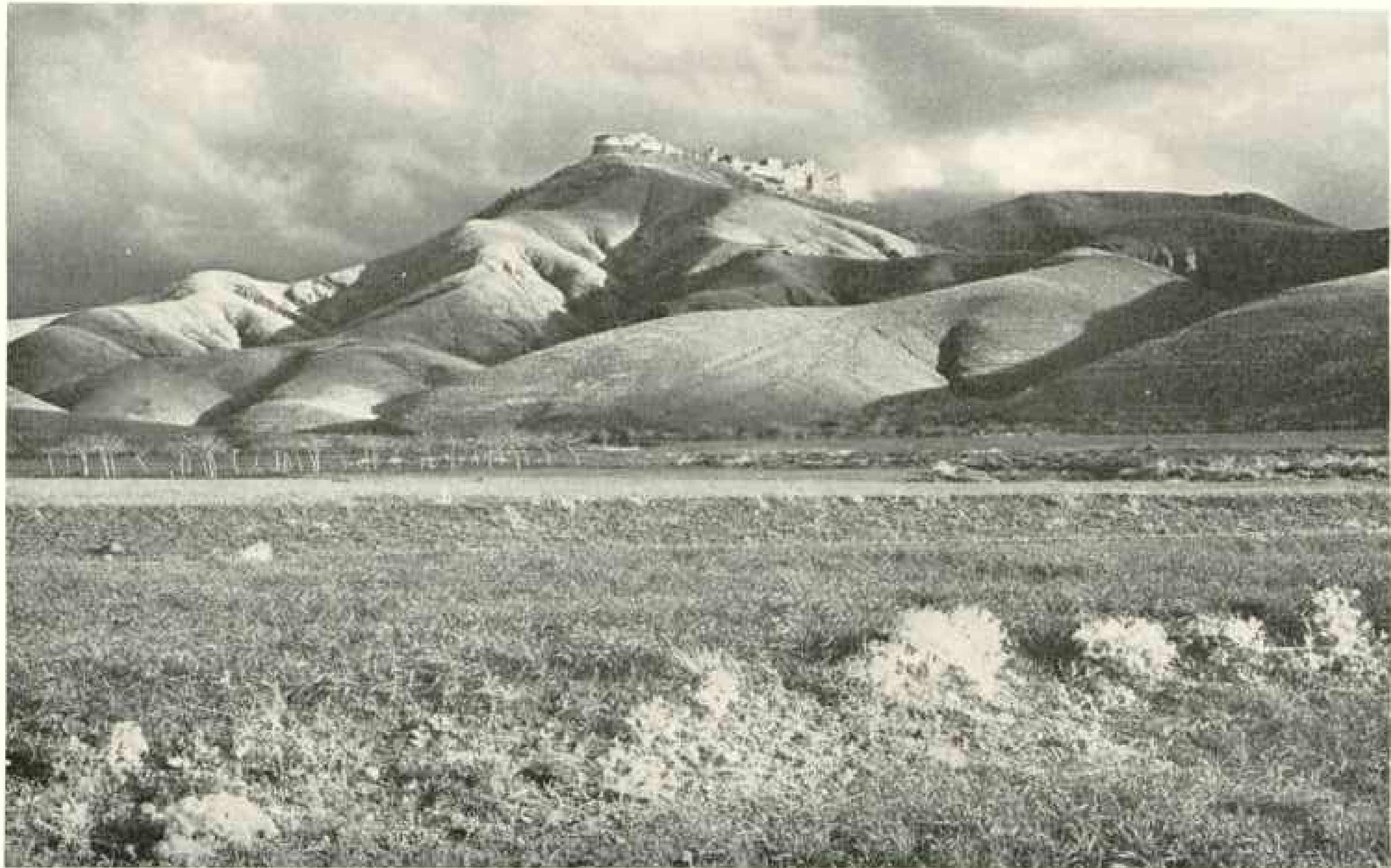
#### WHERE THE CRUSADERS BUILT THEIR CASTLES

After wresting the Holy Sepulcher from the Mohammedans, the knights of Christendom erected a remarkable series of strongholds to insure their control of the Holy Land.

cating in their heavy armor under the fierce July sun, the European army was completely routed. King, lords, knights, Templars, and Hospitalers were either dead upon the field or prisoners in Saladin's tents.

The road to Jerusalem was open and the Holy City once again came into the hands of the Moslems. And there it remained, except during brief intervals, for the next 730 years. At last, in the World War the English general, Allenby, entered the city, not riding in pomp, as a conqueror, but on

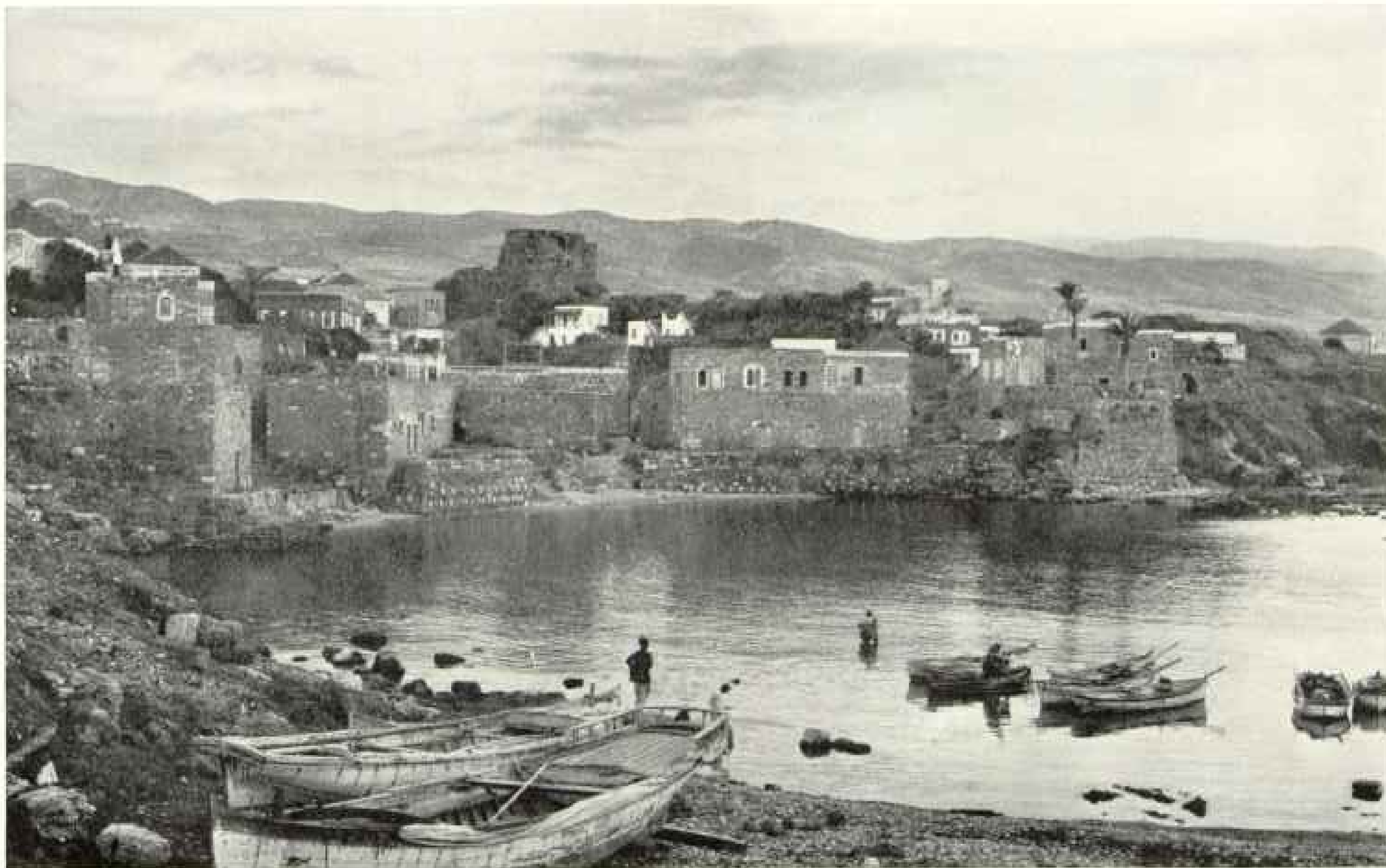




Photograph by Maynard Owen Williams

FOR GENERATIONS MOUNTAIN-CROWNING MARGAD WITHSTOOD EVERY FOE

"The Watchtower," located on an abrupt hill 1,200 feet above the plain, guarded the northern boundary of the County of Tripoli. Here King Richard of England imprisoned the ruler of Cyprus, bound with silver chains, in the "king's chamber" (see text, page 383). After the defeat of the Crusaders by Saladin, the Knights of St. John established their headquarters here in 1188, with Armengaud d'Asp as grand master.



Photograph by Maynard Owen Williams

THIS CRUSADER CASTLE STANDS ON ONE OF THE MOST FAMOUS SITES OF ANCIENT HISTORY

The Biblical Gebal, the Greek Byblos, the Crusaders' Giblet, Jubail (Djebail) fell into Frank hands in 1103, and to Saladin some 80 years later. The castle, across the sand-clogged port, dominates the modern town (see, also, text, page 380). Many columns have been built into the walls around the little harbor.



Photograph by Maynard Owen Williams

"THE WHITE CASTLE" AT SAFITA

From this lofty perch signals could be flashed by day or night to the Templar stronghold at Tartous (see, also, text, page 383). Looking across the town to the castle.

foot, as a humble worshiper.\* Now the city is open to pilgrims of all faiths and nations.

Jerusalem was as much a "holy city" for Moslems as for Christians and Jews. † Saladin had set his heart on regaining the city from the "infidel Christians." He remarked to King Richard, "Jerusalem is as much to us Mohammedans as it can be to you Christians, and more. It is the place whence our Prophet made his night ascent to heaven, and it will be the gathering place of our nation at the Great Judgment."

KNIGHTS TEMPLARS ORGANIZED TO PROTECT PILGRIMS

An English pilgrim of the eleventh century has left a vivid picture of the dangers of the road leading from the seaport,

\*See "An Old Jewel in Its Proper Setting: An Eye-witness's Account of the Reconquest of the Holy Land by Twentieth Century Crusaders," by Charles W. Whitehair, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1918.

† See, also, "The Pageant of Jerusalem," by Maj. Edward Keith-Roach, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1927.

Jaffa, to Jerusalem. Bandits hid in the forests and haunted every defile. It was certain death to fall behind the general caravan, or to stop to aid an injured comrade.

Moved by pity for these poor pilgrims, a Burgundian knight, Hugh de Payen, himself a pilgrim, joined with eight other knights to protect travelers from attacks along the route. Shortly afterward, they were granted a residence on the Temple Area, from which fact they were called Knights of the Temple, or Knights Templars. They took the threefold oath of chastity, poverty, and obedience. Their motto was, "Not unto us, O Lord, but to Thy name be glory." As a costume, they wore a white robe with a red cross on the left breast.

The order grew rapidly. It was joined by many noble and wealthy knights. Chapters were established in a number of centers in Palestine and Syria and also in Europe. They became the bankers for the Crusading armies, receiving deposits and drawing bills of exchange. Ere long they were distinguished for their wealth, their

pride, and their bravery. It was said that they never asked the number of the foe, but rather, "In what direction is he?"

At about the same period another order was organized, devoted to the care of the sick and wounded pilgrims. Their establishment was adjoining the Church of the Holy Sepulcher, where they built a hospital with accommodations for a thousand pilgrims. From this service they were known as the Knights Hospitalers or the Knights of St. John, from their patron saint, John the Baptist. Later this order also became military in nature, with chapters in many places. Their costume was a black robe and the eight-pointed white cross.

Because of their military prowess, these orders were entrusted with the defense of the most important danger points. They were granted large estates, and on these strong castles were erected.

Many of the best-preserved castles belonged to one or the other of these orders. A fine example of Crusader architecture may be seen at Rhodes, where the Italians have restored the grand hall of the Hospitalers. Adjoining it is the Street of the Knights, with coats of arms of the various chapters (see page 386).\*

Reference to the map of Syria and Palestine will show that this region is divided north and south by a great natural bound-

\*See "Skirting the Shores of Sunrise," by Melville Chater, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1926.



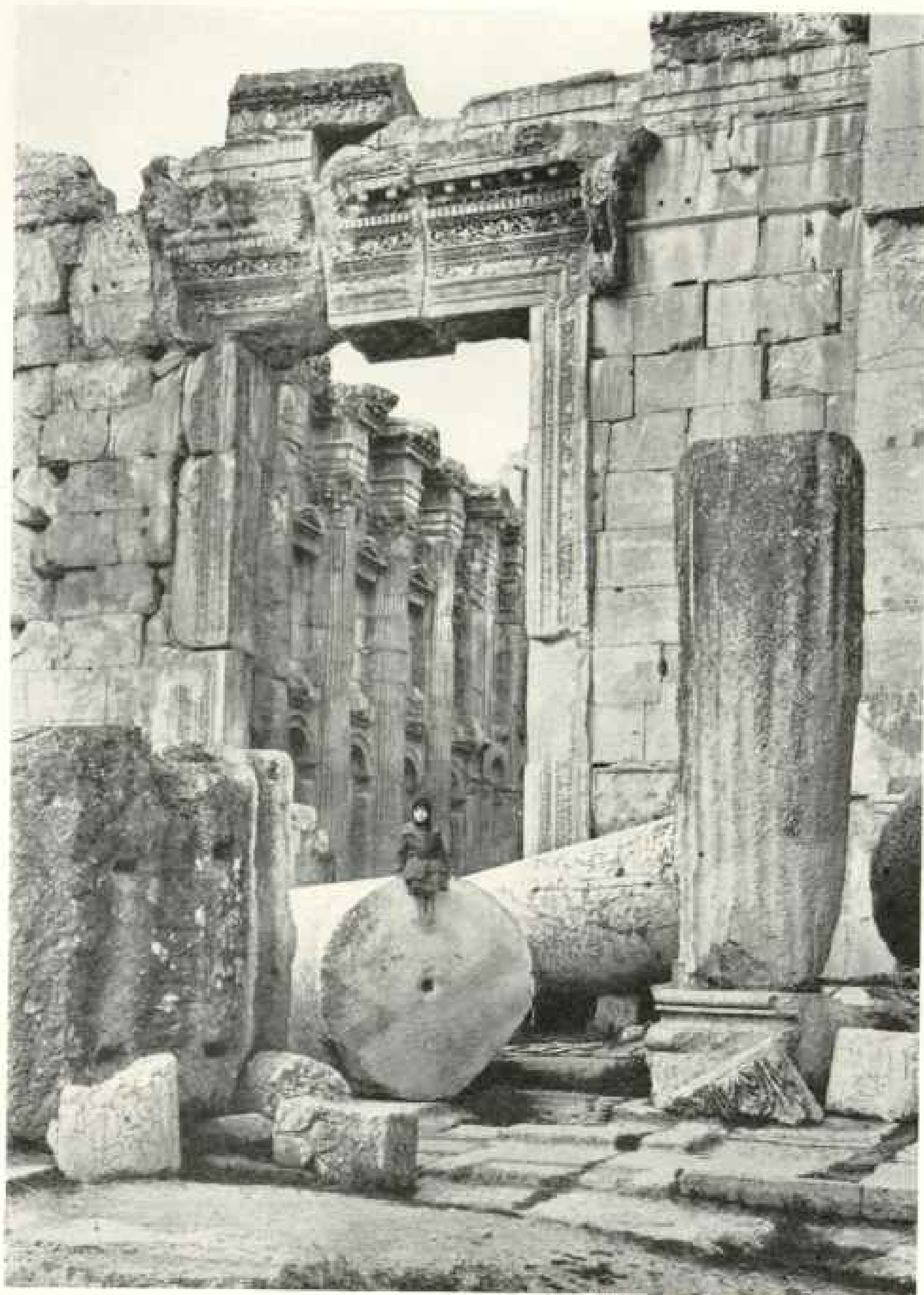
Photograph by American Colony Photographers

#### A PALESTINE BEDOUIN WITH HIS HUNTING FALCONS

The Crusaders delighted in hawking, above all other pastimes, and the Assizes of Jerusalem (see text, page 388) contain an entire chapter dealing with the law relating to falcons. When the cross-bearers returned home, they took with them both birds and trainers, and a vast impetus was given to the sport (see, also, "Falconry, the Sport of Kings," by Louis Agassiz Fuertes, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1920).

ary, almost unbroken from the Antioch plain in the north to the Red Sea in the south. This barrier consists in part of the Lebanon mountain mass, rising to a height of 10,000 feet, and the deep gorge of the Jordan River and the Dead Sea, lying 1,300 feet below sea level (see page 371).

East of this natural boundary lies the granary of Syria and Palestine, a region of fertile plains, with such large cities as Aleppo, Hama, Homs (the ancient Emesa), and Damascus. At the north the country is open to the valley of the



Photograph by Maynard Owen Williams

HAMA'S TEMPLES NEVER FELL INTO FRANKISH HANDS

The Crusaders raided within sight of the walls of this famous stronghold, but never captured it (see text, page 382). The Temple of Bacchus, one of Syria's best preserved and most beautiful ruins, with columns strewn in front of the entrance.

Euphrates and Tigris rivers. Still farther east and southeast is the desert of Arabia, the home of Islam. Arabia, with its fierce, wandering, fanatic tribes, always a land of unknown strength, of unmeasured possibilities; always a land of fanatic zeal!

This eastern land was the center and stronghold of Moslem power. Yet for the most part, in medieval times as well as to-day, its weakness was lack of union. United, under a leader like Saladin, it became a power.

West of this natural boundary are rugged mountain slopes and narrow but fertile coastal plains. At certain vantage points the seaport cities of Jaffa, Acre, Tyre (page 380), Sidon (page 378), Beirut, and Tripoli developed. Because of contact with other nations over the sea routes, these cities flourished and became centers of sympathy for Western lands. On the other hand, they have had little in common with the cities on the far side of the mountain and river boundary.

There are a few points where this natural boundary line breaks down. Over these passes the tribes and armies of the East have occasionally flowed, like a swollen stream through the sluiceways of a dam. Coast cities have been captured and plundered, and then the flood has subsided and normal conditions of more or less isolation have returned.

#### FEUDAL GOVERNORS RULED THE LAND

It was in these coast cities, along this coastal plain and on the western mountain slopes, that the Crusaders established themselves. There they had ready communication by sea with their home lands. The merchant fleets and armed galleys from the Italian maritime cities were constantly coming and going.

These Italian merchants had their markets, customhouses, and warehouses in each of the Syrian ports. They generally demanded, as the price of assistance in naval power and shiploads of supplies, a quarter of the city where they might carry on their trade. And their commerce was not with Crusaders only; they handled extensive imports and exports for Syrian and Arab traders, who also were established in the Crusader cities.

The territories occupied by the Crusaders were divided into a series of lordships, under the great feudal princes. Each lord

had his castle, with attached villages and lands. From these he derived a regular income through taxes, and the villages were liable also to supply quotas of men at arms. So the lord of the castle, with his knights, protected the land or marched away with his little army of foot soldiers to serve his prince or king wherever danger threatened. It was the feudal system, complete and perfected, established in a land where perhaps the natural conditions and temperament of the people offered an even more favorable environment than in western Europe itself.

A writer of the time, Jacques de Vitry, thus describes the system: "To insure its greater safety, the Kingdom of Jerusalem was divided among a number of princes and barons, whose duty it was to hold and guard the land under the king. The king kept in his own hands the noblest and best parts of the land, to wit, the cities of Jerusalem, Sichem, Acre, and Tyre, together with some other towns and villages. The liegemen of the kingdom, bound by oath to serve the king with a certain number of knights, were the Count of Tripoli, the Lords of Beirut, Sidon, Haifa, and Cæsarea, the Prince of Galilee, who was also Lord of Tiberias, the Count of Jaffa and Ascalon, the Lord of Mont Réal and of all the land beyond Jordan, the Lord of Ibelin, and some others; but these were the chief of them and the first in precedence and dignity."

We must remember that the Crusades extended over a period of two hundred years. This seems short in perspective, but a period longer than that in which our American Commonwealth has developed its own institutions.

The city of Acre was preëminent as a seaport and hence the center of much of historic interest. Here landed the King of England and the King of France; here, after the fall of the Holy City, was the residence of the King of Jerusalem; here the Templars and the Hospitalers had great establishments; here nearly every merchant city of Italy had a market and Moslems had bazaars; and in the plains about this city occurred many of the famous contests between Saladin and Richard of the Lion Heart.

The Lord of Ascalon, at the edge of the desert to the south, protected the road to Egypt. The Lord of Sidon, assisted by



Photograph by Maynard Owen Williams

#### THE SEA CASTLE OF SIDON

After St. Louis (Louis IX of France) had been captured during the Seventh Crusade, he purchased his freedom from the Sultan of Egypt in 1250 and retired to Syria, where, as one of his activities, he rebuilt the Sea Castle at Sidon (see text, page 377). It has been modified by succeeding powers. At present it is used as a storehouse for petroleum.



Photograph by Maynard Owen Williams

THE VALLEY OF THE ORONTE AS SEEN FROM CASTLE HILL: HAMA

In the left center one has a clear view of the waterway by means of which the water raised by the huge water wheels known as *sa'ura* is carried to the fertile gardens of the Oronte. Both Tancred and Saladin played a part in Hama's history.





Photograph by Maynard Owen Williams

#### ALL THAT REMAINS OF THE CRUSADERS' CHURCH AT TYRE

According to tradition, Frederick Barbarossa, a leader in the Third Crusade, is buried here, but excavations have not located his tomb.

the castle of Belfort, in the mountains, guarded one of the routes from seashore to central plain. The castle at Beirut stood at the sea end of the road which led over the pass where the railway and carriage road to Damascus now lie. The Lord of Jubail had a castle, parts of which still stand, on the site of one of the most famous cities of ancient history, a defense to the highway by the sea (see page 373).

#### TRIPOLI RESISTED SIEGE FOR SEVEN YEARS

Then came the Count of Tripoli, with his castle on Pilgrim Mount. To-day this castle is used as a government prison. It is built on a rock washed by a rapid mountain stream. This Count of Tripoli, of the family of Raymond of Toulouse, who built the castle, ruled over one of the richest of all Crusader districts. It was, however, more open to attack from the Moslem cities than almost any other part of the kingdom. This is why we find within its confines larger, finer, and stronger castles than in any other part of the dominion. The one who wishes to study Crusader military architecture, or who

loves to explore the towers and halls, the moats and walls, and to try to live again with the knights of the Middle Ages, will find in this County of Tripoli the richest possibilities.

Jacques de Vitry writes: "The county of Tripoli begins at the brook that runs by Margat [Margab] and extends to the brook which flows between Jubail and Beirut. Tripoli is a noble and wealthy city, in a good position in a very commodious site, watered by streams and springs of water, rich with corn land, fruit trees and green pastures, and enjoying many advantages from the neighborhood of Mount Lebanon and the outlying hills.

"This noble city was besieged for a long time after the taking of the city of Jerusalem by Raymond, Count of Toulouse, a valiant knight and devout servant of God. He built a castle near the city that he might more easily besiege it; and the stronghold is called Pilgrim Castle even to this day, because it was built by pilgrims (page 381).

"After his death his son Bertram continued the siege, and after seven years obtained possession of the city by capitula-



Photograph by Walter L. Wright

PILGRIM MOUNT, THE RESIDENCE OF RAYMOND OF TOULOUSE

The port of Tripoli, a mile away, was the capital of the County of Tripoli and was one of the last points to be surrendered by the Crusaders (see text, page 380).

tion of the citizens, and received it as a fief from the King of Jerusalem, who was present at the taking of the city and whose liegeman he became."

At the extreme north of Syria lies Antioch, the city where "the disciples were first called Christians." This was the first city in Syria to yield to the Crusading armies. No sooner had they besieged and captured it than they were themselves besieged by a Moslem army from the east.

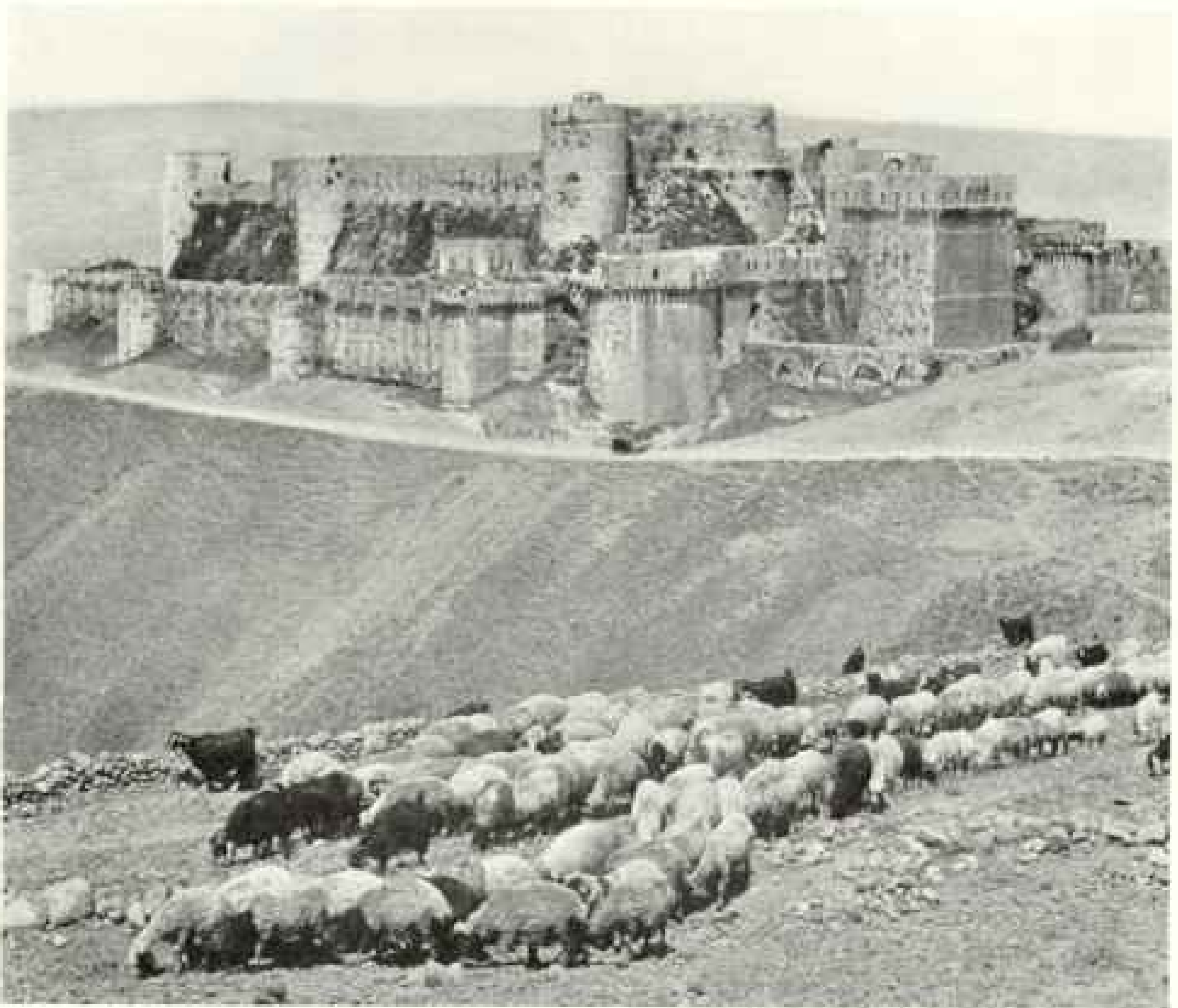
They were so worn by disease and starvation that it seemed they could hold out no longer. At the appropriate moment there came to one Peter Bartholomew the vision of "the Holy Lance." The finding of this sacred relic filled the famished Crusading army with miraculous zeal. They rushed upon the besiegers, took them wholly by surprise, and routed the host, capturing all their treasure and provisions. This occurrence, while saving Antioch, came near to defeating the whole enterprise, for from it developed a bitter quarrel between Raymond, who supported the authenticity of the miracle, and Bohemond, who claimed it a pious fraud.

Antioch became the capital of a Crusader principality that lasted for 170 years. The family of Bohemond was the ruling house. It was subject to the Kingdom of Jerusalem, but existed in true feudal style as an almost independent principality, famous for the luxury of its court. Later the families of Raymond and Bohemond intermarried and a closer union was formed.

Little remains to-day of Crusader antiquities in the Antioch district. Earthquakes, wars, and building operations have destroyed both ancient and medieval relics.\*

A line of Moslem cities, each a sort of city State with outlying dependencies, stretched from north to south east of the Lebanon Range. Each of these cities had its castle or citadel, with outlying castles—homes of lesser lords, who maintained themselves by plundering expeditions against the neighboring Crusader possessions or who joined their city prince in some more united campaign against the foreign invader.

\*See "Antioch the Glorious," by William H. Hall, in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1920.



Photograph by Maynard Owen Williams

KALAT-EL-HUSN IS THE SUPREME TRIUMPH OF THE CRUSADERS' ENGINEERING GENIUS

From its lofty seat this relic of days that are no more looks down to fertile plains rich with fields of waving grain, grazing herds, and flocks of sheep and goats (see, also, text, page 383, and illustrations, pages 384 and 385).

The most noteworthy of the castles remaining to-day are the citadels of Aleppo and Baalbek. The former is a fine example of Saracen construction. An outer gate with a causeway over the moat and the main entrance to the citadel itself give one a fair illustration of castle-building and the methods employed for resisting attack. Aleppo never was taken by the Crusader armies, though they frequently attacked.

Baalbek was a stronghold built upon the ruins of the Greek and Roman temple of Heliopolis. It was safe behind the great mountain wall and, though there were raids within sight of it, was never subjected to Crusader attacks; but earthquakes have overthrown the walls and left both castle and temple the "most magnifi-

cent ruin" in the world. Of other Moslem cities, each had its castle matching the line of strongholds erected by the Crusaders on the sea side of the great natural barrier.

Besides the castles built by feudal lords, such as Sidon, Belfort, and Jubail, there were the fortresses of the knightly orders, the Templars and Hospitalers. Because of their courage and daring, they were often assigned the most strategic and dangerous points to guard. At these places they erected fortresses of amazing size and strength. In their architecture is to be found a combination of western European, Byzantine, and Arab. Whatever lent itself best to making the place impregnable was borrowed and utilized.

And their influence was felt in the homelands, where returned knights frequently

reproduced in their châteaux and castles striking features of the Eastern fortresses. The three most noteworthy castles are all in the County of Tripoli—Tartous on the seashore, Margab on a hill overlooking the sea (page 372), and Kalat-el-Husn (page 382) guarding one of the mountain passes.

There are also three outstanding examples of Knight Templar castles, all of them, however, in ruins. Athlit, on the seashore a little south of Mount Carmel, in Palestine, has one high wall still standing and portions of the chapel and knightly hall, enough to give evidence of their original extent and richness (see page 390).

Safita, "the White Castle," standing on a lofty eminence northeast from Tripoli, has a central tower containing chapel and grand hall almost intact. Around it many traces of the protecting walls and entrance can still be found. From its flat roof a wonderful panorama is obtained, and one can discern the remains of numerous castles on neighboring hills. From this tower signals could be flashed by day or night to the Templar stronghold of Tartous by the sea (see page 374).

Tartous is, perhaps, the finest specimen of Templar fortification. It is on the seashore. A moat and wall inclosed extensive gardens and a village. Then followed a second moat and wall, and immediately within this a third moat and wall, which inclosed the citadel, the chapel, and the knightly hall, with quarters for soldiers, and magazines for provisions and implements of war. This was all by the sea, so that the Templars were in constant touch by ship with Europe.

#### THE KNIGHTS HOSPITALERS GROW IN POWER

In 1136 the Knights Hospitalers were given charge of a new castle, Beit Jibrin (Gibelin), situated at the foot of the Palestinian hills opposite Ascalon. They were to protect the country against the frequent forays from Ascalon, then in the hands of the Saracens. This was the beginning of the territorial influence of the Hospitalers. After that, the protection of the borders of the Latin territory was more and more committed to the orders of the Hospital and the Temple.

Thirty years later the Prince of Antioch granted the Hospitalers and Templars certain castles in his territories, agreed to

observe any treaties they might make with the Moslems, and arranged that his own treaties should not be valid unless approved by the orders.

The year 1142 first saw the Knights of the Hospital in the County of Tripoli, a district which soon became their chief Syrian possession. Count Raymond also promised that he would not make peace with Moslems without the consent of the Hospitalers.

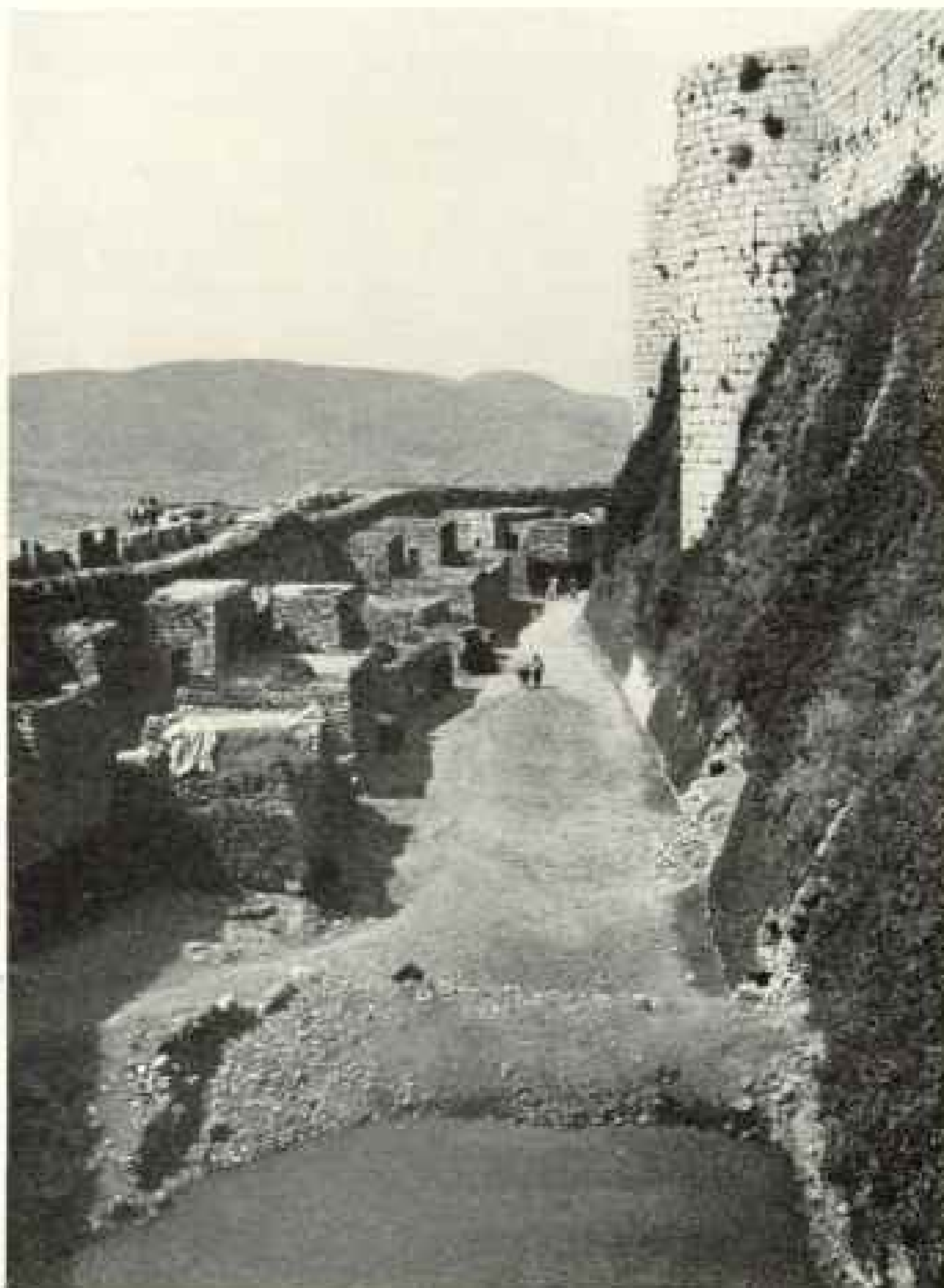
While there are ruins of many castles in the County of Tripoli, there are two, once the possession of the Knights of the Hospital, which are better described as deserted rather than ruined. These are the castles of Margab and Kalat-el-Husn.

Margab, "the Watchtower," is situated near the sea, on a precipitous hill, 1,200 feet above the Mediterranean. The road to it winds up through olive orchards and a village, around the head of a deep ravine, along the steep hillside, under the castle walls, always commanded by the loopholes and overhanging machicolation of the flanking towers. The entrance gateway is on the side toward the west. Entering the great inclosure, which covers the top of the hill, one finds himself in a deserted fortress. Yet the walls are complete; the chapel, with its flagstone flooring, raised altar platform, groined ceiling, and roof of stone, seems all ready for a service and as if the priests of the order had but yesterday followed the Knights as they marched away under their flag of truce (see page 372).

The enormous southern tower is waiting for the watchman, and one turns to "the king's chamber" expecting to hear even now the clink of a silver chain and to see Isaac Comnenus, ruler of Cyprus, peering out from his prison bars; for here is the chamber where Richard the Lion-hearted imprisoned for life the Despot of Cyprus because he had not welcomed England's shipwrecked queen with becoming hospitality.

#### KALAT-EL-HUSN, SUPREME TRIUMPH OF CRUSADERS' ENGINEERING GENIUS

But of all the castles built by the genius of Crusading engineers and defended by Western knights, the most imposing, the most complete to-day, in all the land of Palestine and Syria, is Kalat-el-Husn, near Homs. From its lofty seat it looks



Photograph by Maynard Owen Williams

#### THE ROADWAY ON THE OUTER WALL OF KALAT-EL-HUSN

On top of the outer wall a protected way permitted the defenders to move easily from point to point. On the outer face a stone balcony, or machicolation, extended around the castle. This enabled the defenders to repel any attempts to undermine or scale the walls. The lower courses of the wall are plastered with dung drying for fuel. Note the size of the man and donkey compared with the walls. This level is much above that of the country roundabout (see text, page 383).

down a thousand feet to fertile plains rich with fields of waving grain, grazing herds, and flocks of sheep and goats.

The Crusaders knew it as "Krak (or Kerak) des Chevaliers."

For more than a hundred years the Order of the Knights Hospitalers counted this as their strongest and richest possession. For a century and a half the Counts of Tripoli rested easy in their castle by the sea because Kalat-el-Husn, with its high walls and the strong arms and brave hearts of its knights, protected the eastern fron-

tier from Moslem invasion.

For five generations the banner of the Knights of St. John waved proudly over the chateain's tower, while the commander of the castle looked forth from his window confident that his walls and moats and ramparts were the last word of the engineer's skill in military defensive architecture.

The peasants who live in the near-by villages to-day claim that this castle was built by "the jinn," for no human hands could have fashioned such stones, much less have raised them to their places in the lofty walls; and visitors from Western lands can offer no better explanation when they consider the vastness of the work and remember the inadequate construction machinery of those medieval days.

There is an outer wall, flanked with frequent towers, that follows the contour of the hill. Around the wall is a hanging stone balcony, or machicolation, with loopholes and openings in the

floor for protection against any attempt to undermine or batter down the wall. Inside the wall is a moat, and beyond, rising from the sloping sides of the rock, the citadel itself. Three great towers, with walls 30 feet in thickness, protect the southern and most vulnerable part of the fortress.

The entrance to the castle is most complicated. Through the massive swinging gates of an arched doorway, one passes into a vaulted tunnel. Side chambers lead to loopholes in the walls. In threading

this absolutely dark entrance passage, one encounters three successive doors, each guarded by openings in the ceiling; before he stands in front of the main gate of the citadel. At one point the passage turns abruptly upon itself and is open to defense from one of the three southern towers.

The final entrance has folding doors and a portcullis, as well as an especially large machicolation in the ceiling. As far as records show, no enemy ever succeeded in making his way through this entrance passage.

Unfortunately, at the present time the interior of this superb relic of Crusader architecture is occupied by villagers with their flocks of goats and cattle and horses. The grand hall of the Knights is half filled with piles of manure, and every chamber and tower is turned into a wretched and filthy hovel. One can but long for the Herculean privilege of cleansing this Augean stable.

That European knights went to Syria and actually made their homes there, built castles, married, and reared families, has hardly been realized by us of the present day. Yet, in places like Antioch, Tripoli, Tyre, Sidon, and Acre, sons and daughters to the sixth and seventh generations intermarried, enjoyed the social pomp of knightly courts, had their romances and adventures just as did the families of France and England. Traces can still be found among Syrian people of Crusader names, and an



Photograph by Walter L. Wright

#### THE OUTER WALL OF KALAT-EL-HUSN'S SOUTHWEST TOWER

Between the outer and inner walls was the moat, which is used to-day as the chief water reservoir for a village that has sprung up within the castle itself. From the Southwest Tower, the residence of the commander, floated the banner of the Knights Hospitalers, sometimes called the Knights of St. John, and later the Knights of Rhodes and the Knights of Malta (see, also, illustrations, pages 382 and 383, and text, pages 383 and 384).

occasional blonde head and blue eyes are supposed to be evidence of a strain of Western blood.

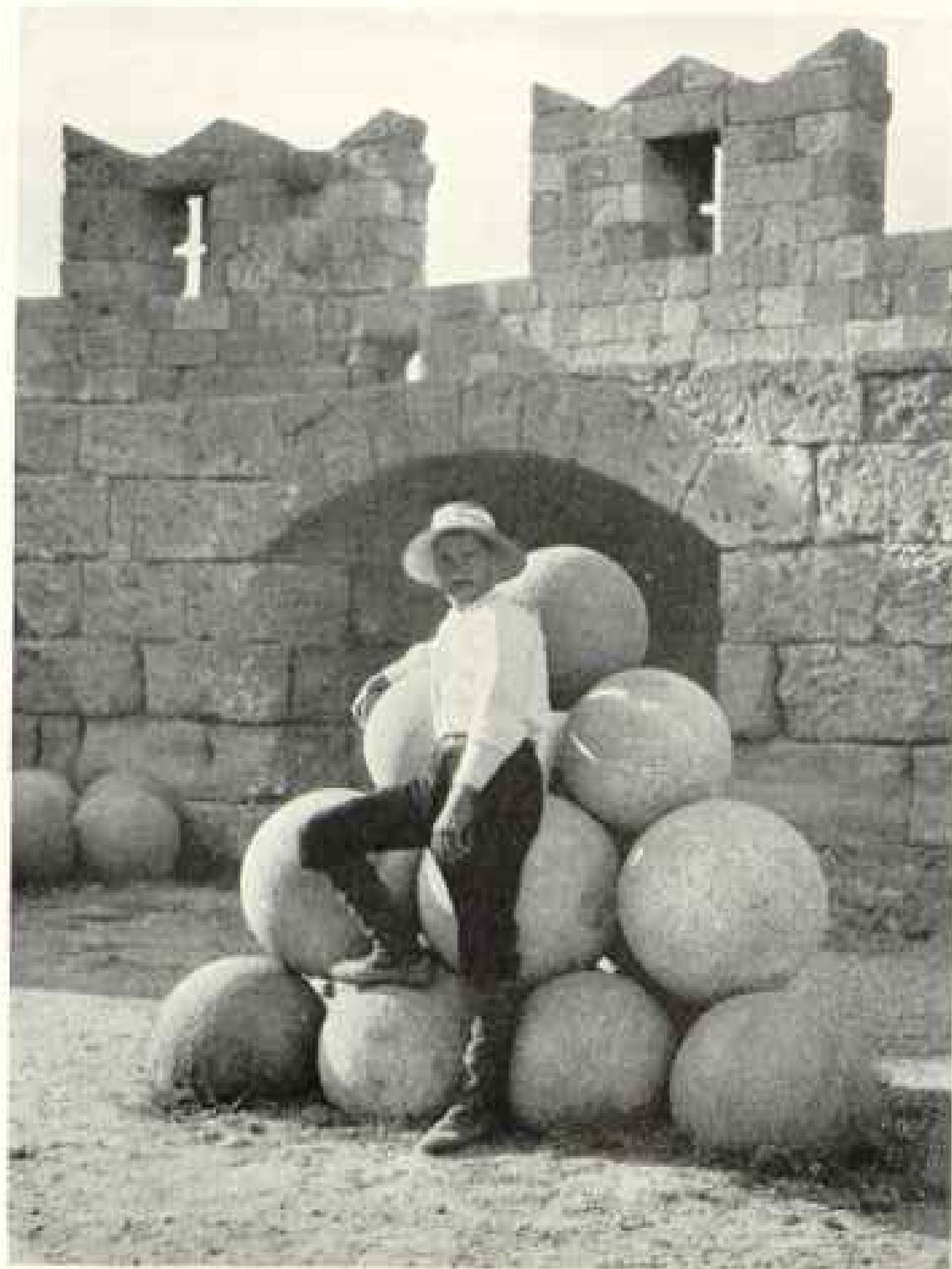
The knights enjoyed a rather brilliant social life and established codes of social, commercial, and political usage. They visited in one another's castles; they gathered for rejoicings such as betrothals and weddings.

In 1183 Saladin made an attack on the castle of el Kerak, east of the Dead Sea. Just at that time the castle was full of



KALAT SAHYUN TOPS A ROCK NEAR LAODICEA (LATAKIEH)

This column of native stone is surmounted by masonry which carried a drawbridge or an aqueduct across the artificial cut that separated the castle from the rest of the ridge. Sahyun's fortress, like that of el Kerak (see text, page 385), never belonged to any of the great military orders. The two are important types of feudal castles built by the Crusaders.



GRIM RELICS OF CROSS AND CRESCENT HAUNT RHODES

When the Hospitalers were expelled from the Holy Land, after the fall of the Kingdom of Jerusalem, in 1291, they re-established their order in the island of Rhodes (see, also, text, page 375). Here they continued to fight the Moslem. To-day sheep nibble among mounds of the stone cannon balls which were flung into the city by Turkish bombardis.

Photographs by Maynard Owen Williams



*Photograph by American Colony Photographers*

HERE GODFREY ERECTED HIS MOVABLE TOWER AND WAS THE FIRST TO GAIN A PLACE ON THE CITY WALLS OF JERUSALEM  
It was also on this side, the North Wall, that the Roman general, Titus, successfully attacked Jerusalem, A. D. 70. (see text, page 379).





Photograph by American Colony Photographers

#### THE TOMB OF SALADIN AT DAMASCUS

In the glass case at the head of the tomb, which is covered with a dark-green cloth embroidered with gold, is preserved the turban worn on special occasions by this noble antagonist of the Crusaders (see text, pages 360, 371, 375, and 377). The walls of the tomb are covered with tiles of ancient Damascus work.

guests, jesters, minstrels, and others, gathered to celebrate the wedding of the stepson of Reginald de Châtillon, Lord of el Kerak, to the youngest sister of the King of Jerusalem. One may well picture the excitement over this unplanned entertainment at the wedding feast.

Shortly after the capture of Jerusalem Godfrey de Bouillon, after having consulted the leading nobles as to customs prevailing in their own countries, ordered a collection of laws to be made. This collection was kept in a coffer in the Holy Sepulcher, but was later destroyed by the Saracens. Oral tradition, however, had embodied the essential features practiced, and these were later codified and became famous as "the Assizes of Jerusalem."

The king and ruling lords had various forms of income. Villages of about twenty families each were attached to the

great castles. The villagers might be either Syrian Christians or Moslems. Whenever a castle changed rulers, the villages went with the castle. It mattered little to the peasants who ruled, whether Latin or Saracen, for the rules governing their lives were much the same. The greatest hardship was when one lord tried to take over the village or income of his neighboring lord.

Each village paid to its lord from one-fourth to one-third of the net produce of the land, besides extras in fowls, eggs, cheese, etc. A similar custom still exists in the semifeudal system of the great landowners of Syria. The landlord controlled rather strictly the rotation of crops.

There were also market dues and tolls on caravans and monopolies on such industries as dyeing, tanning, and brewing. There were poll taxes levied on Moslems

and Jews who resided within the domain of the Crusader lord, and from time to time special taxes were assessed for building a wall or tower or in case of a need for special defense.

#### CUSTOMS DUTIES WERE A SOURCE OF LARGE INCOME

But one of the chief sources of income was the customhouse. The laws name 111 articles on which duty could be collected.

An Arab geographer, Ibn Jubair, describes his visit to the customhouse in Acre:

"On our arrival we were taken to the customhouse. Opposite the door, on a covered bench, were seated the clerks of the customs, who are Christians. They had inkpots of ebony, gilded and handsomely decorated, and they wrote in the Arabic language, which they also spoke well. Their head, who farms the customs, has to pay a very heavy sum to the government. The merchants deposited their goods in a storeroom above the customhouse. Private travelers were allowed to pass after an examination of their baggage. The officials did their work courteously and without violence and exaction."

A previously quoted writer of the times, Jacques de Vitry (see text, page 377), thus describes another form of income of the lords of the castles:

"Some inland cities, more especially beyond the Range of the Lebanon, which our people could not conquer, they nevertheless forced to pay them tribute, for our people often wasted their borders and suburbs and laid many ambushes for their people, till they were glad to free themselves from molestations. The city of Homs and some other cities of Coelesyria, being near our people, could be more easily annoyed by them; wherefore they bought peace and security with much money."

"Coelesyria" was the name applied in antiquity to the valley, or "hollow," between Liban and Anti Liban, and, later, to the region stretching eastward from the latter.

For the Crusaders the middle of the twelfth century was the period of greatest prosperity. They had adopted many of the luxuries of the East, especially in dress and manners, and they lived in greater comfort than the nobles in Europe. Their city homes were built in Eastern style, around

an open court, with fountains and marble paving, and were decorated by Greek and Arab artists. The palaces were especially rich in the use of mosaics. The home of the family of Ibelin, in Beirut, was famous for its decorations.

For recreations, the most popular outdoor sports were tournaments, hunting expeditions, and hawking (see page 375). This last is much in fashion at the present time in the districts around the old castles of Safita and Kalat-el-Husn. The indoor games were chess, checkers, and backgammon. The pawns in chess were named farmer, blacksmith, butcher, merchant, innkeeper, warder, gamester, and physician—an interesting commentary on the way these trades and professions were rated in the social scale.

#### THE CRUSADERS' DOCTORS USED STRENUOUS REMEDIES

The medical profession was not highly developed among Crusaders as compared with their Saracen contemporaries. King Baldwin III, when marching against the Sultan Nur-ed-din, according to the custom of the times took some pills given by the doctor of the Count of Tripoli. Sickness followed and he died in the city of Beirut. As the body was being taken to Jerusalem, there was great mourning. It was suggested to Nur-ed-din that he take advantage of the occasion to make an attack. He replied: "We ought to pity this people's righteous sorrow, for they have lost a prince whose like is not now left in the world."

In Edward G. Browne's "Arabian Medicine," the following contrasts in medical practice are given:

"At the request of the Frank warden of Castle Munaytera, in Lebanon, an Arab physician was sent to treat certain patients there. He returned after ten days and was congratulated on his early return. Being pressed for the reason, he explained that there were two patients, a man with an abscess in his leg and a consumptive woman. These he was treating, the first with poultices and the second by suitable diet and drugs.

"Both were progressing well when a Frank doctor intervened, pronouncing treatment useless. He asked the man whether he preferred to live with one leg or to die with two. The patient chose the



Photograph by Maynard Owen Williams

#### ALL THAT IS LEFT OF THE CASTLE OF THE PILGRIMS

One high wall still standing and portions of the chapel and knightly hall serve to show the original extent and richness of this Templar ruin at Athlit, the last possession of the Crusaders in Palestine (see, also, text, page 383).

former. The physician then summoned a stalwart soldier and ordered him to cut off the leg of the patient with one blow of the ax. This he failed to do. The second blow so crushed the leg of the patient that he died at once.

"He examined the woman, whom he declared to be possessed of a devil located in her head. He ordered her hair shaved off and prescribed a diet of garlic and oil. She grew worse. Then the doctor made a deep cruciform incision in her head, exposing the bone, and rubbed in salt. The woman expired.

"'After this,' said the Arab doctor, 'I asked if my services were longer needed, and, receiving a negative reply, returned home, having learned of their medical practice what had hitherto been unknown to me.'"

The Crusaders came in contact with many new industries. They were early attracted by the people about Tripoli, who were chewing a kind of cane. On trying

it they found it had a juice "like honey." One of the Europeans wrote: "Sugar canes are canes full of honey—that is, of exceeding sweet juice—from which, by crushing them in a press and then thickening the juice over a fire, men make first a sort of honey and then sugar."

And again: "The fields of the Jordan riverside drop sweetness from the thick multitudes of sugar canes and yield abundance of sugar."

And so the western Franks came, and fought, and built, and lived, and traded, and learned in the land of the Crusades. Then the thought of Europe turned in other directions, and one by one the castles, bulwarks of the Crusader Kingdom, fell into the hands of the Saracens, as the knights were driven to a smaller and smaller strip of territory along the coast. At last they sailed away. But Athlit, Tartous, Margab, and Kalat-el-Husn remain to-day mute reminders of those brave days of chivalry and renown.

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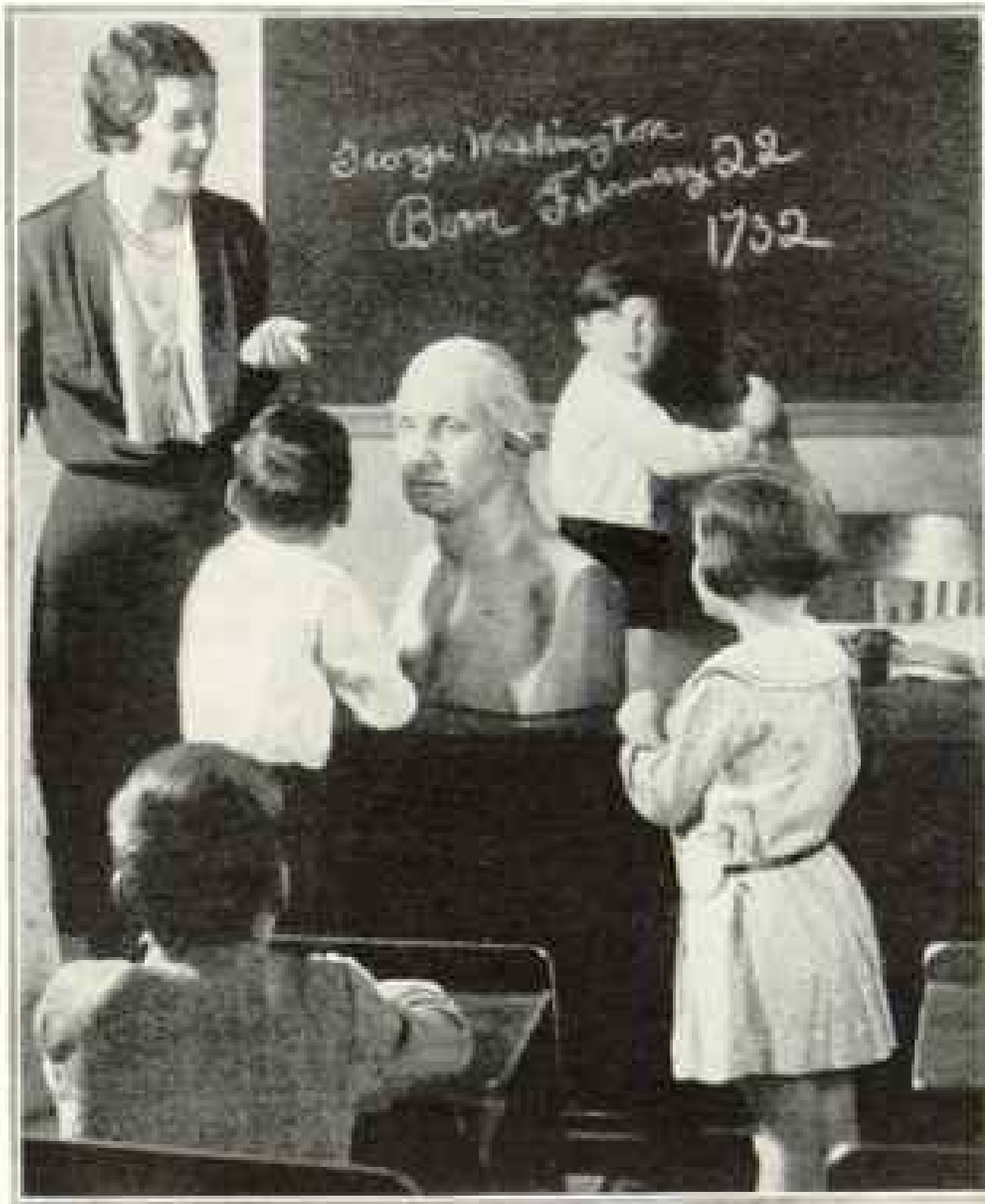
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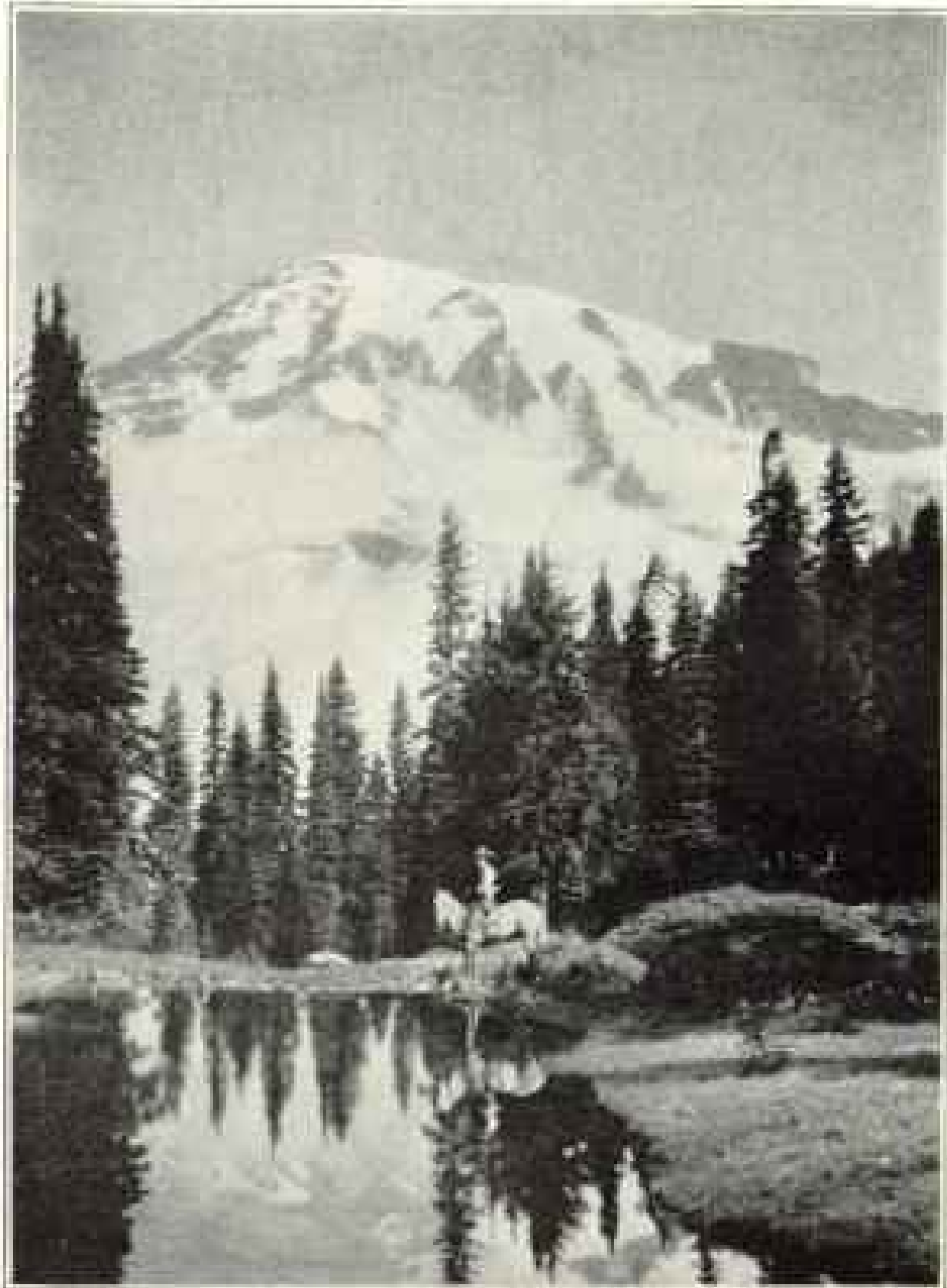
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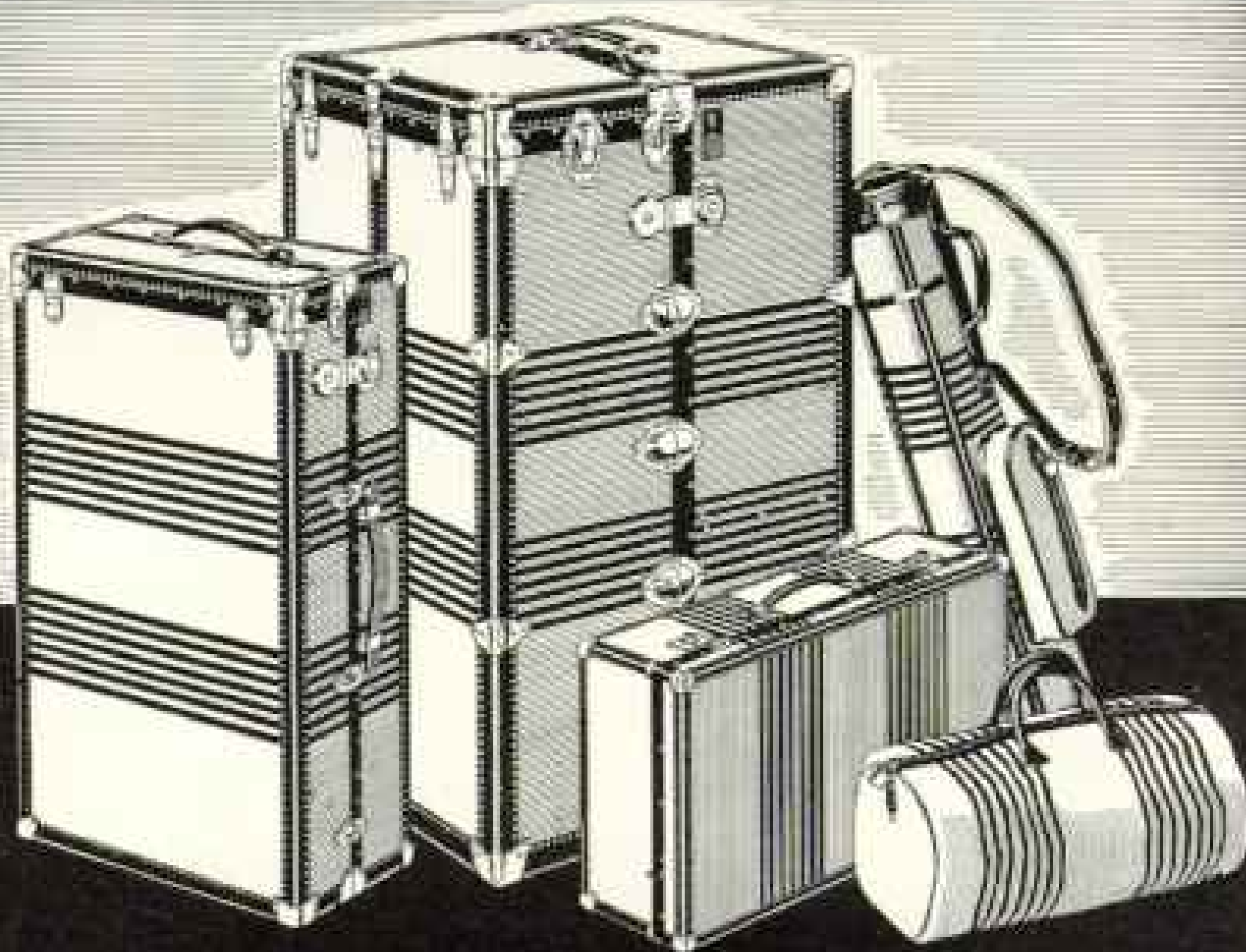
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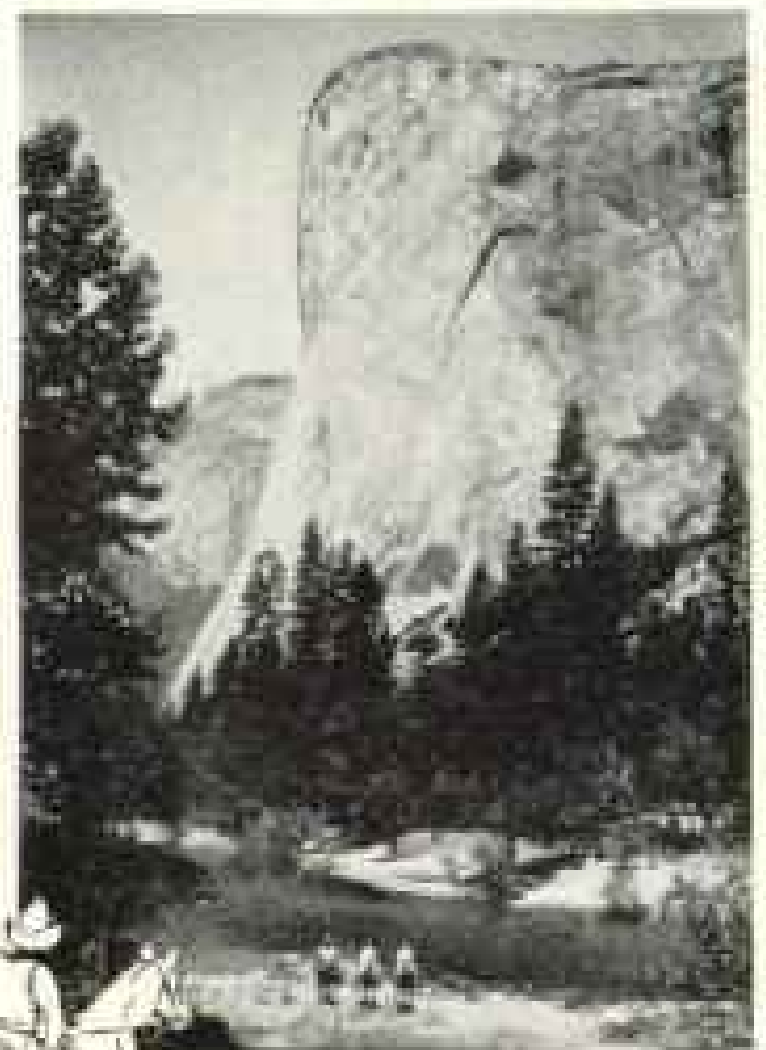
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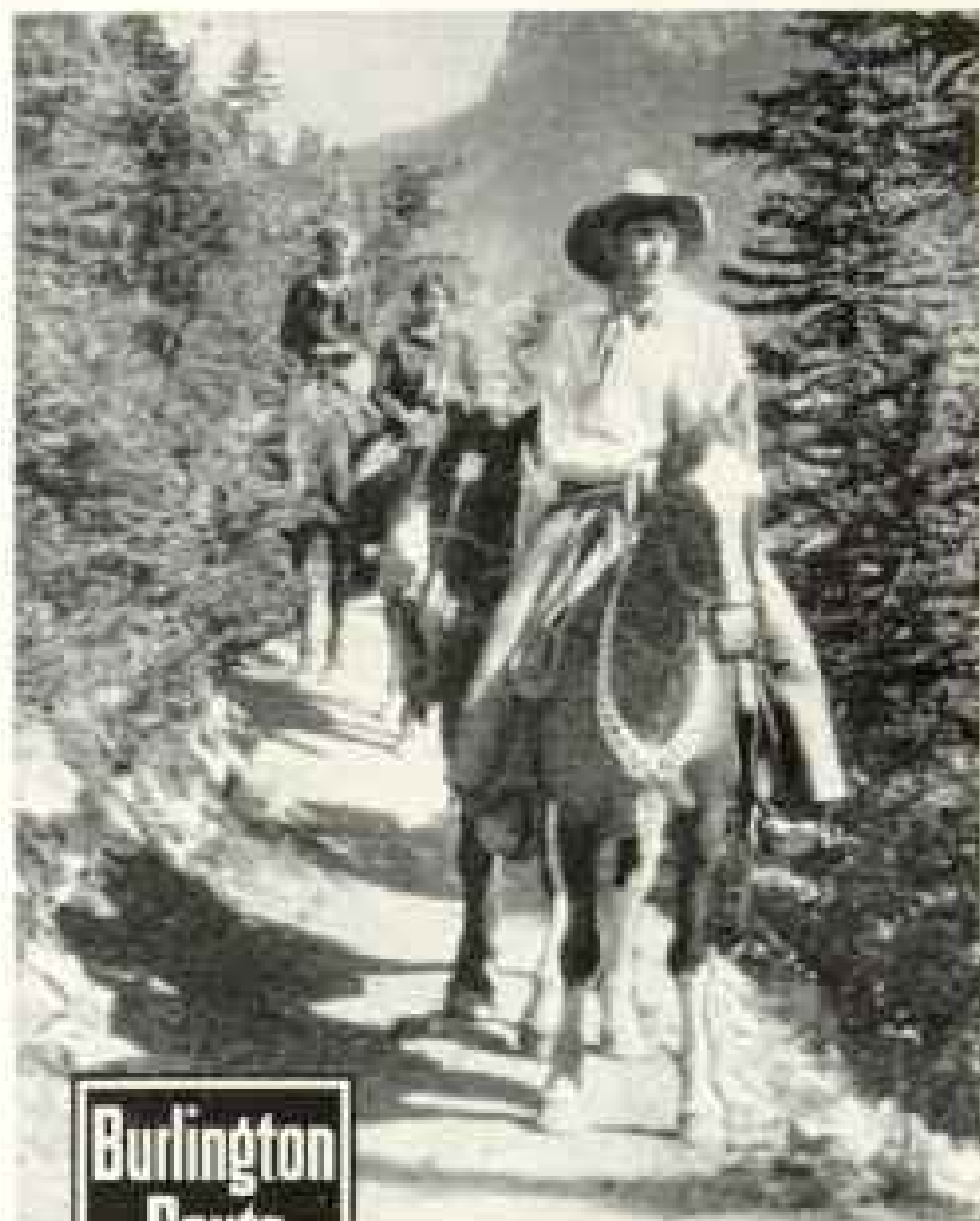
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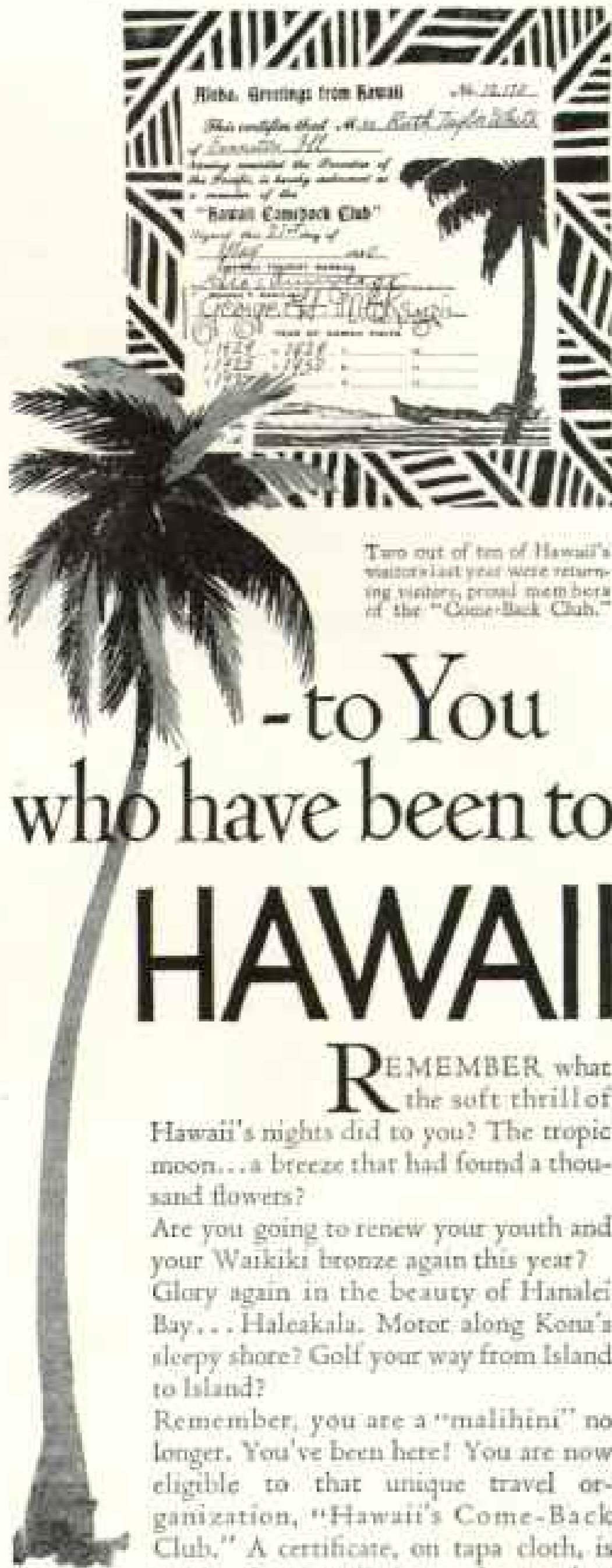
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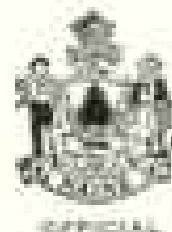


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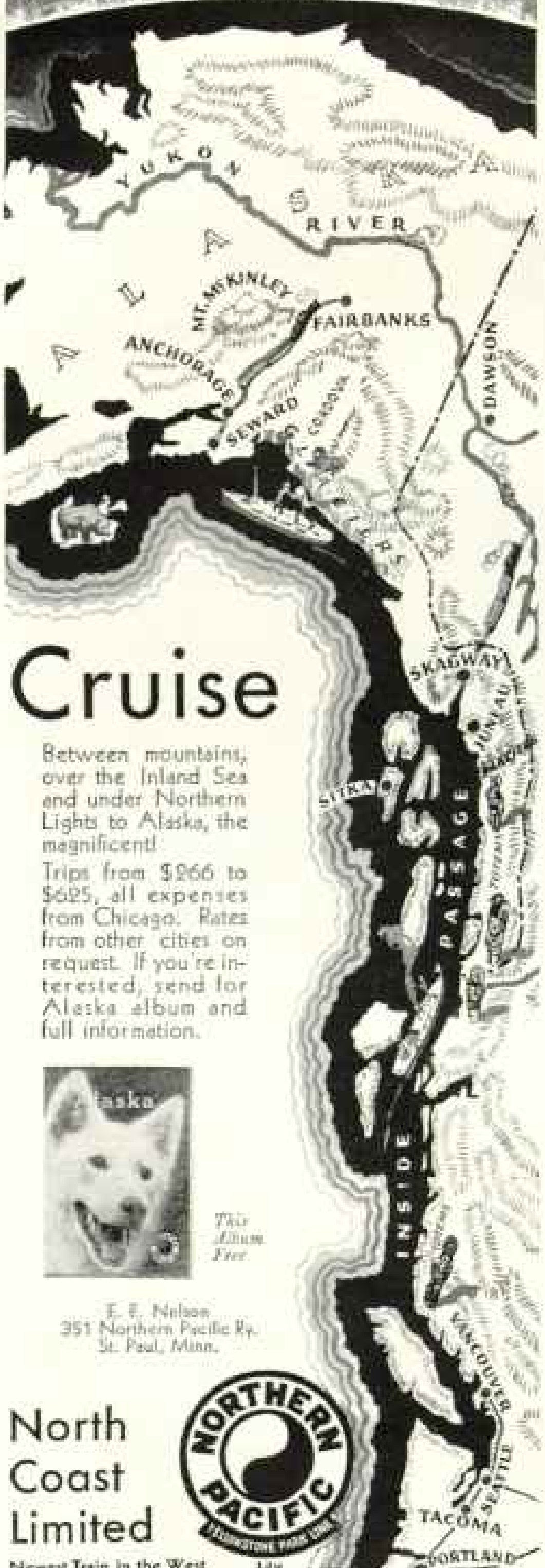
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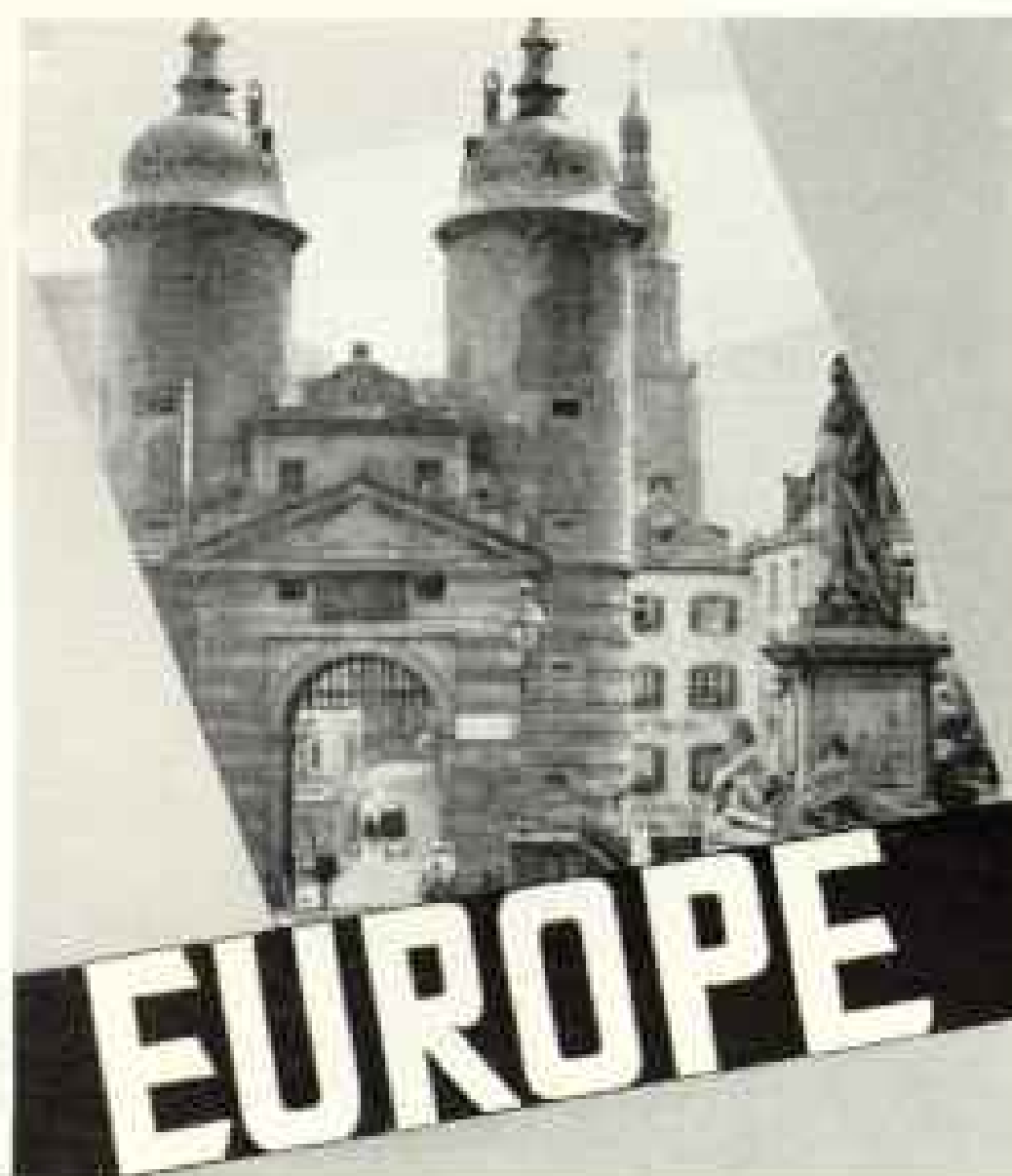
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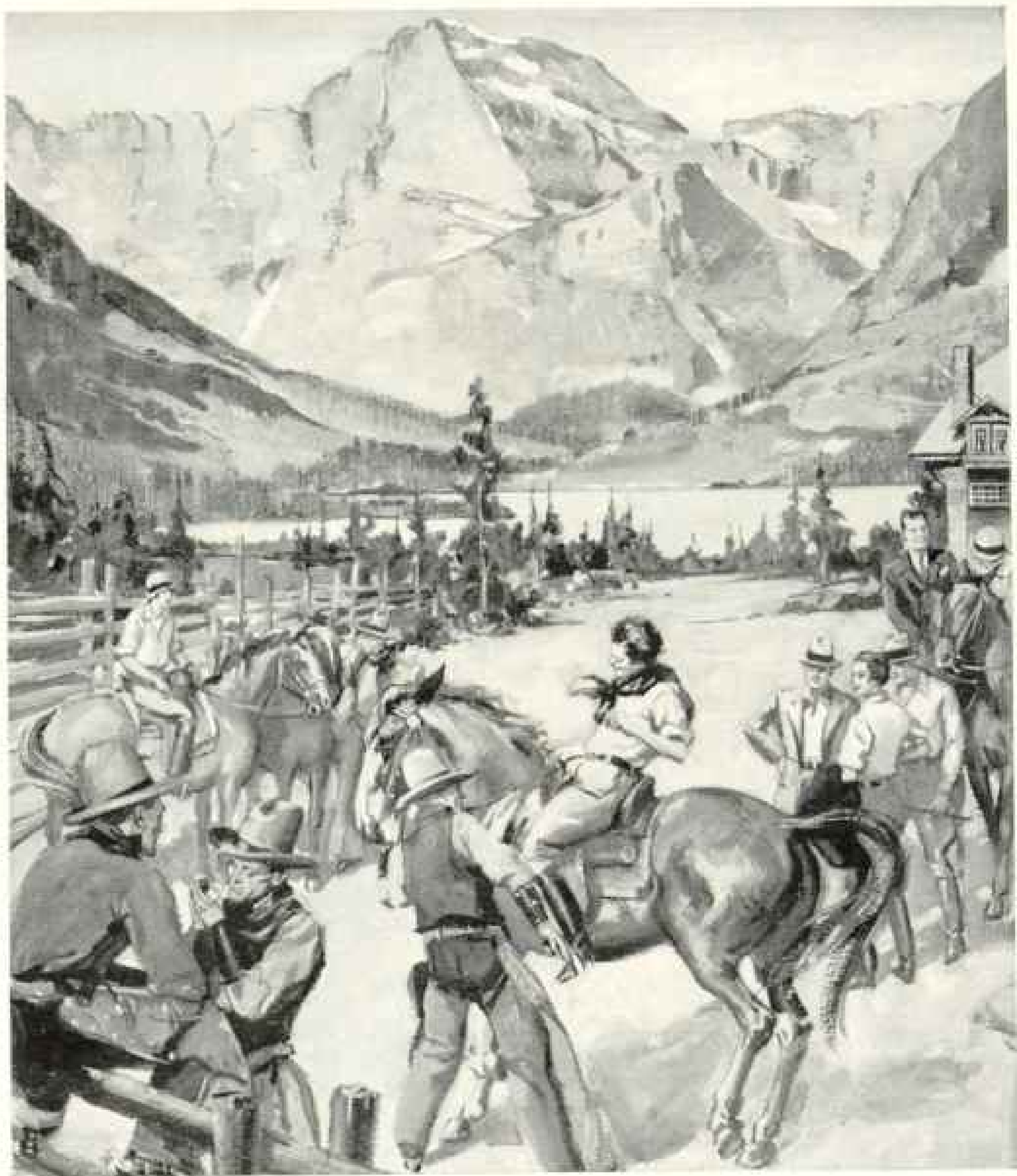
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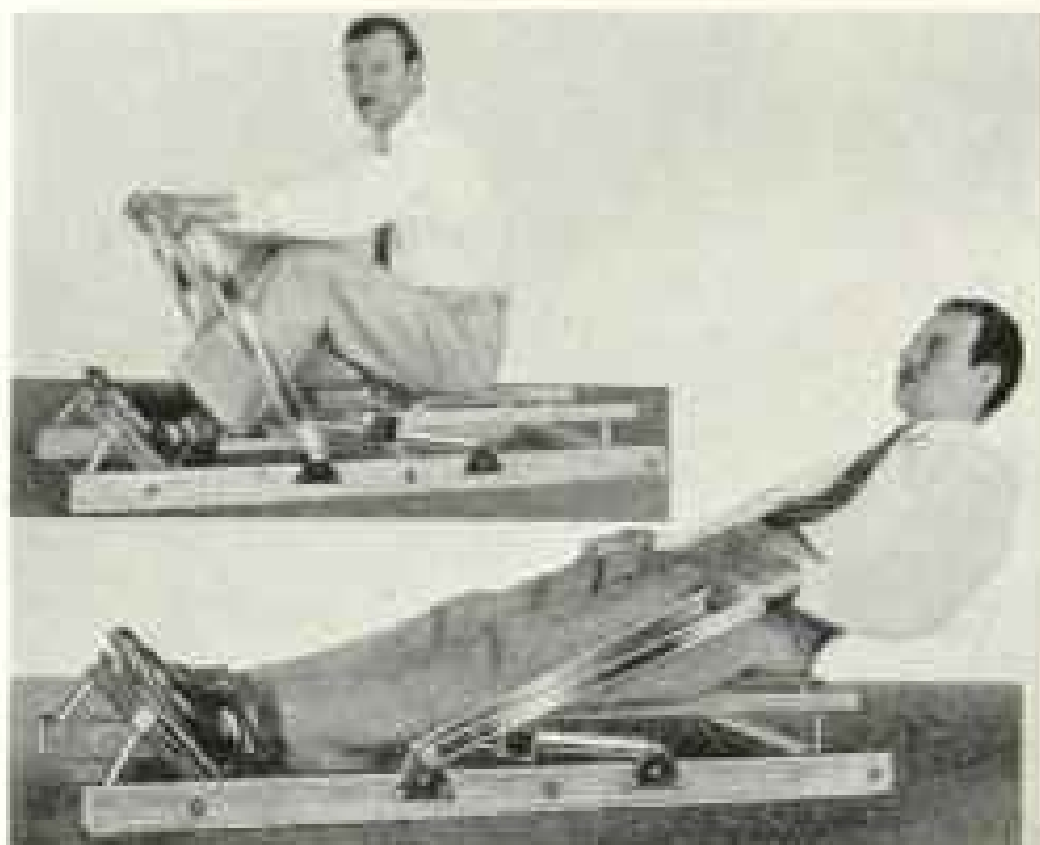
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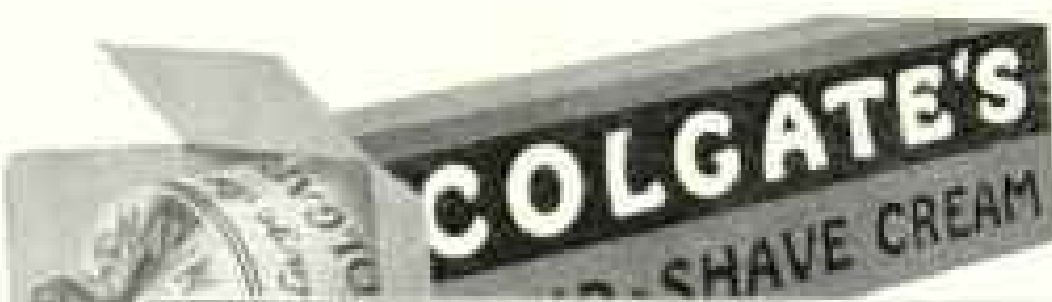
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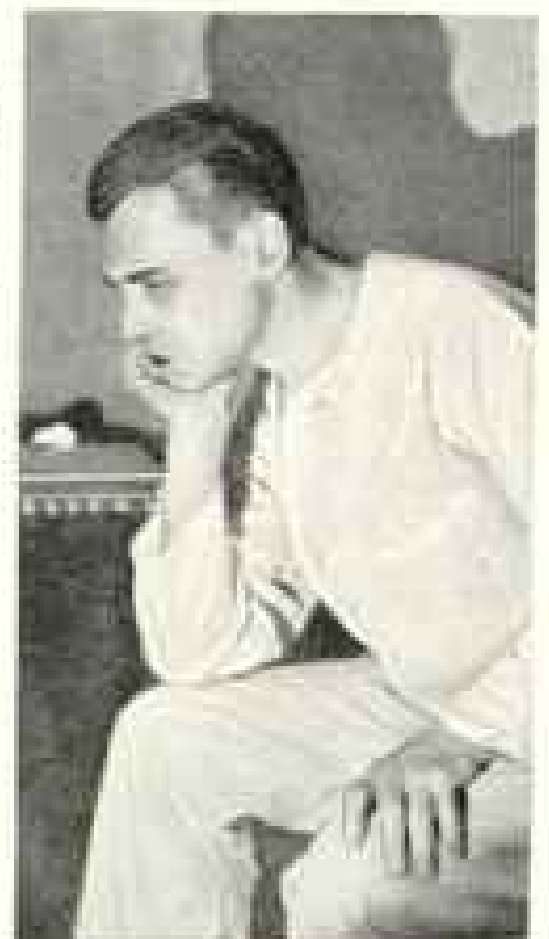
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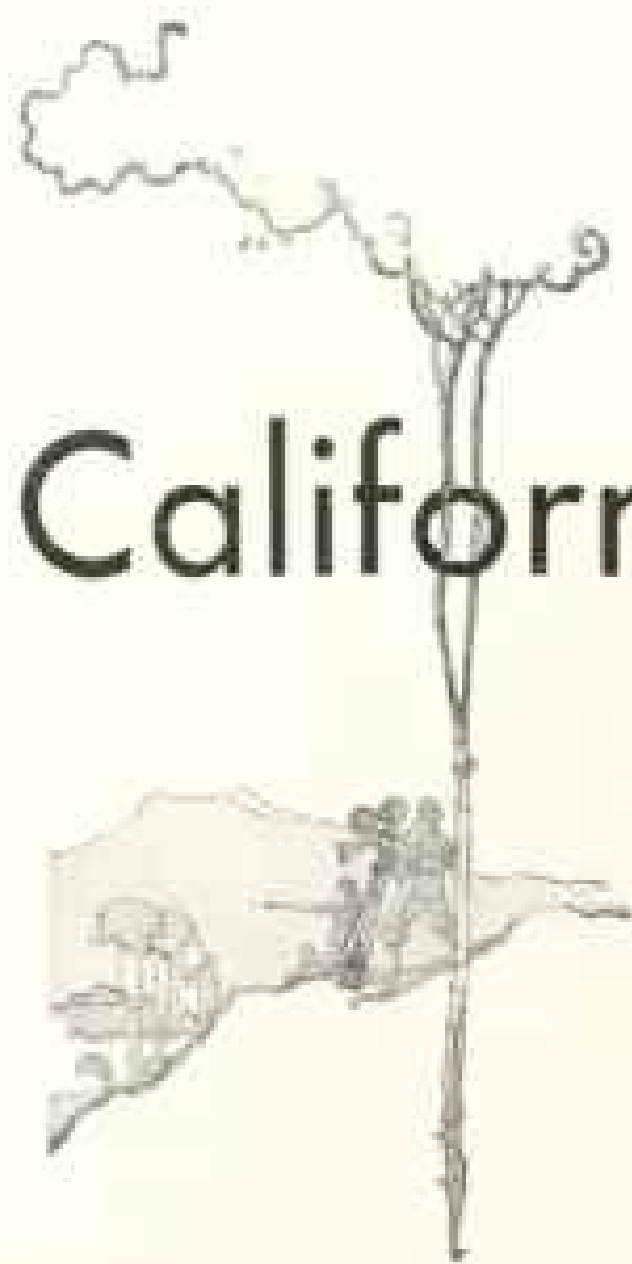
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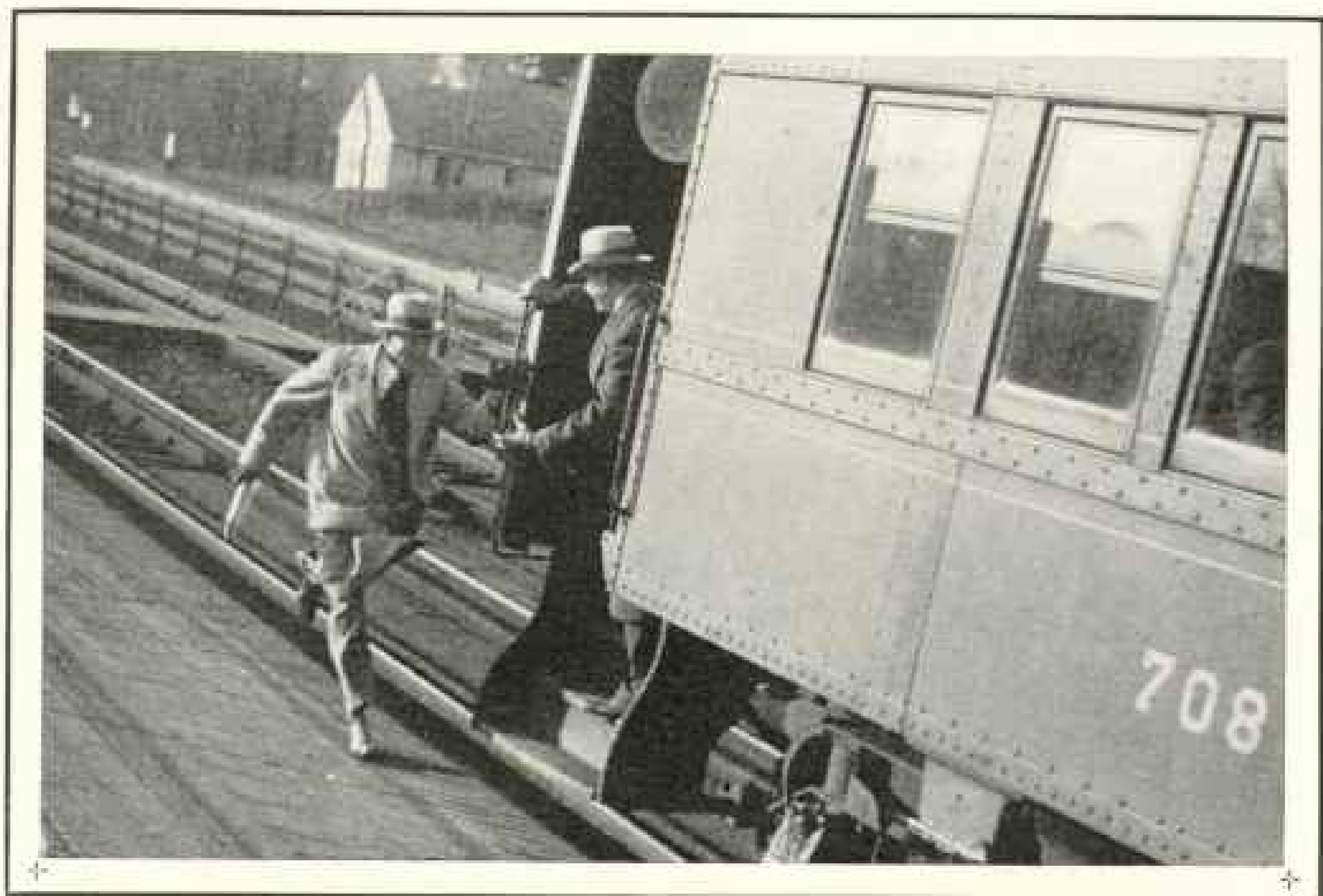
day, matter-of-fact convenience—like running water and electricity—that it is natural to take it for granted. It is well to pause occasionally and consider the nation-wide organization of men, money, and materials that makes this vital service possible, and at such low cost.

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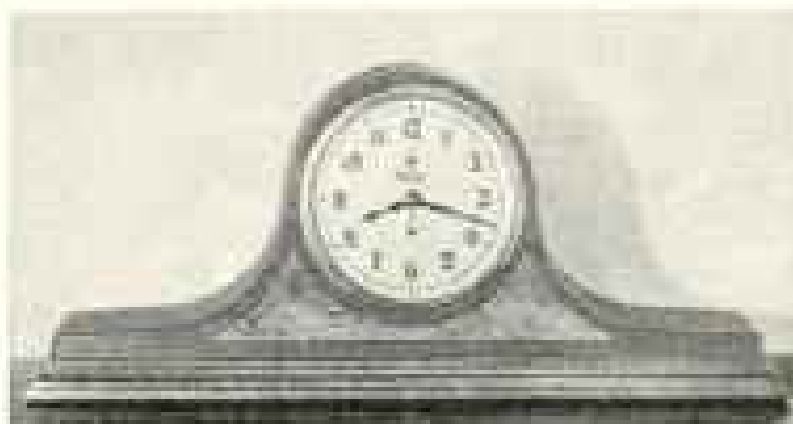
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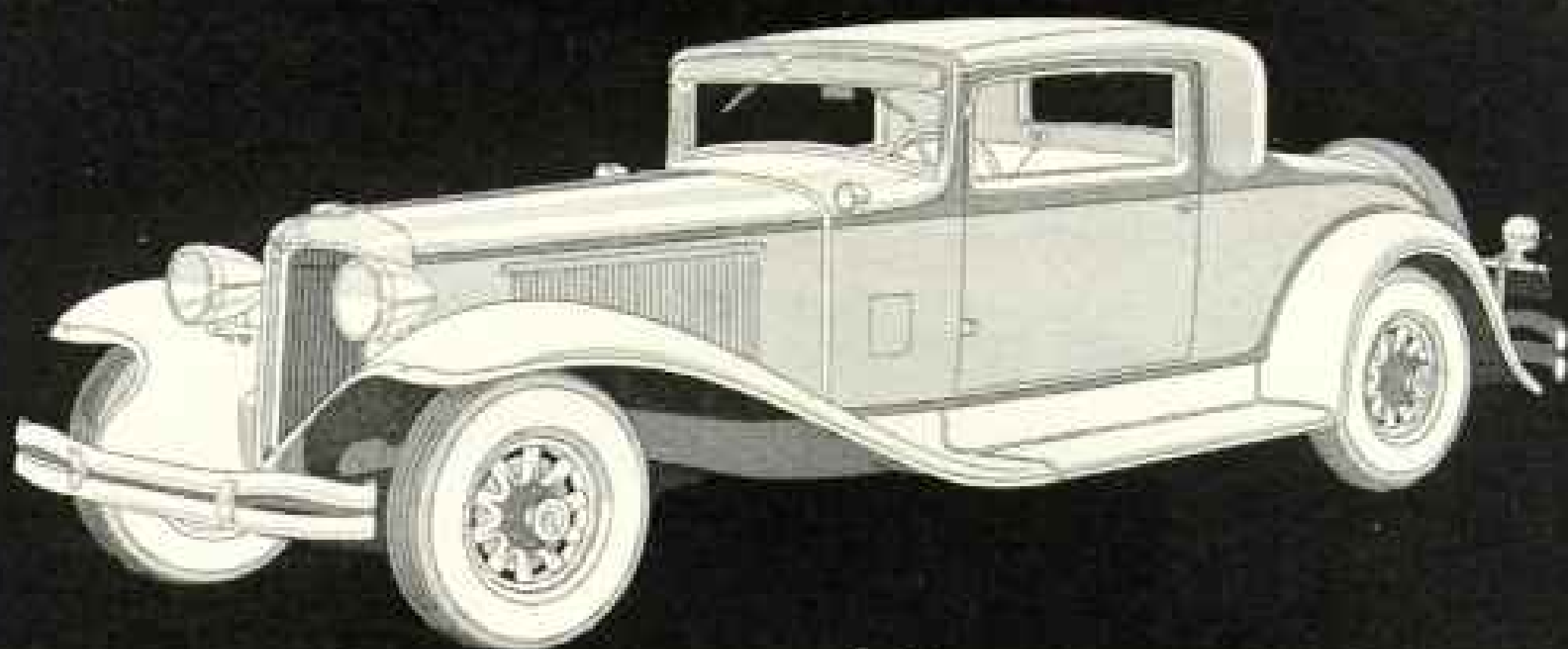
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Chrysler eight-cylinder smoothness gives a fascination to performance that is remarkable not only in power, but in the results of an exclusive Multi-Range 4-speed transmission with Dual High gears. You have the driving pleasure of *two distinctly different high gears*—one quiet "high" for the sprints of traffic and speedy hill-climbing, another quiet "high" for the open road. Shifting back and forth, either up or down between these two "highs",

may be done at any speed without hesitation or clashing.

Marked distinction and smartness are due to the graceful design of their strong insulated steel bodies in combination with an extremely low center of gravity. Low-swung car weight makes possible a perfection of balance that assures better performance, finer riding qualities and greatest safety at all speeds.

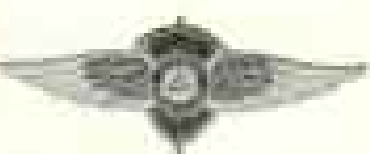
A constant sense of safety is also inspired by the positive control of internal hydraulic brakes.

At the national automobile shows, and everywhere, all public comment supports the fact that these are the outstanding motor cars of 1931.

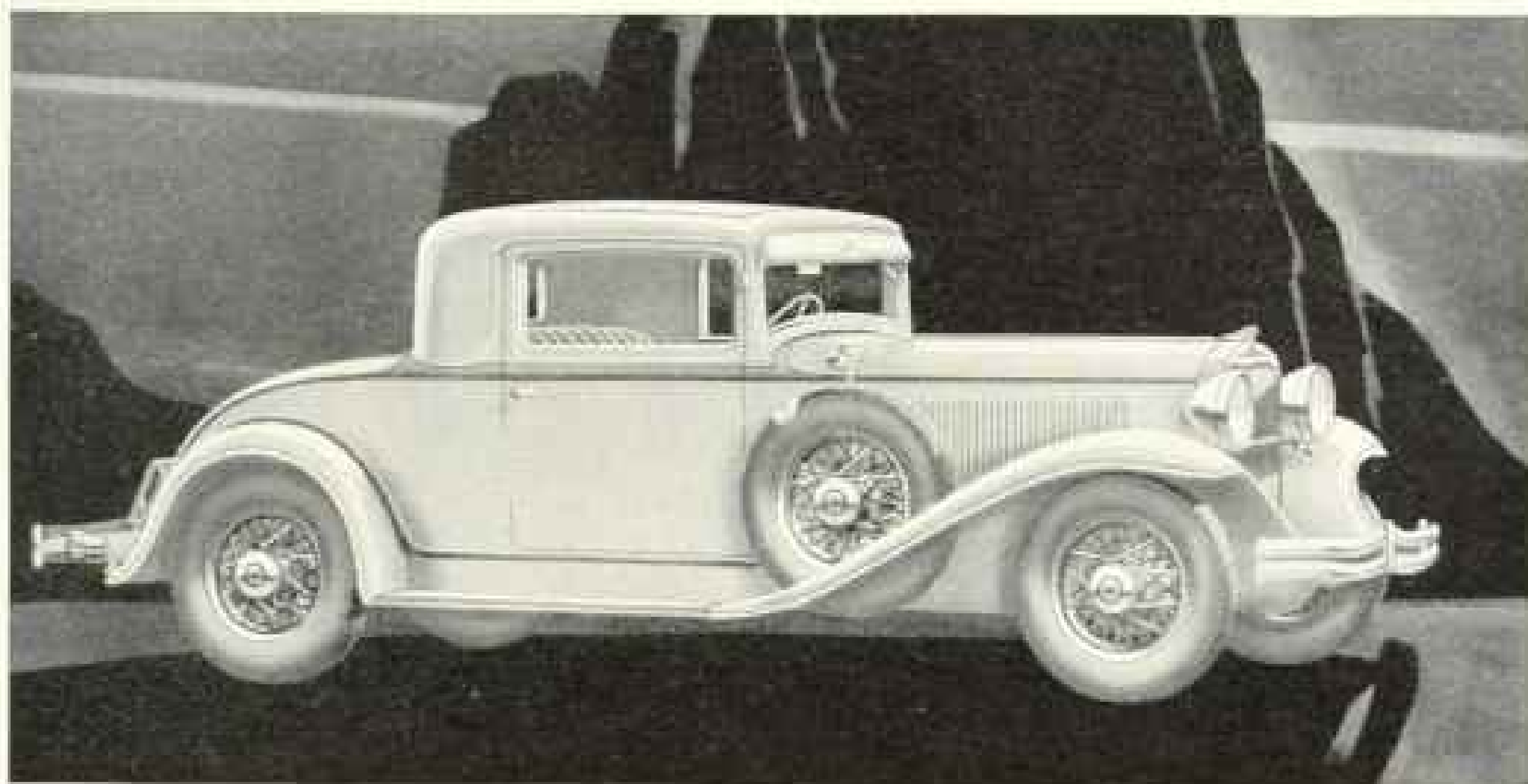


CHRYSLER EIGHT—Coupe (with rumble seat) \$1495; Sedan \$1525; Convertible Coupe \$1665; Roadster \$1495. Six wire wheels, \$80 extra. Sport Roadster (including six wire wheels and trunk rack) \$1595. CHRYSLER IMPERIAL EIGHT—Five-passenger Sedan \$2745; Close-Coupled Sedan \$2845; Seven-passenger Sedan \$2945; Sedan-Limousine \$3145. With custom bodies designed by LeBaron—Coupe \$3150; Roadster \$3220; Convertible Coupe \$3320; Phaeton \$3375. All prices f. o. b. factory.

Chrysler Eight and Chrysler Imperial Eight closed cars are factory-wired for immediate installation of Transitone, the pioneer automobile radio. Other models will be equipped on order.



## DODGE DEPENDABILITY



# New Beauty AND THE TRADITIONAL EXCELLENCE YOU EXPECT FROM DODGE

Dodge Brothers first thought is to offer the public a good motor car. The new beauty of the new Dodge Six and Eight is therefore the true beauty of high quality . . . the kind of beauty that results from fine materials, skillful design, good taste and good workmanship. ☞ A new type double-drop frame gives lines of sweeping lowness and tremendous basic strength. ☞ Long wheelbases add much to beauty and make possible also a great advance in comfort. ☞ The

rich Bedford cord and other fine upholstery fabrics . . . the safe silent Mono-Piece Steel Bodies . . . the internal weatherproof hydraulic brakes . . . the dependable, brilliantly performing power plants . . . these things illustrate how much has been put into these cars to make them a lasting joy to own. ☞ With so much in quality, and such size, beauty and comfort,

these cars at Dodge Brothers traditional price levels obviously bring about an entirely new scale of motor car value.



© 1931 Dodge Brothers Corporation

New Dodge Six \$815 to \$845, New Dodge Eight \$1095 to \$1135, Standard Six \$755 to \$835, Standard Eight \$995 to \$1095. Prices f.o.b. factory

Golden hours—packed with pleasure ★ ★



21 new Custom  
and Standard  
runabouts and  
sedans: 17 to 30  
ft.; 25 to 45 H.P.  
P. H.: \$1295 to  
\$6500.

Every day is filled with pleasure . . . when you own a Chris-Craft. A world unknown to landmen is yours to explore. ★ ★ Go where blue skies beckon; drink deep of sun and wind . . . and health. Log the miles slowly, or eat them up in a swift, exhilarating dash. ★ ★ Chris-Craft joins the young folks in their water sports. It carries family and friends in *dry*, deep-cushioned comfort on all-day trips. It is a necessary part of vacation or social life at the world's watering places. ★ ★ You'll enjoy Chris-Craft speed, beauty and luxury more, knowing these are *safe*, seaworthy boats . . . product of 44 years' experience . . . with the famous Chris-Craft V-type hull and double-planked bottom. ★ ★ A *new* Chris-Craft fleet, smarter and finer than ever, now awaits inspection . . . models suiting every taste as to size, speed, power and price; as outstanding in value as in beauty and performance. ★ ★ Plan, this year, to share the joys of motor boating, which Chris-Craft has made so inexpensive and easy to obtain. Your Chris-Craft merchant will gladly demonstrate . . . and explain the finance plan that enables you to buy out of income.

© C-C Corp., 1031 (107)

**Chris-Craft**

RUNABOUTS . . . SEDANS . . . COMMUTERS  
CRUISERS . . . YACHTS . . . TENDERS

New 31- and 36-ft.  
family cruisers; single  
and double cabins,  
open or enclosed bridge;  
priced as low as \$3075.



CHRIS-CRAFT CORPORATION—703 DETROIT ROAD, ALGONAC, MICHIGAN  
NEW YORK DIRECT FACTORY BRANCH—1 WEST 52ND ST., AT 5TH AVENUE

# NoMAR RESTS . . . . .



## ... for the legs of your davenport, upholstered chairs

Bassick NoMar Rests will keep your floors and floor coverings beautiful—free from gouges and ugly matted spots. Free from scratches and blemishes.

NoMars spread the weight of furniture f-l-a-t on their broad, unbreakable Atlasite bases, protecting floors, rugs, carpets. NoMars are easy to install. Their natural brown wood-tone blends in with furniture—adds a fine, finished appearance.

A few dollars invested in floor protection will save you many times that amount when it comes to refinishing floors and replacing coverings.

Buy Bassick NoMar rests and casters at any hardware or house furnishing store. Or mail coupon below.

THE BASSICK CO., Bridgeport, Conn.



"Softer" NoMars fit snugly into casters or heels. "Drive-on" NoMars slide on easily and quickly. Cannot split furniture legs or work holes. Four sizes. \$6.50 to \$1.00 per set of 4.

# BASSICK

For 39 years the buy-word for fine casters and furniture rests

THE BASSICK COMPANY, Bridgeport, Conn.

In Canada: Clark Metals, Ltd., Lindsay, Ont., Can.

Send me descriptive literature showing where and how to use Bassick Casters and NoMar Rests.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

## Avoid the Expense and Inconvenience of Refinishing Floors



RENEW THEM WITH THE AMAZING NEW **FLOOROLA METHOD**



Clean and Permanently Protect Your Floors This Remarkable New and Different Way!

THE ravages of time, the tread of many feet and household accidents leave marks and stains upon your floors. No longer are the effects of wear, tear and casualties difficult and expensive to remove. Quickly, easily FLOOROLA will even take away every trace of ground-in, imbedded dirt.

Never again will it be necessary to smear wax on your floors by hand, with mops or other messy gadgets, for FLOOROLA waxes, cleans and polishes entirely automatically. Automatically, FLOOROLA-WAX is applied from sealed containers to the distributing brushes and then brushed vigorously into thousands of tiny pores.

No other machine has this efficient and effective method of wax distribution that actually cleans as it waxes.

Waxed Floors No Longer Sticky or Slippery!

FLOOROLA-WAX comes to you in containers, sealed against inferior substitution, dirt and impurities. It contains no sticky, slow-drying paraffin and is non-expansive. With the FLOOROLA method of application, it produces a crystal clear surface, hard, brilliant, non-slipping. A surface forever rid of old-style, non-protecting, surface waxing.

At slight cost, with little effort, floors can always be dirt-free and permanently beautiful. With FLOOROLA you are forever rid of the expense of refinishing floors and the tremendous bother of having workmen upset your home for days at a time.

THE FLOOROLA CORPORATION, YORK, PENNSYLVANIA

The NEW **FLOOROLA**

The Floorola Corporation  
Dept. BFG-1 York, Pennsylvania  
Enclosure  
I want to know more about this revolutionary new FLOOROLA process and the new amazing booklet, "The Secret of Beautiful Floors."  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
( ) Send name of nearest dealer



No mess—no effort—simply place container, set, sealed wax containers over floor distributing brushes... at a snap of the handle trigger switch,

automatically your floors are **CLEANED** and **WAXED**

Dealers: There are a few territories still available in which The Floorola Corporation has no representation. Write or wire for particulars.

Enhance the Charm and Value of Your Home

An intriguing booklet, "The Secret of Beautiful Floors" will tell you more about this sensational new method of floor maintenance. You will want to see this machine. Ask for the name of your nearby dealer.

**Now — PRICED WITHIN THE REACH OF EVERY HOME OWNER.**

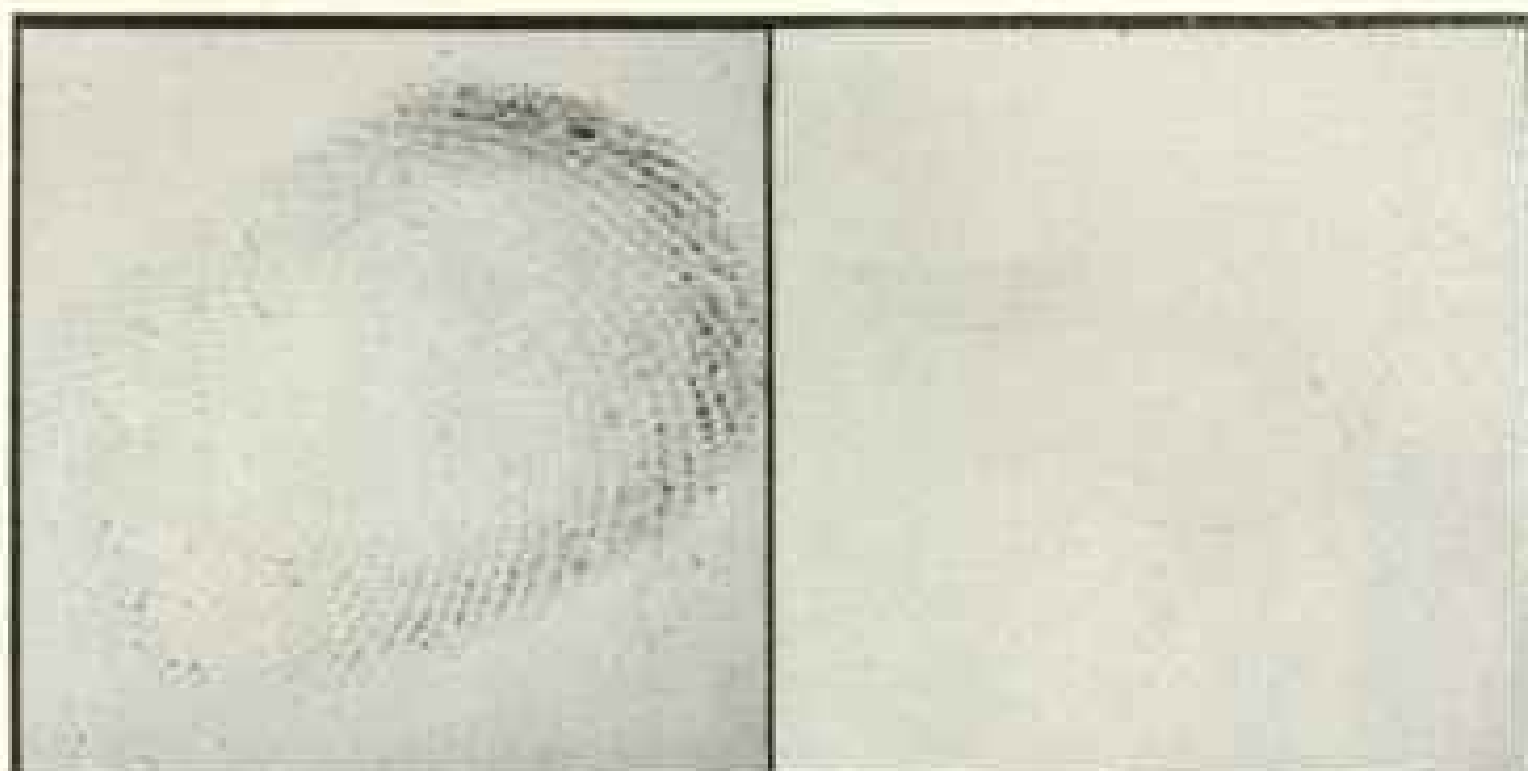
# Wash woodwork?

Why—there's a way to keep it from getting dirty at all

● Which method do you follow? The one that makes work, or the one that saves it? As long as you WASH woodwork and panelling, light or dark, you're sure to have MORE washing to do. As soon as you start WAXING it—you prevent those spots and have a new freedom from drudgery.

● Johnson's Wax is absolutely transparent on white woodwork—so don't worry about dulling its lustre. You'll improve it!

● It's a joy to see white woodwork gleaming white. But, it's a much more wonderful sensation to see it stay clean for days and days in



UNWAXED SURFACE

WAXED SURFACE

*These enlarged unretouched photographs show the difference between finger marks left on waxed and unwaxed surfaces. They illustrate recent tests scientifically made by Henry W. Banks, III, famous scientist and chemist. See how the protective coating of Johnson's Liquid Wax wards off soil and smudges.*

spite of all the soiled fingers, big and little, that carelessly press against it.

● Johnson's Wax—this special blended wax—is more than just a material. It's a housekeeping method. What a difference it makes in your work . . . It keeps finger prints off woodwork. It keeps dust off furniture. It makes floor-cleaning quick and scientific instead of laborious and back-breaking.



● Johnson's Wax in paste and liquid form—for floors, furniture and motor cars.

**Send 10c for 25c trial can**

S. C. JOHNSON & SON, Dept. NG-3, RACINE, WIS.  
Gentlemen: Please send a 25c can of Johnson's Liquid Wax. Enclosed is 10c to defray part of cost and postage.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

PLEASE PRINT

# JASPER

*A National Park of  
incredible beauty in the mighty Canadian Rockies*



**S**ET in the scenic heart of the Canadian Rockies, the towering majesty of Jasper National Park is matched by few spots on earth.

Here, ringed with snow-capped peaks, is Jasper Park Lodge, offering you the most thrilling vacation you can imagine. Golf on one of the finest courses in the entire world . . . swimming in a luxurious, warmed outdoor pool . . . trail riding through scenes of

breath-taking splendor . . . mountain-climbing, alone or with Swiss guides . . .

Jasper Park Lodge is owned and operated by Canadian National Railways. It offers you every luxury of accommodation and service, and is reached by through Canadian National trains from Montreal, Toronto, Chicago, Winnipeg or Vancouver. Write to any of the offices listed below for illustrated booklets.

*Showings of Canadian travel films may be arranged at any of the offices listed below.*



## CANADIAN NATIONAL

*The Largest Railway System in America*

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CLEVELAND  
353 Euclid Ave.  
DETROIT  
1225 Washington Blvd.  
DULUTH  
420 W. Superior St.  
HANNABURY  
725 Walnut Street

LOS ANGELES  
201 So. Grand Ave.  
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NEW YORK  
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PITTSBURGH  
227 Fifth Avenue  
PORTLAND, ME.  
Grand Tower Bldg. Sta.  
PORTLAND, ORE.  
207 Yamhill St.  
ST. LOUIS  
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# Only \$75 for this new Home Movie Camera



## A Simplified Ciné-Kodak... low in price... and sold on easy terms

**H**OME MOVIES are not a rich man's hobby... something you would like to have but think you can't afford.

Eastman has so simplified the motion picture camera that today a Ciné-Kodak can be bought for as little as \$75, case included. It's the new Model M, illustrated above... the lightest camera ever made for 100 feet of 16 mm. film. Comes with *f*.3.5 lens and a special attachment for close-ups.

No focusing required. You just aim your camera and press

a lever... that's all there is to it. You get crisp, clear movies... sparkling with quality... alive with action... the first time you try.

Developing by Eastman experts is included in the price of the film. Your reels come back to you promptly, ready to show in your home.

Turn the switch of your Kodascope projector. Then sit back in the quiet of your darkened living room and enjoy the movies you made yourself.

If you haven't made a movie, you've missed one of the biggest thrills in life. Get acquainted with this new form of home entertainment. Stop in at your Ciné-Kodak dealer's and ask him about the \$75 Ciné-Kodak Model M. Kodascope projectors as low as \$60. You can get a complete outfit for a small down payment and easy terms.

### Mail coupon for free HOME MOVIE BOOKLET

EASTMAN KODAK CO., Rochester, New York  
Please send me FREE illustrated booklet telling me how I can easily make my own movies.

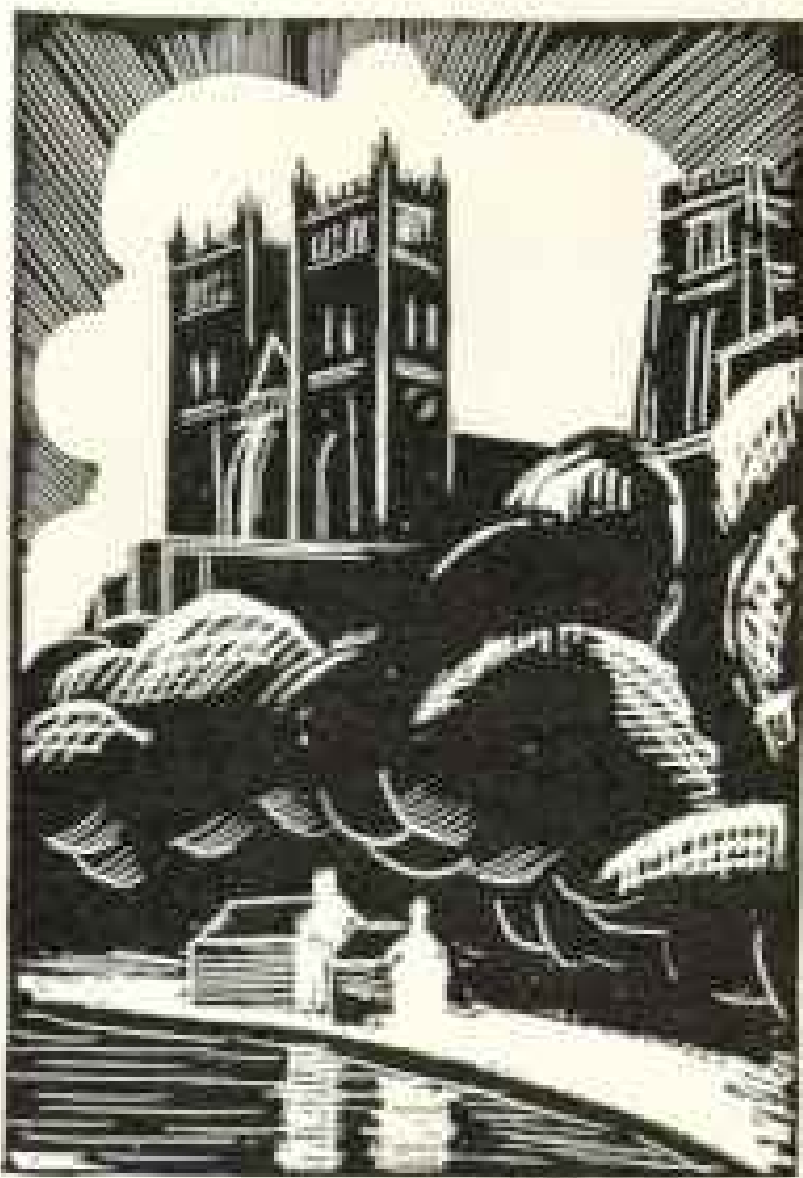
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## Ciné-Kodak Simplest of Home Movie Cameras

SEE THE HISTORY OF  
**BRITAIN**



DURHAM...glorious eleventh century cathedral peacefully towering above the River Wear... a magnificent glimpse of mediæval splendour—one of many that you mustn't miss. Travelling through England's eastern counties is more than a journey... it's a panorama of history and romance... Often you have heard the names... YORK... ancient city dominated by its sublime cathedral, treasure house of stained glass... ELY, PETERBOROUGH, NORWICH, LINCOLN, FOUNTAINS ABBEY, CAMBRIDGE... and a dozen more. Let them be mere names no longer... make them into memories. You will find them all on the eastern side of Britain, served by the London and North Eastern Railway.

Call or write for new descriptive booklet 64.

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General Agent, 11 W. 42nd Street, New York

◆  
**LONDON  
AND NORTH EASTERN  
RAILWAY**

**OF ENGLAND AND SCOTLAND**

Why choose between  
**SLEEP AND  
COFFEE**

If you have been forced to give up coffee at night because it keeps you awake, discover the joy of coffee that lets you sleep—the improved Kellogg's Kaffee Hag Coffee.

Drink all you wish of Kellogg's Kaffee Hag Coffee. It cannot affect your sleep or nerves. Because the harmful effects of caffeine are removed.

Yet all the wonderful flavor and good cheer that you love is in the improved Kellogg's Kaffee Hag Coffee. It is not a substitute. It is a new blend of the world's choicest coffee beans. The improved Kellogg process and the recent price reduction make it more popular than ever.

Let tonight see the return of coffee to your table—Kellogg's Kaffee Hag Coffee. At all grocers in vacuum-sealed tins. Or, the coupon will bring you a generous sample. Made by Kellogg in Battle Creek.

You'll enjoy Kellogg's Slander Music, broadcast over WJZ and associated stations of the N. B. C. every Sunday evening from 10.30 to 11.00 (Eastern standard time).



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**KELLOGG COMPANY**  
Dept. AB-3, Battle Creek, Michigan

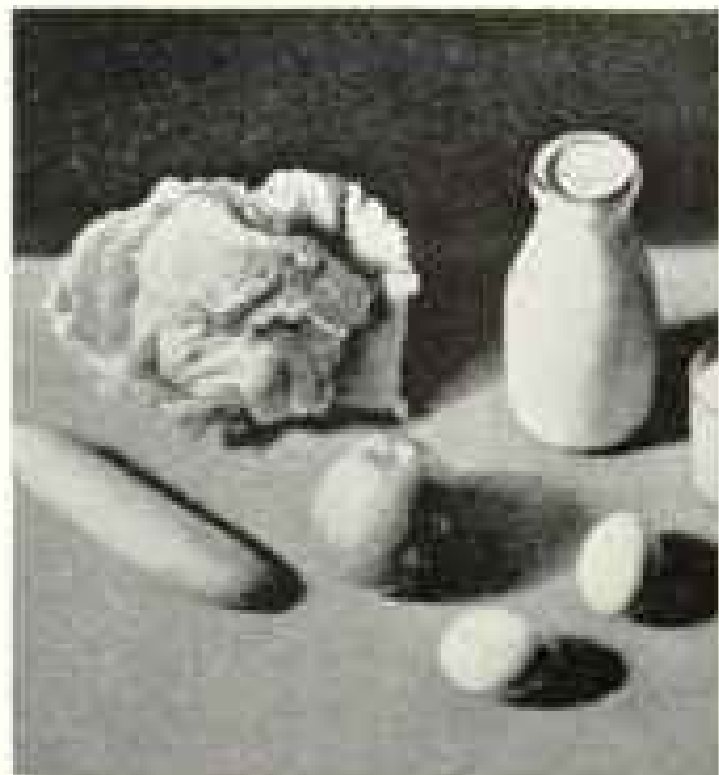
Please send me, postpaid, sample can of Kellogg's Kaffee Hag Coffee. I enclose ten cents (stamps or coin). (Offer good in U. S. A. only.)

Name \_\_\_\_\_

Address \_\_\_\_\_



Do these three things . . . to have strong, healthy teeth



**1. Include these in your daily diet:**

*One or two eggs, raw fruit, fresh vegetables, head lettuce, cabbage as celery, ½ lemon with orange juice. One quart of milk, and other food to suit the taste.*

**2. Use Pepsodent twice a day.**

**3. See your dentist at least twice a year.**

# Teeth neglected today may inflict a costly penalty

this is no time to economize with health

**F**OR your health's sake, don't carry economy too far. If you need dental treatment, don't delay because of the few dollars you will pay in dental fees. Neglect a tiny decay cavity in your teeth, and you may pay for it with heart trouble or rheumatism. If you escape that, or something worse, the best you can hope for is some expensive bridgework in the future.

*Take care of teeth—remove film*

Keep teeth in repair. Keep Pepsodent tooth paste at hand and see that the whole family uses it. Those are two important ways to save both health and money.

Pepsodent frees teeth of the stubborn, clinging coating known as *film*. Remove film and you remove the millions of acid-producing bacteria that destroy the tooth's delicate enamel . . . that cause many other commonly known disorders. You remove

the unsightly stains that film absorbs from different foods and smoking. These are mistaken by most people as the natural color of their teeth.

To remove film more effectively than by any other method except your dentist's cleaning, Pepsodent was developed. That's why it is called the film-removing tooth paste.

Pepsodent contains no pumice, no harmful grit or crude abrasives. It has a gentle action that protects the delicate enamel. It is completely SAFE . . . yet it removes dingy film where ordinary methods fail.

Try Pepsodent today—it is an important adjunct in possessing lovelier, healthier teeth through life.



Amos 'n' Andy brought to you by Pepsodent every night except Sunday over N. B. C. network, 7:00 p. m. on stations operating on Eastern time, 10:00 p. m. on stations operating on Central time, 9:00 p. m. Mountain time, 8:00 p. m., Pacific time.

NEWLY  
DISCOVERED  
*Pepsodent Antiseptic  
Mouth Wash*  
NOW at your  
nearest druggist's

# Pepsodent

THE SPECIAL FILM-REMOVING TOOTH PASTE



## Home Portraits ... artistic ... ex- pressive ... are made with the Graflex Camera.

In years to come—remember—the portraits you make now will be truly precious to yourself and your family.

WITH a Graflex Camera Mr. Leventon, a well-known musician, made this portrait of his own son.

This picture he proudly called "Portrait of a Russian Boy"—and within the short period of a year it has been accepted by 20 international exhibitions of photography.



ALEXANDER  
LEVENTON

# GRAFLEX

FOLMER GRAFLEX CORP. . . . ROCHESTER, N.Y.

FOLMER GRAFLEX CORP., Dept. 100, Rochester, N.Y. Please mail booklet, "Why a Graflex?"... which describes how more interesting photographs are made with a Graflex...to name in margin of this page.

Serve Malted Nuts as a hot or cold beverage—or sprinkle on fruits or cereals.



## Put the Smile of Health on his Face

Let abounding health paint roses in your children's cheeks. Give them a food they will enjoy. One rich in the precious food elements so vital to vigorous growth.

Malted Nuts makes a captivating food drink. It is delicious any way you serve it. As a topping for desserts and salads. With fruits, or sprinkled over cereals.

Its abundance of easily assimilated food iron, lime and vitamins make it nourishing and sustaining. Infants thrive on it. Nursing mothers enjoy an abundance of health-giving milk. Lean people gain weight rapidly. Hard workers find it gives them new energy.

Those who do not like milk, or with whom it does not agree, relish Malted Nuts, which, for them, takes its place.

You can get Malted Nuts, together with the full line of Battle Creek Sanitarium Health Foods, at the authorized Battle Creek Dealer, your Grocer, Druggist or Department Store.

At Battle Creek we maintain a staff of dietitians to advise you on any diet problem. Check your child's diet problem on the coupon below and mail to Miss Jean Kain, our chief dietitian. She will send you suggestions for your child's individual diet, without charge. Naturally, no diagnosis of any disease will be at-

**FREE  
diet  
advice**

tempted. Consult your physician for that. "Healthful Living", a most helpful book written by a leading nutrition expert, will also be sent free. This offer to assist you is bona fide and without obligation. The diet may be followed with or without charge. Naturally, no diet, without charge. Naturally, no diagnosis of any disease will be at-

### MAIL COUPON TODAY

Miss Jean Kain NG-3-31-281  
THE BATTLE CREEK FOOD CO., Battle Creek, Michigan.  
I want to avail myself of your Free Diet Service. My child's diet problem is checked below. Also send "Healthful Living"  
 Constipation  To Gain Weight  Meal Planning  
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Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

# MALTED NUTS

—{ Delicious Vegetable Milk }—

# Motion picture cameras prove we sleep 10 to 15 different ways each night



Millions of Mattresses now in use are  
enemies of VITALIZING REST

"I DIDN'T turn over all night"—the proud  
boast of many a person after a good night's  
sleep.

But the boaster *did* turn over. If he is like the  
average healthy sleeper, he took 10 to 15 different  
positions, and changed from one to another 20 to  
45 times.

We "rest in parts." One position rests one set  
of muscles and organs. Other positions rest other  
groups. Now it has been proved!

Automatic motion picture cameras recorded  
sleep habits in an investigation carried on by Dr.  
H. M. Johnson and a staff of scientists at Mellon  
Institute, Pittsburgh. Out of this study has come  
a new knowledge of sleeping equipment.



**RIGHT SUPINE SPRAWL.**—one of the dozen or more  
positions assumed nightly by many of the healthy sleepers  
under observation in the Investigation of Sleep at Mellon  
Institute. Photographed by motion picture camera.

Millions of mattresses now in use are enemies of  
vitalizing rest. Because they pad down. Form  
bumps and hollows. They don't permit the rest-  
ing of all the muscles and organs in turn, by  
making all postures *comfortable*.

Look at the cross-section photograph of the  
Simmons *Beautyrest* Mattress. Instead of solid  
stuffing, here are hundreds of springy *inner coils*  
under soft cushioning. The Simmons *Deepsleep* is  
also the inner-coil type. These mattresses cannot  
pad down. They "breathe." They are always  
"alive." They bring blissful ease—truly *vitalizing*  
rest!

See the Beautyrest and Deepsleep at any good  
furniture store. Test their comfort. Inspect their  
lovely coverings! . . . A new booklet has been pre-  
pared: "Bodily Positions in Restful Sleep." Write  
for it! Address the Simmons Company, Dept.  
H-1, 222 North Bank Drive, Chicago, Illinois.



The famous Simmons *Beautyrest* Mattress on which the  
most revealing sleep tests in history were made. See the inner  
coils which make up the heart of this mattress. Hundreds of  
them set closely together, held between layers of softest  
cushioning. . . . \$39.50  
Beautyrest Box Spring to match . . . . . 39.50

The new Simmons *Deepsleep* Mattress, similar in principle  
to the Beautyrest, different in construction. Inner coils, too.  
Buoyant, relaxing. Lovely coverings . . . . . \$23.00  
Deepsleep Box Spring to match . . . . . 27.50

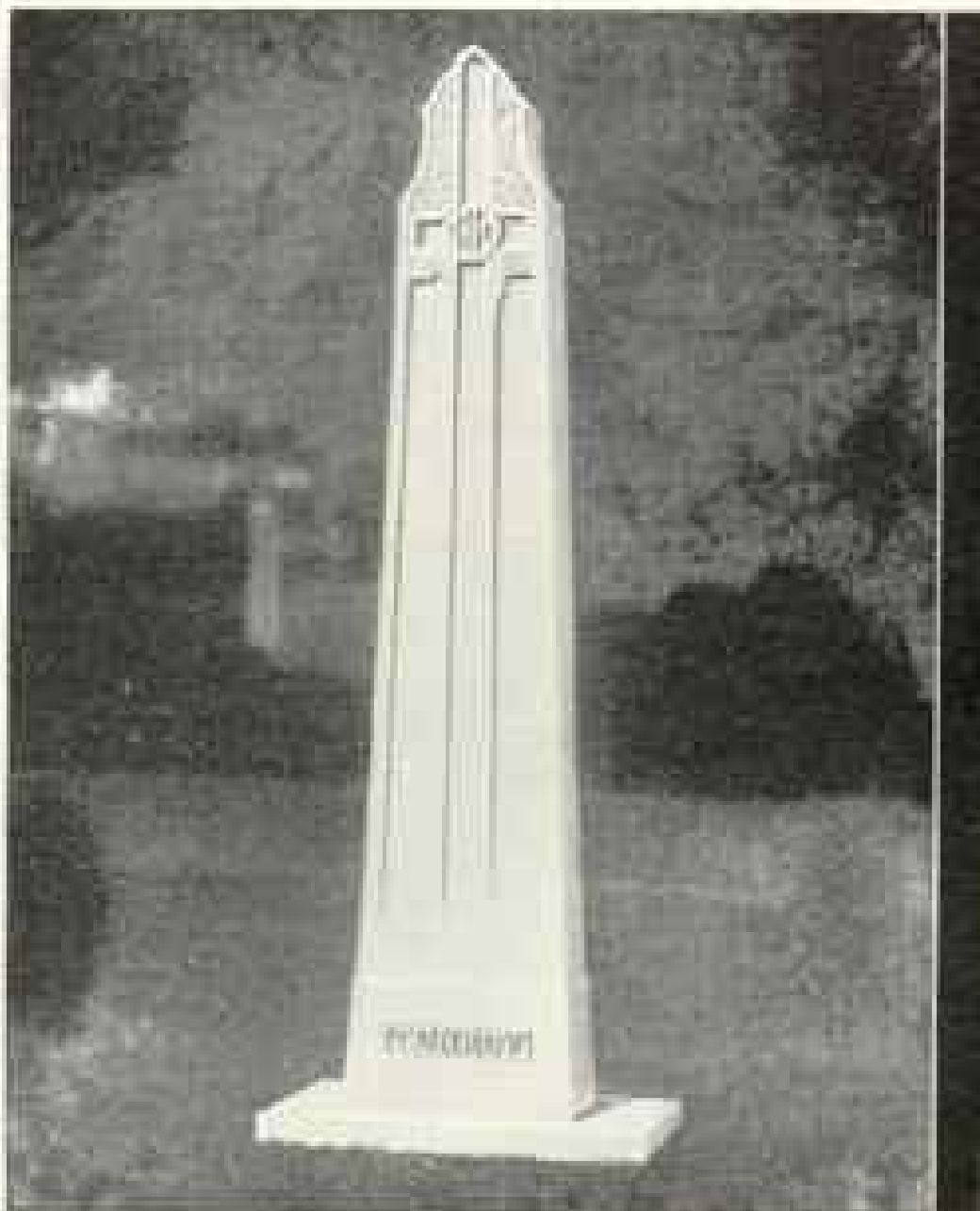
Simmons *Ace Open Coil* Spring, suitable for use with either  
the Beautyrest or the Deepsleep Mattress, proved to be the  
ideal type for healthful sleep. . . . . \$19.75

*Rooby Mountain region and West slightly higher*

# SIMMONS

BEDS SPRINGS MATTRESSES

**IMPERISHABLE SHAFTS  
OF QUIET BEAUTY**



(Design copyrighted by Jones Bros. Co.)

A THOUSAND YEARS from now, people yet unthought of may read on Guardian Memorials the record of a generation which, centuries before, provided wisely for the preservation of its memory.

For in Guardian Memorials, fine-textured Barre, Vermont, granite is carved by master craftsmen into imperishable shafts of quiet beauty. They are finished in exquisite simplicity, and perfect taste. A guarantee bond that may be passed to distant heirs assures every purchaser of immediate satisfaction and enduring protection.

Guardian Memorials are manufactured and guaranteed by Jones Brothers Company, Boston, Mass., and Barre, Vermont, and distributed by leading retail memorial dealers.

**GUARDIAN  
MEMORIALS  
OF EVERLASTING BEAUTY**



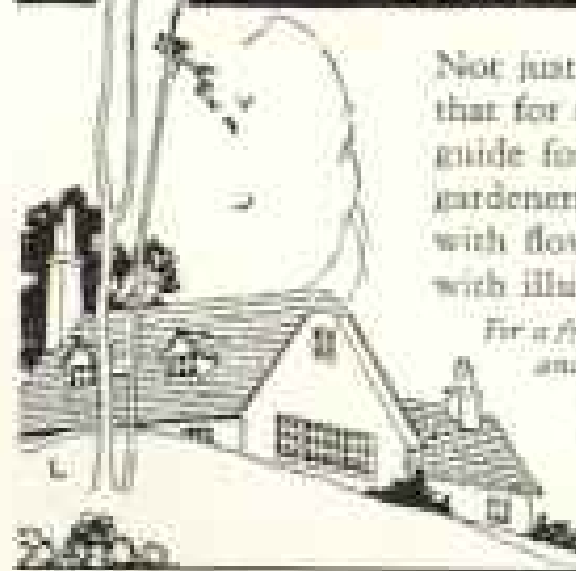
Registered Trade-Mark

**JONES BROTHERS COMPANY**  
Dept. K-3, 10 High Street, Boston, Massachusetts

Gentlemen: Will you please send me, without charge, your helpful booklet, "To Mark the Place with Beauty Forever."

My name \_\_\_\_\_  
My address \_\_\_\_\_  
\_\_\_\_\_

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Not just a catalogue, but the book that for nearly 100 years has been a guide for amateur and professional gardeners. It will help you to success with flowers or vegetables. Filled with illustrations and expert advice.

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**HENRY A. DREER**  
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Philadelphia, Pa.

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POWER MOWER**

LIGHT weight, rigid steel construction, roller drive, easy to operate. Trims close; separate control for roller and cutter. Drop-out reel. Climbs 25% grade without bog. Half starting and sharpening. Always. COUPON will bring full particulars.

Desirable territory for dealers or special representatives' lives still open.



**GILSON BOLENS MFG. CO.,** 3004 PARK STREET, PORT WASHINGTON, WIS.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Type and size lawn \_\_\_\_\_

To maintain glowing Health Use—

# The GENERAL ELECTRIC Sunlight MAZDA Lamp

When Disease Threatens—

## Call in your Family Physician

SINCE the dawn of civilization primitive men and animals instinctively turn to sunlight for its beneficence. What modern science knows, the ancients only sensed. The Greeks and the Romans had their Phoebus Apollo. The Brahmans of India paid homage to the sun under a variety of forms. So did many Buddhist sects. The Emperors of China and Japan claimed to be the descendants of the Sun God. Virtually, all the Indians of North and South America were sun worshipers, the most fanatic in this respect being also the most highly civilized—the Incas and the Mayas.

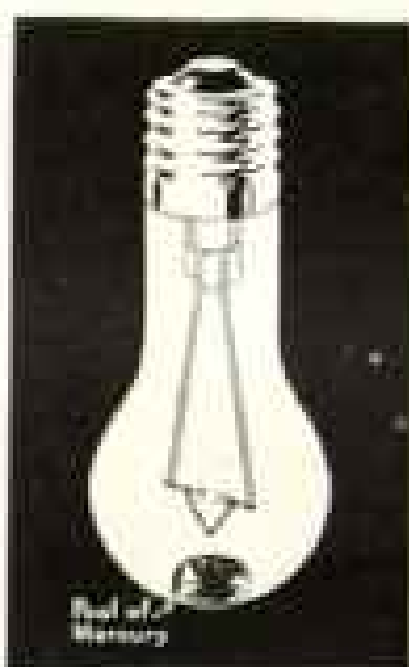
For countless centuries these people turned gratefully to the sun, worshiping its benevolence. Belief in the goodness of sunshine is something that is born in every one of us, a heritage from those far off days when the cave man selected his residence to face the sun and the Romans built lavish solariums better to enjoy the health-giving energy of sunlight.

Unfortunately for most of us, as physicians and scientists realize, the sunshine that our forefathers knew, a kindly beneficent season out in the open under a cloudless sky, free from smoke and dust and dirt, is gone. Economic necessity has made of us a nation of sun dodgers, hiding away in closely packed buildings in the daytime, working and playing behind glass that screens out the ultra-violet rays of sunshine just as surely as the window shades screen out the visible rays of the sun's light. We bundle up our bodies. We ride in subways and street cars and automobiles, almost totally cut off from the sunshine which our forefathers enjoyed as a matter of course. Even when we get out-of-doors in our cities, smoke and dirt cloud the air and rob the sunshine of more than three-quarters of its active, health-giving rays. And then winter comes; and the sunlight loses most of its health value. Lucky, indeed, it is for us that we know more about the sun than the Romans did—than even modern science knew about it up to twenty-five years ago. Lucky, indeed, it is that science has presented us with a new means of compensating our bodies for the losses caused by our economic necessities.

It is to compensate for this loss of health-maintaining ultra-violet that Mazda Research has designed the General Electric Sunlight Mazda lamp. It is upon this basis that the family physician will recommend its use, because he realizes the number of people who need the *Preventive* power of ultra-violet far exceed those who should have it for its *Curative* effects.

The G. E. Sunlight Mazda lamp in the home is designed to help maintain family health—to build up resistance to disease—to help develop Vitamin D—the sunshine vitamin—

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which during the pre-natal and growth years of life is an absolutely essential element for building strong bones and for sound, healthy development.

Mazda Research has therefore developed a sunlight source almost as simple and quite as safe as the sun. The G. E. Sunlight Mazda lamp can be used freely on all members of the family. Like orange juice, tomato juice, fresh vegetables and wholesome foods, its benefits come naturally. People do not take "treatments" under it so much as they read, relax, play and work under its healthful radiance. Fixtures designed for the use of the G. E. Sunlight Mazda lamp (this lamp will not operate in the ordinary lamp socket) look like beautiful bridge or floor lamps—and operate as simply—without noise, fuss or odor.

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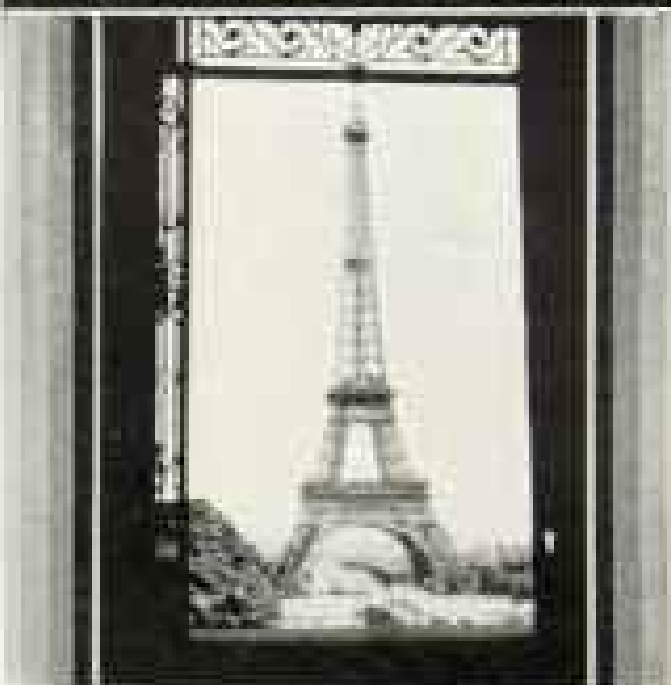
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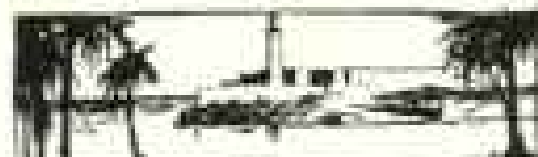
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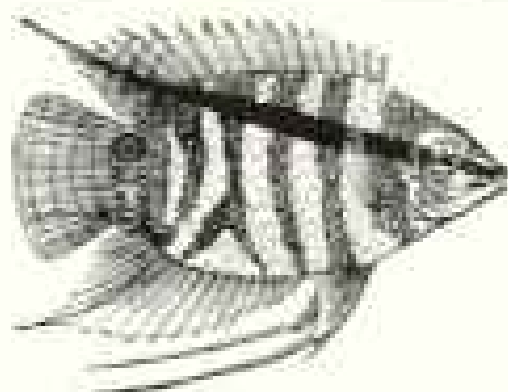
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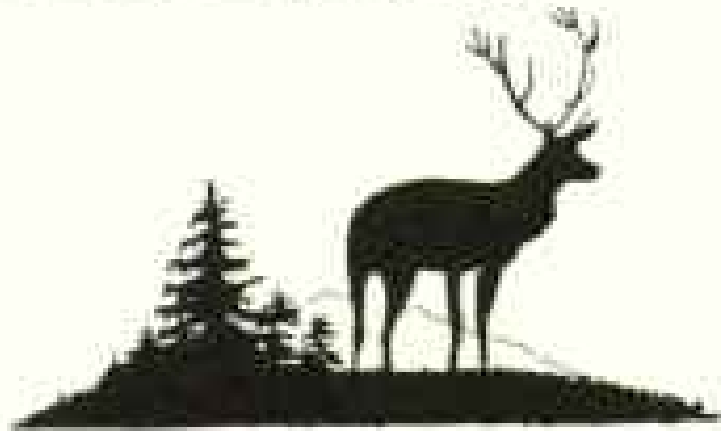


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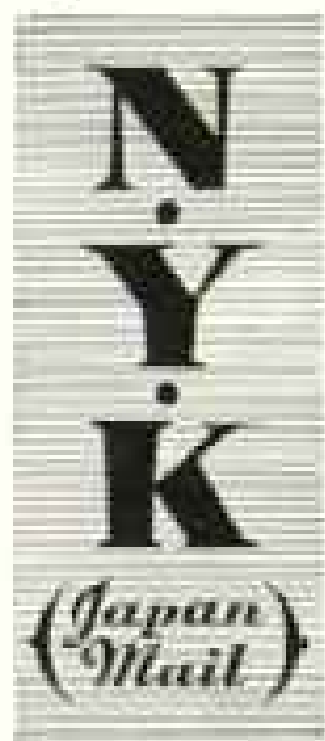
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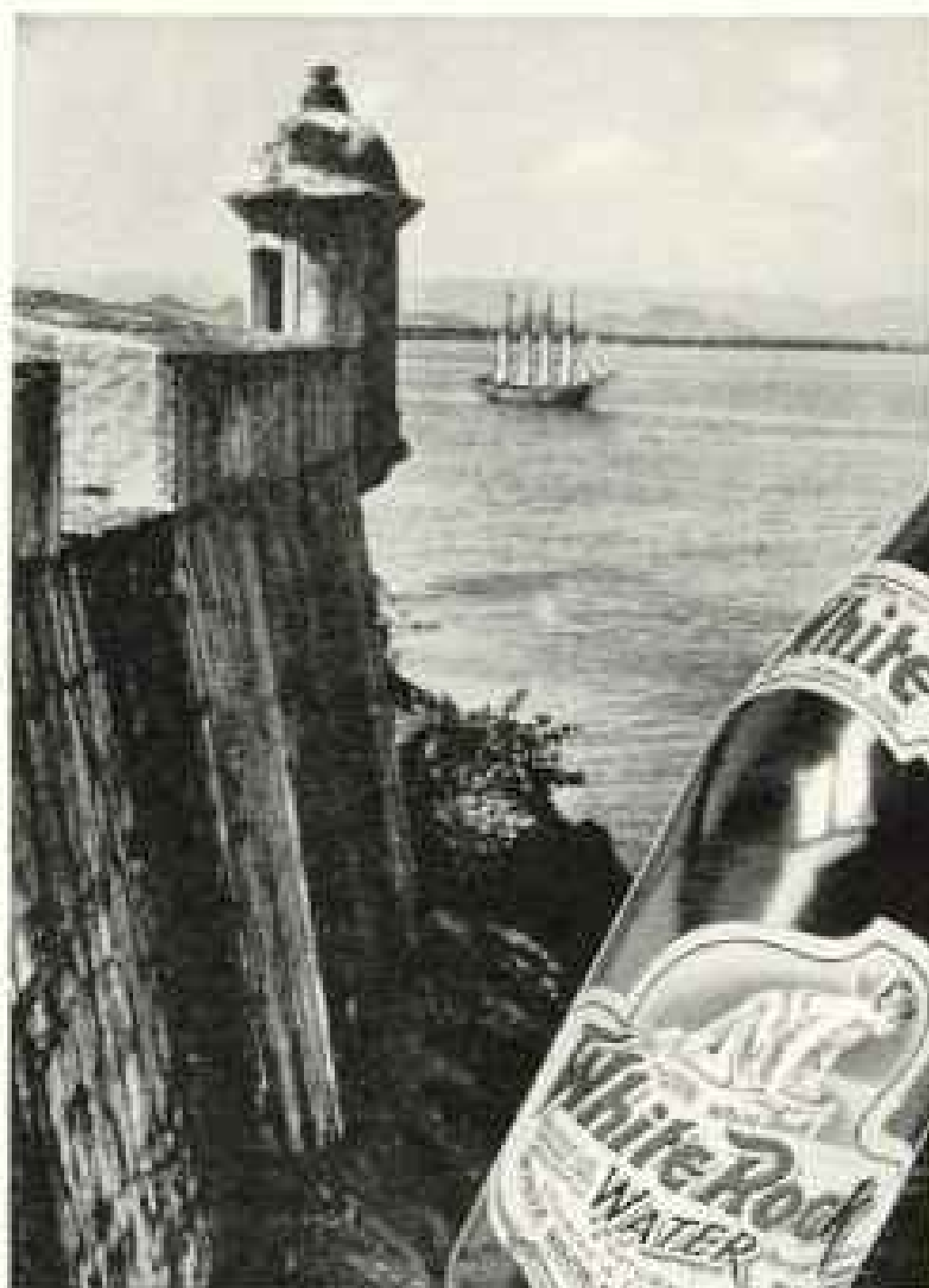
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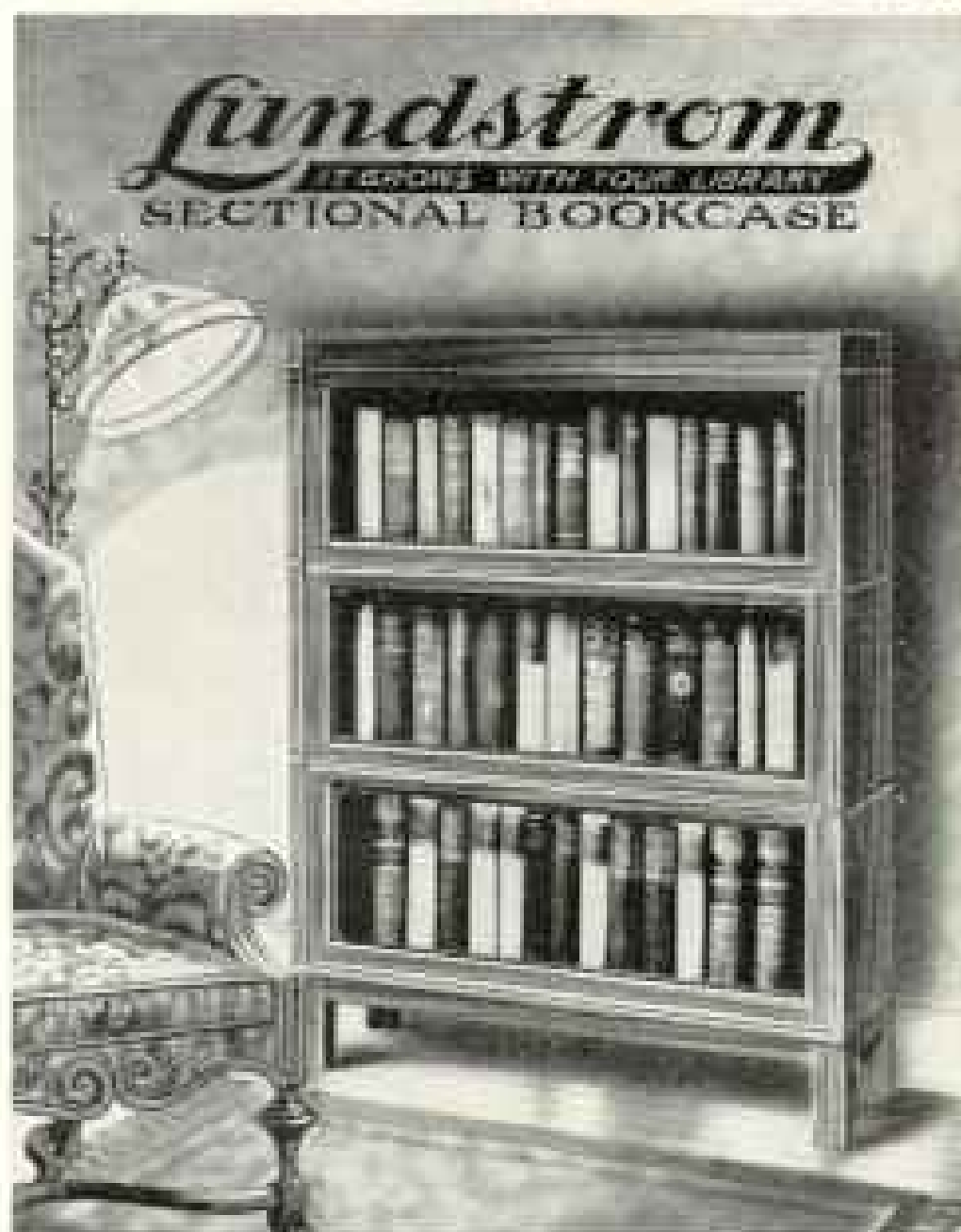
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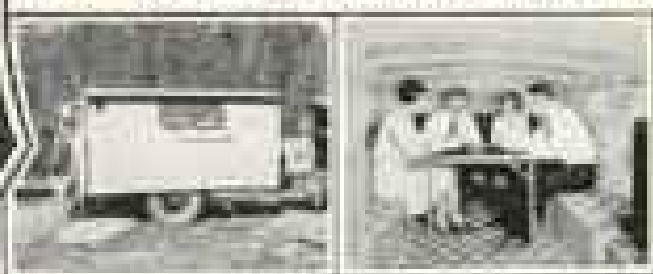


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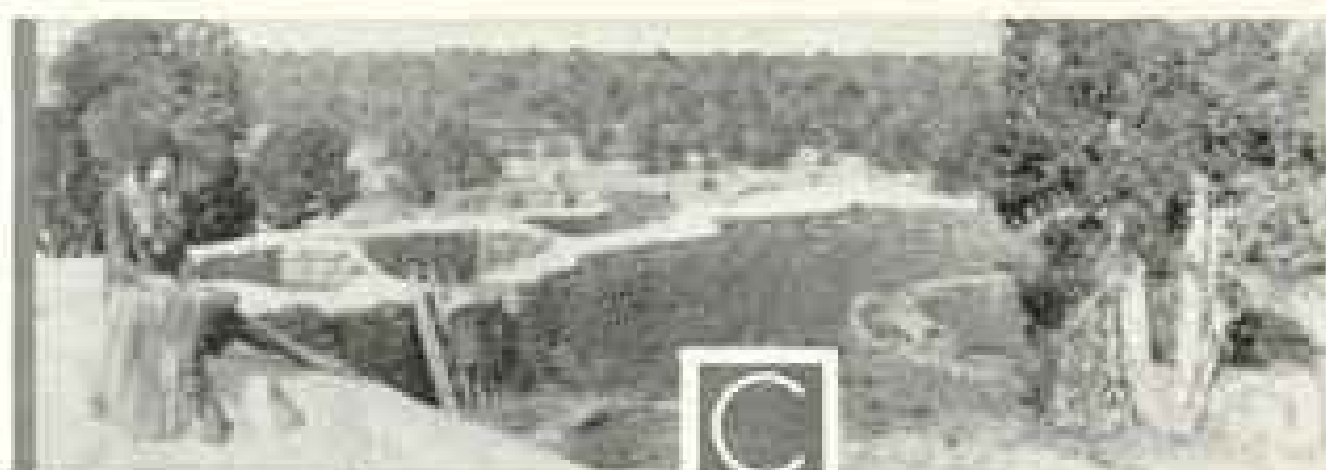
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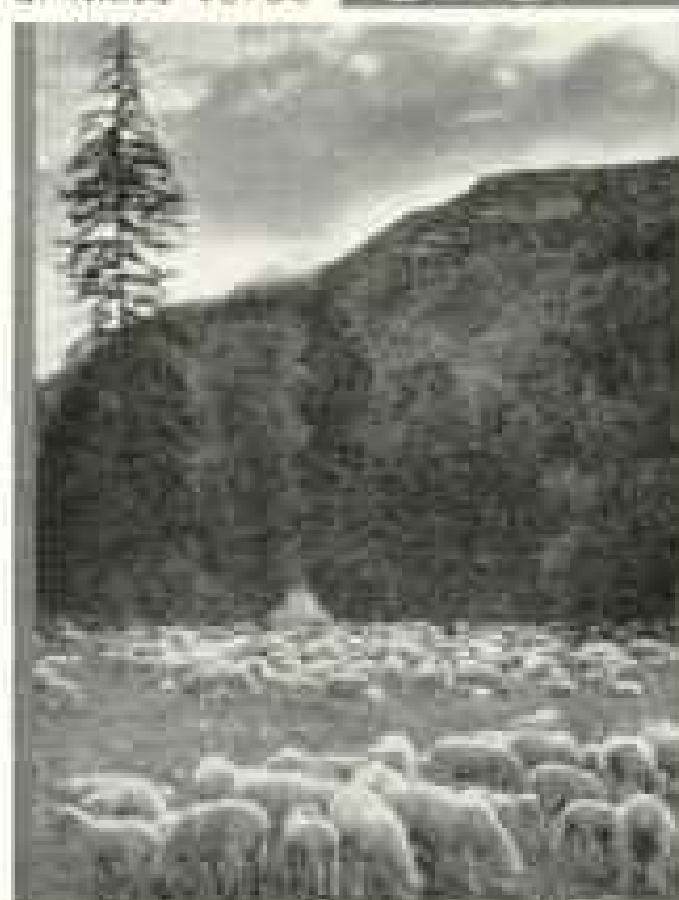
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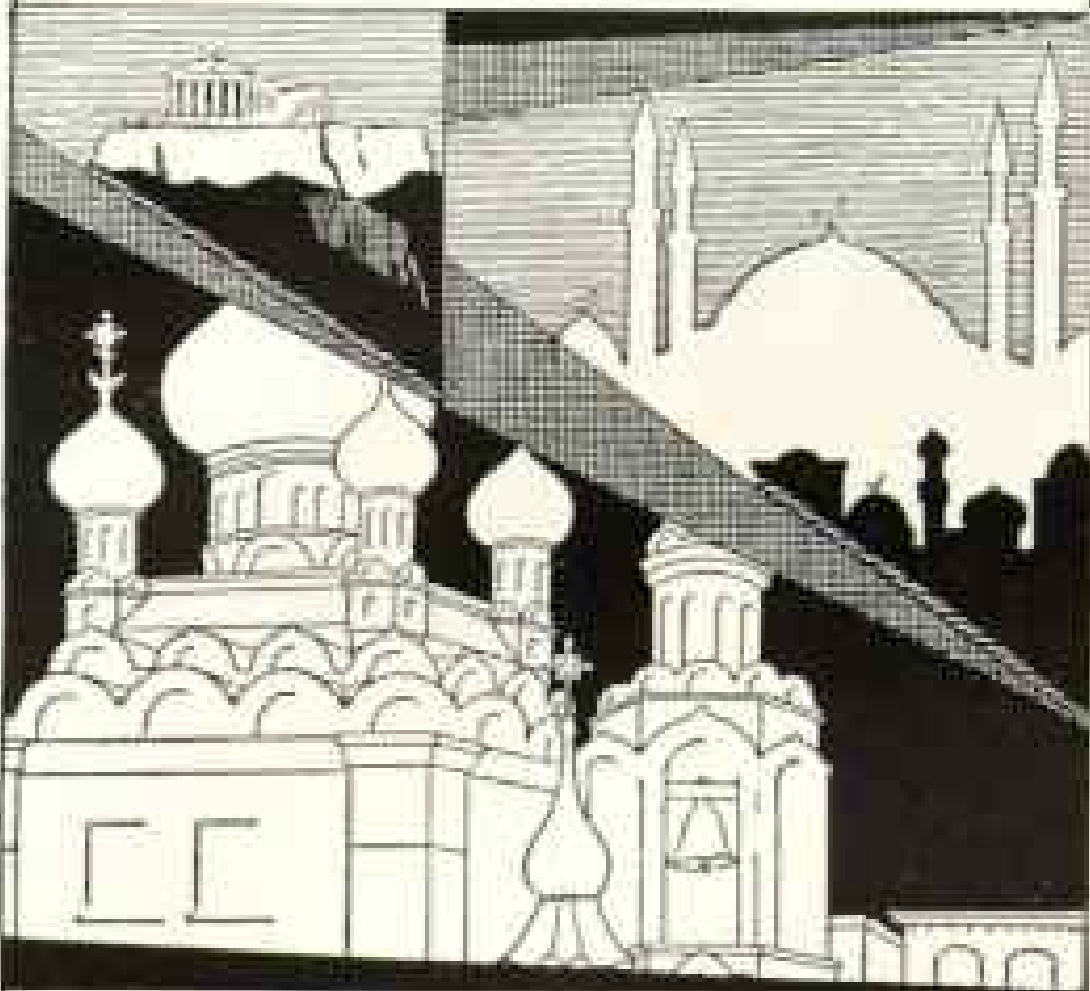


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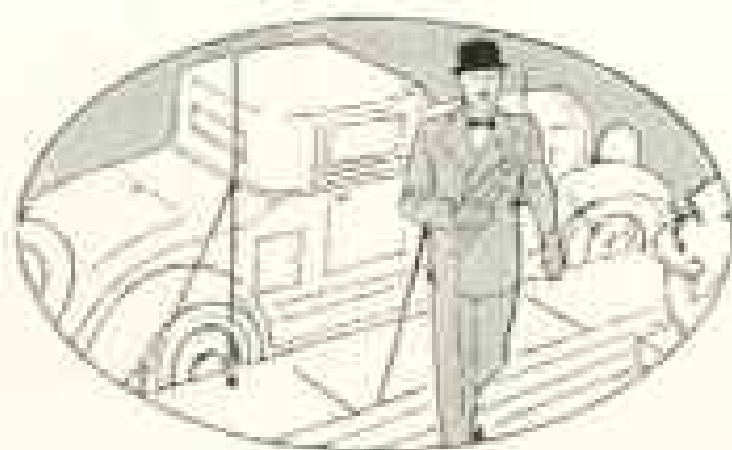


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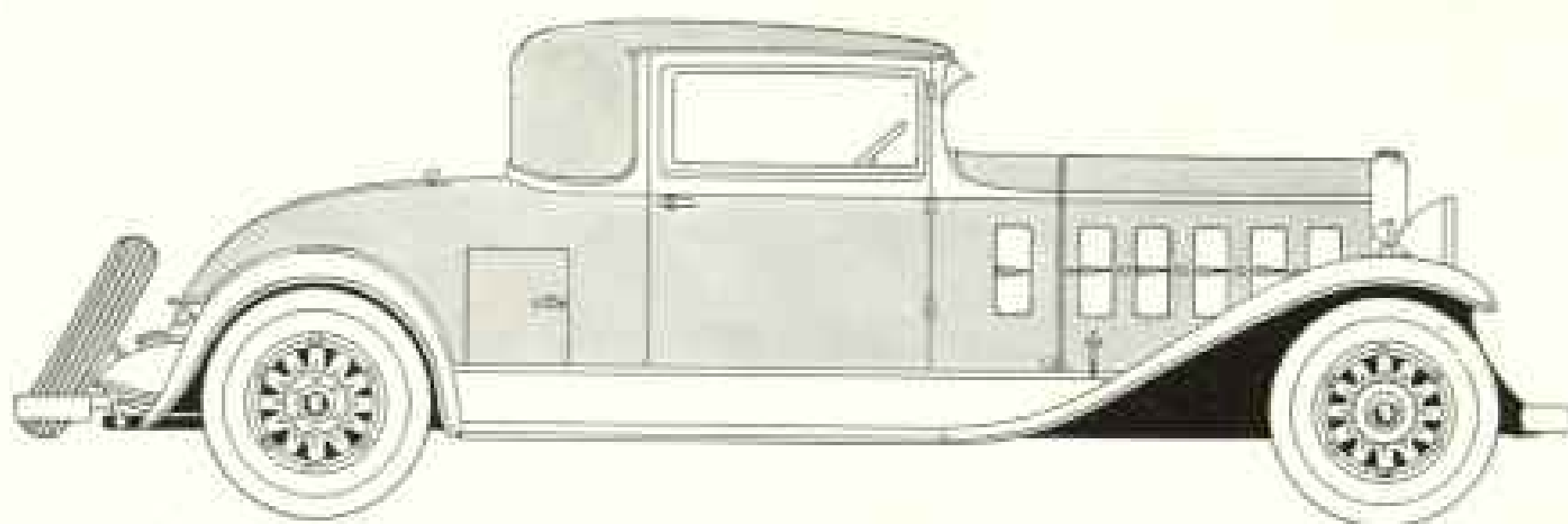
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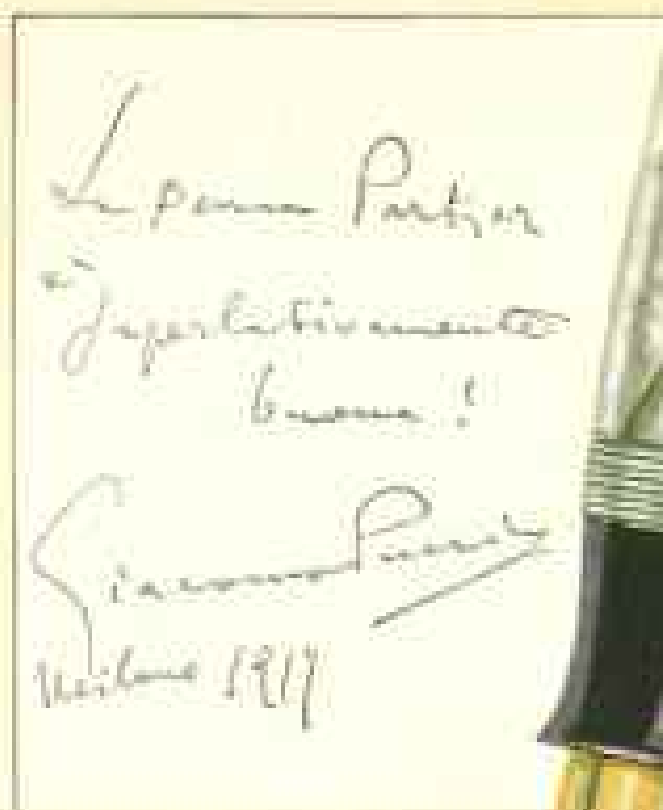
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