SPECIAL SUPPLEMENT: A TRAVELER'S MAP OF FRANCE (page 832)

VOL. 139, NO. 6 JUNE 1971

NATIONAL GEOGRAPHIC

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

NATIONAL GEOGRAPHIC SOCIETY

WASHINGTON, D. C.

Organized "for the increase and diffusion of geographic knowledge"

GILBERT HOVEY GROSVENOR
Editor, 1899-1903; President, 1920-1954
Chairman of the Board, 1954-1966

THE NATIONAL GEOGRAPHIC SOCIETY is chartered in Washington, D. C., in accordance with the laws of the United States, as a nonprofit scientific and educational organization for increasing and diffusing geographic knowledge and promoting research and exploration. Since 1890 the Society has supported 656 explorations and research projects, adding immeasurably to man's knowledge of earth, sea, and sky. It diffuses this knowledge through its monthly journal, NATIONAL GEOGRAPHIC; more than 27 million maps distributed each year; its books, globes, atlases, and filmstrips; 30 School Bulletins a year in color; information services to press, radio, and television; technical reports; exhibits from around the world in Explorers Hall; and a nationwide series of programs on television.

Articles and photographs of travel, natural history, and explorations to far places are desired. For material used, generous remuneration is made.

MELVIN M. PAYNE, *President*
ROBERT E. DOYLE, *Vice President and Secretary*
LEONARD CARMICHAEL, *Vice President for Research and Exploration*
GILBERT M. GROSVENOR, *Vice President*
THOMAS M. BEERS, *Vice President and Associate Secretary*
HILLEARY F. HOSKINSON, *Treasurer*
OWEN R. ANDERSON, WILLIAM T. BELL,
LEONARD J. GRANT, W. EDWARD ROSCHER,
C. VERNON SANDERS, *Associate Secretaries*

BOARD OF TRUSTEES

MELVILLE BELL GROSVENOR
Chairman of the Board and Editor-in-Chief

THOMAS W. McKNEW, *Advisory Chairman of the Board*

LEONARD CARMICHAEL, *Former Secretary, Smithsonian Institution*
LLOYD H. ELLIOTT, *President, George Washington University*
CRAWFORD H. GREENEWALT, *Chairman, Finance Committee, E. I. du Pont de Nemours & Company*
GILBERT M. GROSVENOR, *Editor, National Geographic*
ARTHUR B. HANSSON, *General Counsel, National Geographic Society*
CARYL P. HASKINS, *President, Carnegie Institution of Washington*
EMORY S. LAND, *Vice Admiral, U. S. Navy (Ret.), Former President, Air Transport Association*
CURTIS E. LEMAY, *Former Chief of Staff, U. S. Air Force*
H. RANDOLPH MADDOX, *Former Vice President, American Telephone & Telegraph Company*
WM. McCHESNEY MARTIN, JR., *Former Chairman, Board of Governors, Federal Reserve System*
BENJAMIN M. McKELWAY, *Editorial Chairman, Washington Star*
MELVIN M. PAYNE, *President, National Geographic Society*
LAURANCE S. ROCKEFELLER, *President, Rockefeller Brothers Fund*
ROBERT C. SEAMANS, JR., *Secretary of the Air Force*
JUAN T. TRIPPE, *Honorary Chairman of the Board, Pan American World Airways*
FREDERICK G. VOSBURGH, *Former Editor, National Geographic*
JAMES H. WAKELIN, JR., *Assistant Secretary of Commerce for Science and Technology*
EARL WARREN, *Former Chief Justice of the United States*
JAMES E. WEBB, *Former Administrator, National Aeronautics and Space Administration*
ALEXANDER WETMORE, *Research Associate, Smithsonian Institution*
LLOYD B. WILSON (*Emeritus*), *Honorary Board Chairman, Chesapeake & Potomac Telephone Company*
CONRAD L. WIRTH, *Former Director, National Park Service*
LOUIS B. WRIGHT, *Former Director, Folger Shakespeare Library*

COMMITTEE FOR RESEARCH AND EXPLORATION

LEONARD CARMICHAEL, *Chairman*
ALEXANDER WETMORE and MELVIN M. PAYNE, *Vice Chairmen*
GILBERT M. GROSVENOR, MELVILLE BELL GROSVENOR, CARYL P. HASKINS, EMORY S. LAND, THOMAS W. McKNEW, T. DALE STEWART, *Senior Scientist, Office of Anthropology, Smithsonian Institution*, MATTHEW W. STIRLING, *Research Associate, Smithsonian Institution*, JAMES H. WAKELIN, JR., FRANK C. WHITMORE, JR., *Research Geologist, U.S. Geological Survey*, CONRAD L. WIRTH, FREDERICK G. VOSBURGH, and PAUL A. ZAHL; BARRY C. BISHOP, *Secretary on leave*; EDWIN W. SNIDER, *Secretary*

Assistant Secretaries of the Society
EVERETT C. BROWN, FRANK S. DELK, JOHN GOEDEL, JOSEPH B. HOGAN, RAYMOND T. McELLIGOTT, JR., EDWIN W. SNIDER
Assistant Treasurer: WARD S. PHELPS

Leonard J. Grant, *Editorial Assistant to the President*; Edwin W. Snider, Richard E. Pearson, *Administrative Assistants to the President*; Judith N. Dixon, *Administrative Assistant to the Chairman and Editor-in-Chief*; Lenore W. Kessler, *Administrative Assistant to the Advisory Chairman of the Board*

SECRETARY'S STAFF: *Administration*: Earl Corliss, Jr., *Accounting*: Jay H. Givans, George F. Fogle, Alfred J. Havre, William G. McGhee, Martha Allen Baggett. *Statistics*: Thomas M. Kent. *Payroll and Retirement*: Howard R. Hudson (*Supervisor*), Mary L. Whitmore, Dorothy L. Dameron (*Assistants*). *Procurement*: J. P. M. Johnston, Robert G. Corey, Sheila H. Immel, Margaret A. Shearer. *Membership Research*: Charles T. Kneeland. *Membership Fulfillment*: Geneva S. Robinson, Paul B. Tylor, Peter F. Woods. *Computer Center*: Lewis P. Lowe. *Promotion*: E. M. Pusey, Jr., Robert J. Warfel. *Printing*: Joe M. Barlett, Frank S. Oliverio. *Production Control*: James P. Kelly. *Personnel*: James B. Mahon, Adrian L. Loftin, Jr., Glenn G. Pepperman, Nellie E. Sinclair. *Medical*: Thomas L. Hartman, M.D. *Translations*: Zbigniew Jan Latyk.

COVER: Pacific Crest Trail hikers brave a cold drizzle in Washington State's Glacier Peak Wilderness (page 741).

BACKGROUND BY DAVID HISER © N.G.S.

POSTMASTER: SEND CHANGE OF ADDRESS FORM 3579 AND UNDELIVERED COPIES TO NATIONAL GEOGRAPHIC MAGAZINE, 17TH AND M STS. N.W., WASHINGTON, D. C. 20036

NATIONAL GEOGRAPHIC MAGAZINE

MELVILLE BELL GROSVENOR *Editor-in-Chief and Board Chairman*
MELVIN M. PAYNE *President of the Society*
GILBERT M. GROSVENOR *Editor*
FRANC SHOR, JOHN SCOFIELD *Associate Editors*

Senior Assistant Editors
Allan C. Fisher, Jr., Kenneth MacLeish, Robert L. Conly

Assistant Editors: Jules B. Billard, Andrew H. Brown, James Cerruti, W. E. Garrett, Edward J. Linehan, Carolyn Bennett Patterson, Howell Walker, Kenneth F. Weaver

Senior Editorial Staff: Rowe Findley, William Graves, Jay Johnston, Stuart E. Jones, Robert P. Jordan, Joseph Judge, Nathaniel T. Kenney, Samuel W. Matthews, Bart McDowell; *Senior Scientist*: Paul A. Zahl

Foreign Editorial Staff: Luis Marden (*Chief*); Thomas J. Abercrombie, Howard La Fay, Volkmar Wentzel, Peter T. White

Editorial Staff: Harvey Arden, Thomas Y. Canby, Louis de la Haba, Mike W. Edwards, William S. Ellis, Alice J. Hall, Werner Janney, Jerry Kline, John L. McIntosh, Elizabeth A. Moize, Ethel A. Starbird, Gordon Young

Editorial Layout: Howard E. Paine (*Chief*); Charles C. Uhl, John M. Lavery

Geographic Art: William N. Palmstrom (*Chief*). *Artists*: Lisa Biganzoli, William H. Bond, John W. Lothers, Robert C. Magis, Robert W. Nicholson, Ned M. Seidler. *Cartographic Artists*: Victor J. Kelley, Snejinka Stefanoff. *Research*: Walter Q. Crowe (*Supervisor*), Virginia L. Baza, George W. Beatty, John D. Garst, Jean B. McConville, Dorothy A. Nicholson, Isaac Ortiz (*Production*), Marie L. Barnes (*Administrative Assistant*)

Editorial Research: Margaret G. Bledsoe (*Chief*); Ann K. Wendt (*Associate Chief*), Alice M. Bowsher, Lodie L. Densmore, Margaret L. Dugdale, Jan Holderness, Lavenia Luder, Frances H. Parker

Geographic Research: George Crossette (*Chief*); Newton V. Blakeslee (*Assistant Chief*), Leon J. Canova, Bette Joan Goss, Lesley B. Lane, John A. Weeks

Photography: John E. McConnell (*Chief*); Lawrence F. Ludwig (*Assistant Chief*)

Library: Virginia Cartor Hills (*Librarian*); Margery K. Barkdull (*Assistant Librarian*), Melba Barnes, Louise A. Robinson, Esther Ann Manion (*Librarian Emeritus*)

Editorial Administration: Joyce W. McKean, *Assistant to the Editor*; Harriet Carey, Virginia H. Finnegan, Winifred M. Myers, Shirley Neff, Betty T. Santorse, Inez D. Wilkinson (*Editorial Assistants*); Dorothy M. Corson (*Indexes*); Rosalie K. Milford, Lorine Wendling (*Files*); Evelyn Fox, Dolores Kennedy (*Transportation*); Carolyn F. Clewell (*Correspondence*); Jeanne S. Duiker (*Archives*)

ILLUSTRATIONS STAFF: *Illustrations Editor*: Herbert S. Wilburn, Jr. *Associate Illustrations Editor*: Thomas R. Smith. *Art Editor*: Andrew Poggenpohl. *Assistant Illustrations Editors*: Mary S. Griswold, O. Louis Mazzatenta. *Layout and Production*: H. Edward Kim (*Chief*). *Senior Picture Editors*: Charlene Murphy, Robert S. Patton. *Picture Editors*: David L. Arnold, Michael E. Long, Elie S. Rogers, W. Allan Royce, Jon Schneeberger, C. William Snead. *Research*: Paula C. Simmons, Barbara A. Shattuck (*Asst.*). *Librarian*: L. Fern Dame

Artists: Walter A. Weber (*Naturalist*), Peter V. Bianchi

Engraving and Printing: Dee J. Andella (*Chief*); Raymond B. Bunsinger, John R. Metcalfe, William W. Smith, James R. Whitney

PHOTOGRAPHIC STAFF: *Director of Photography*: Robert E. Gilka. *Assistant Director*: Dean Conger. *Film Review*: Albert Moldvay (*Chief*); Guy W. Starling (*Assistant Chief*). *Photographic Equipment*: John E. Fletcher (*Chief*), Donald McBain. *Pictorial Research*: Walter Meayers Edwards (*Chief*). *Photographers*: James L. Amos, James P. Blair, Bruce Dale, Dick Durrance II, Otis Imboden, Emory Kristof, Bates Littlehales, George F. Mobley, Robert S. Oakes, Winfield Parks, Joseph J. Scherschel, Robert F. Sisson, James L. Stanfield. Lilian Davidson (*Administration*). *Photographic Laboratories*: Carl M. Shrader (*Chief*); Milton A. Ford (*Associate Chief*), Herbert Altemus, Jr., David H. Chisman, Claude E. Petrone, Donald E. Stemper

RELATED EDUCATIONAL SERVICES OF THE SOCIETY

Cartography—Maps, atlases, and globes: *Chief Cartographer*: Wellman Chamberlin. *Associate Chief*: William T. Peele. *Base Compilation*: Charles L. Stern (*Supervisor*), Charles F. Case, James W. Killion. *Name Compilation*: Donald A. Jaeger (*Supervisor*), Charles W. Gotthardt, Jr., Manuela G. Kogutowicz, David L. Moore. *Map Drawings*: Douglas A. Strobel (*Supervisor*), Robert W. Northrop, Tibor G. Toth, Thomas A. Wall. *Map Editing*: Ted Dachtera (*Supervisor*), Russel G. Fritz, Thomas A. Walsh. *Projections*: David W. Cook. *Layout and Design*: John F. Dorr. *Revisions*: Richard J. Darley. *Archeology*: George E. Stuart. *Printing Control*: Richard K. Rogers. *Administrative Assistant*: Catherine M. Hart

Books: Merle Severy (*Chief*); Seymour L. Fishbein (*Assistant Chief*), Thomas B. Allen, Ross Bennett, Charles O. Hyman, Anne Dirkes Kobor, John J. Putman, David F. Robinson, Verla Lee Smith

Special Publications: Robert L. Breeden (*Chief*); Donald J. Crump (*Assistant Chief*), Josephine B. Bolt, David R. Bridge, Margery G. Dunn, Johanna G. Farren, Ronald M. Fisher, Mary Ann Harrell, Bryan Hodgson, Geraldine Linder, Philip B. Silcott, Joseph A. Taney

School Service: Ralph Gray (*Chief and Editor of National Geographic School Bulletin*); Arthur P. Miller, Jr. (*Assistant Chief and Associate Editor of School Bulletin*), Joseph B. Goodwin, Ellen Joan Hurst, Paul F. Minar, Charles H. Sloan, Janis Knudsen Wheat. *Educational Filmstrips*: David S. Boyer (*Chief*); Margaret McKelway Johnson, Bonnie S. Lawrence

News Service: Windsor P. Booth (*Chief*); Paul Sampson (*Assistant Chief*), Donald J. Frederick, William J. O'Neill, Robert C. Radcliffe; Isabel Clarke

Television: Robert C. Doyle (*Chief*); David Cooper, Carl W. Harmon, Jr., Sidney Platt, Patricia F. Northrop (*Administrative Assistant*)

Lectures: Joanne M. Hess (*Chief*); Robert G. Fleegal, Mary W. McKinney, Gerald L. Wiley

Explorers Hall: T. Keilor Bentley (*Curator-Director*)

EUROPEAN OFFICES: W. Edward Roscher (*Associate Secretary and Director*), Jennifer Moseley (*Assistant*), 4 Curzon Place, Mayfair, London, W1Y 8EN, England; Jacques Ostier, 6 rue des Petits-Pères, 75-Paris 2e, France

ADVERTISING: *Director*: William A. Boeger, Jr. *National Advertising Manager*: William Turgeon, 630 Fifth Ave., New York, N.Y. 10020. *Regional managers—Eastern*: George W. Kellner, New York. *Midwestern*: Robert R. Henn, Chicago. *Western*: Thomas Martz, San Francisco. *Los Angeles*: Jack Wallace. *Automotive*: John F. Grant, New York. *Travel*: Gerald A. Van Splinter, New York. *International Director*: James L. Till, New York. *European Director*: Richard V. Macy, 21 rue Jean-Mermoz, Paris 8e, France.

Anyone can get Kodak color developing. Just ask for it.

European experts discover auto safety device:

00 deaths in crashes up to 60 mph.

That's right, no deaths. None. Zero. In crashes up to 60 miles an hour, where driver and passengers were wearing both lap and shoulder belts.

The study was conducted in Europe and reported in this country by the Insurance Institute for Highway Safety.

Experts say we could save eight to ten thousand lives a year if people would use the seat belts *that are in their cars already*. And that figure is conservative. Makes you wonder, doesn't it?

You wonder why only one out of four drivers uses the lap belt—only four out of a hundred the shoulder belt.

At Allstate, we're determined to do everything we can to reduce deaths and injuries in crashes . . . to make it better for you to own and drive a car . . . and to hold down the rising cost of auto insurance.

Obviously, we need your help.

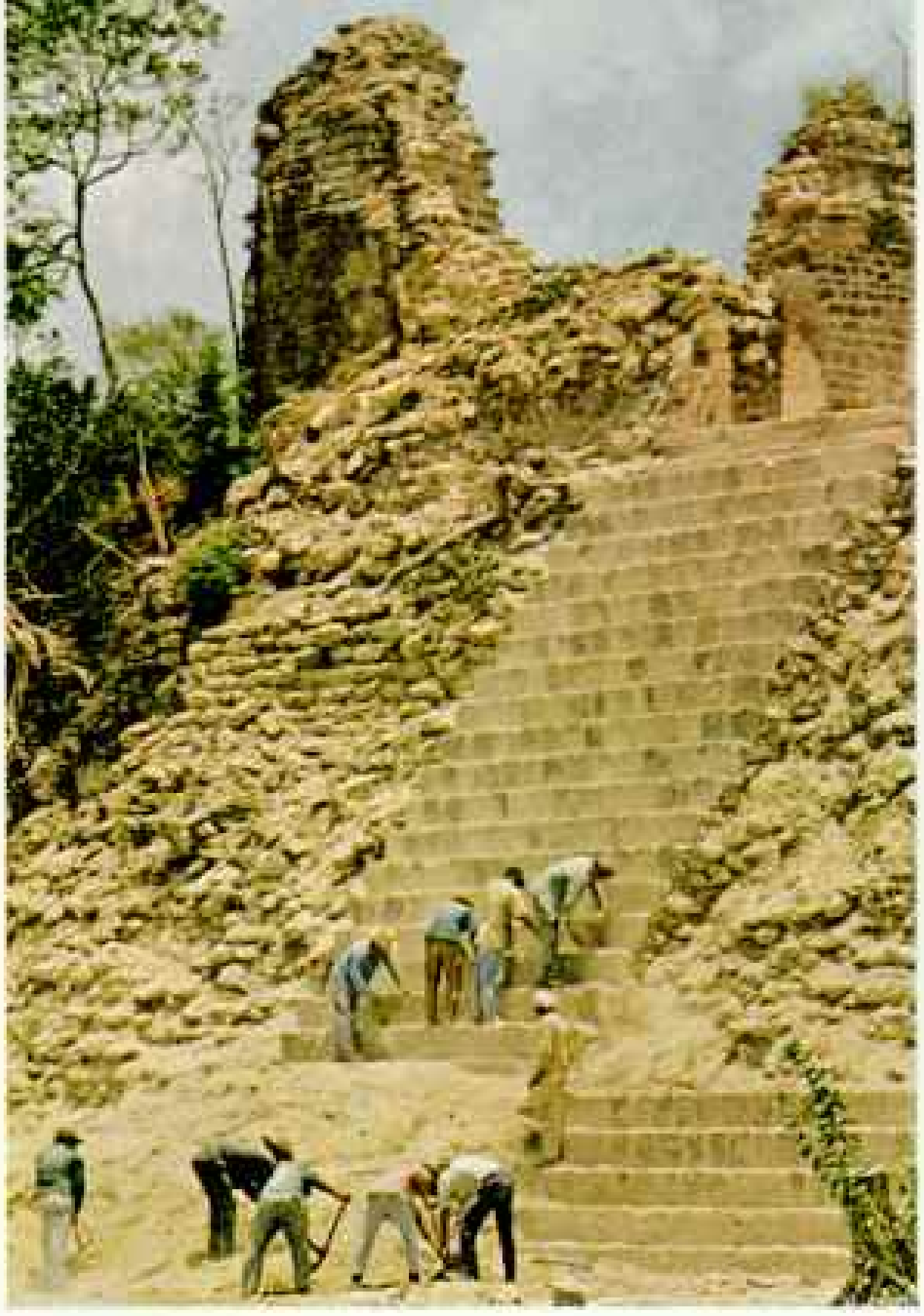
Use your lap and shoulder belts, even if you're just going to the grocery store.

Remind other people to use them, too.

And if you're willing to do a little more, write the Safety Director, Allstate Insurance Companies, Northbrook, Illinois 60062. He'll send you the free booklet, "Let's make driving a good thing again" that tells ways you can help.

Allstate®

Let's make driving a good thing again.



ROADWORKERS AND EXTRACHROME (ABOVE) BY TED SPIEGEL © N.G.S.

Río Bec—crucial link between Maya realms

STAIRWAY TO THE GODS reaches a Maya temple atop a crumbling 1,250-year-old pyramid at Becan, deep in the Río Bec area of Mexico's Yucatán Peninsula. Behind a simple façade the pyramid contains a multistory "palace."

Supported in part by National Geographic Society grants, Dr. E. Wyllys Andrews (above right), of Tulane University, and a team of archeologists suggest that architecture and pottery uncovered in this area will reveal important cultural relationships between the Maya centers of Guatemala and those of northern Yucatán. Clay incense burners with effigy lids (top right) were recently excavated at Chicanna, near Becan.

Let your friends share in this and similar projects by nominating them for Society membership on the form below.

The inside secret of this

It's the polyester cord body

You see it here—it's the very heart of this Custom Wide Tread Polyglas tire.

What makes polyester unique is that it combines the strength of nylon with the smooth ride of rayon.

So you get a tire that softens the hard knocks—and rolls over the bumps while absorbing the shocks.

Two tough fiberglass belts

In this Goodyear Polyglas tire, we've securely bonded the polyester cord body to two tough fiberglass cord belts—using a special polyester adhesive system known only to Goodyear.

These belts help to hold the rugged tread firm and flat on the road for mileage and traction.

Goodyear Polyglas tire

Traction, Strength, and Mileage

A polyester cord body, two fiberglass belts, a big wide tread—that's the vital combination that goes into the construction of the Goodyear Custom Wide Tread Polyglas tire.

As a result, you get a combination of advantages...traction, strength, and mileage. And they all add up to value.

To make sure you're getting a Polyglas tire, just look at the sidewall: **If it doesn't say Goodyear, it can't be Polyglas.**

GOODYEAR


EMERGENCY

Now motorists along this solitary 95-mile stretch of highway have someone to talk to.

Every half mile.

Interstate 80 runs through parts of Pennsylvania so sparsely settled that bear and deer may still outnumber people.

And interchanges are often ten miles apart.

Until recently, this was no place for a stranded motorist.

Now 370 roadside emergency telephones are helping to make this section one of the safest highways in the state.

Each yellow call box is connected to one of the five State Police stations in the area.

In an emergency, the motorist can pull to the side of the road, lift the receiver, and instantly get help.

A light flashes on a phone back at police headquarters indicating the driver's direction of travel. And numbers on the call box enable him to give his exact location.

The emergency telephones are located at least a dozen feet from the apron to avoid the danger of the caller being side-swiped by a passing vehicle.

The American Telephone and Telegraph Company and your local Bell Company cooperate with local, state and Federal authorities to make the telephone serve you better.

In this case, to help make highways safer.

"How an Accutron® watch helped me set the American record for the fastest single-handed sailing across the Atlantic."

By Tom Follett
Marine Consultant

If you're crazy enough to sail across a 3,000 mile ocean with no crew, no motor and no way to contact shore, then you'd better have a couple of things going for you.

A boat, for one.

Mine was called "Cheers." And every single inch of her forty feet was designed, built and tested specially for the crossing.

But all that wasn't worth a can of beans if I couldn't get her from Plymouth, England to Newport, Rhode Island.

To navigate, I used my hand calibrated, Royal Navy sextant and my four-year-old Accutron watch.

What I had to have going for me besides a boat (and luck) were navigational instruments.

So I used my hand calibrated, Royal Navy sextant. And my four-year-old Accutron watch.

When you compute longitude, even if your sextant is perfect, if your timepiece is just 40 seconds off, it'll throw you 10 miles off course.

And I had enough to worry about without that.

My Accutron had a tuning fork movement guaranteed accurate to within a minute a month.* It also had forty-eight months of experience on other boats.

After all that time of keeping me on course (no matter how far off a storm tried to throw me) I trusted it to come through again.

And as you can see by that big headline up there, it did.

It's been two years now, since the crossing. And "Cheers" has retired to a British museum.

But my old Accutron watch has remained very accurately on the job.

And I would still be wearing it now, if it weren't for the fact that Bulova gave me a new one for writing this ad.

Accutron Deep Sea "A": Water resistant to 600 feet. Crystal-enclosed elapsed time indicator. Luminous hands and markers. Stainless steel case and band. $195. Other styles from $110.
*Timekeeping will be adjusted to this tolerance, if necessary, if returned to Accutron dealer from whom purchased within one year from date of purchase. ®Bulova Watch Company, Inc.

The watch that's become a navigational instrument. Accutron® by Bulova.

In Britain, who gives an air stewardess her basic training? Her Mum.

There's a lot more to giving good service on an airline than serving a tray of food. Or announcing your arrival time.

There's an attitude. Helpfulness. Intangible qualities that you can't learn from an instructor.

In Britain, our girls learn them from their Mothers. It's our way of life. Making someone feel at home. Being polite. Smiling because you're glad to help—not because it's in the manual. And simply saying please and thank you. Always.

In flying to Britain, we can do more for you than any other airline. Fly you from 11 cities in the U.S. to six cities in Britain. Take you through our own terminal at Kennedy in New York. And offer you not just the 747 but our own VC10 jets. But despite all these things we know you are still going to judge an airline by the service you get.

So if you're coming to our home, or planning to visit any of the other 53 countries we go to around the world, we hope you'll fly with us. So see your Travel Agent or call us for reservations. If you don't, we'll be disappointed. Our girls will be disappointed. And our Mums will be disappointed.

BOAC takes good care of you.

British Overseas Airways Corporation

In South Africa, you can take a trip through the wild without the rigors of the wild.

You climb in your car and drive off, at 5-10 miles an hour, through landscape that looks like it belongs on another planet.

You discover you're playing hide-and-seek with the animals. It's a game of endless variety, full of fantastic surprises.

Ten, twenty, or a hundred impalas come bounding gracefully across the road.

You turn a hairpin bend and surprise a giraffe nibbling at the tender tips of a tree. Or a small herd of elephants lumbering into the bush.

Your guide knows every hide-away. With his help you penetrate the disguises of camouflage.

He points out a cheetah fleeting through the underbrush. Or a lilac breasted roller — whose wings flash like jewels in flight.

You see zebras, lions, wildebeests, water buffalos, baboons, monkeys, hippos. And all sorts of antelopes with strange names — steenboks, gemsboks, klipspringers.

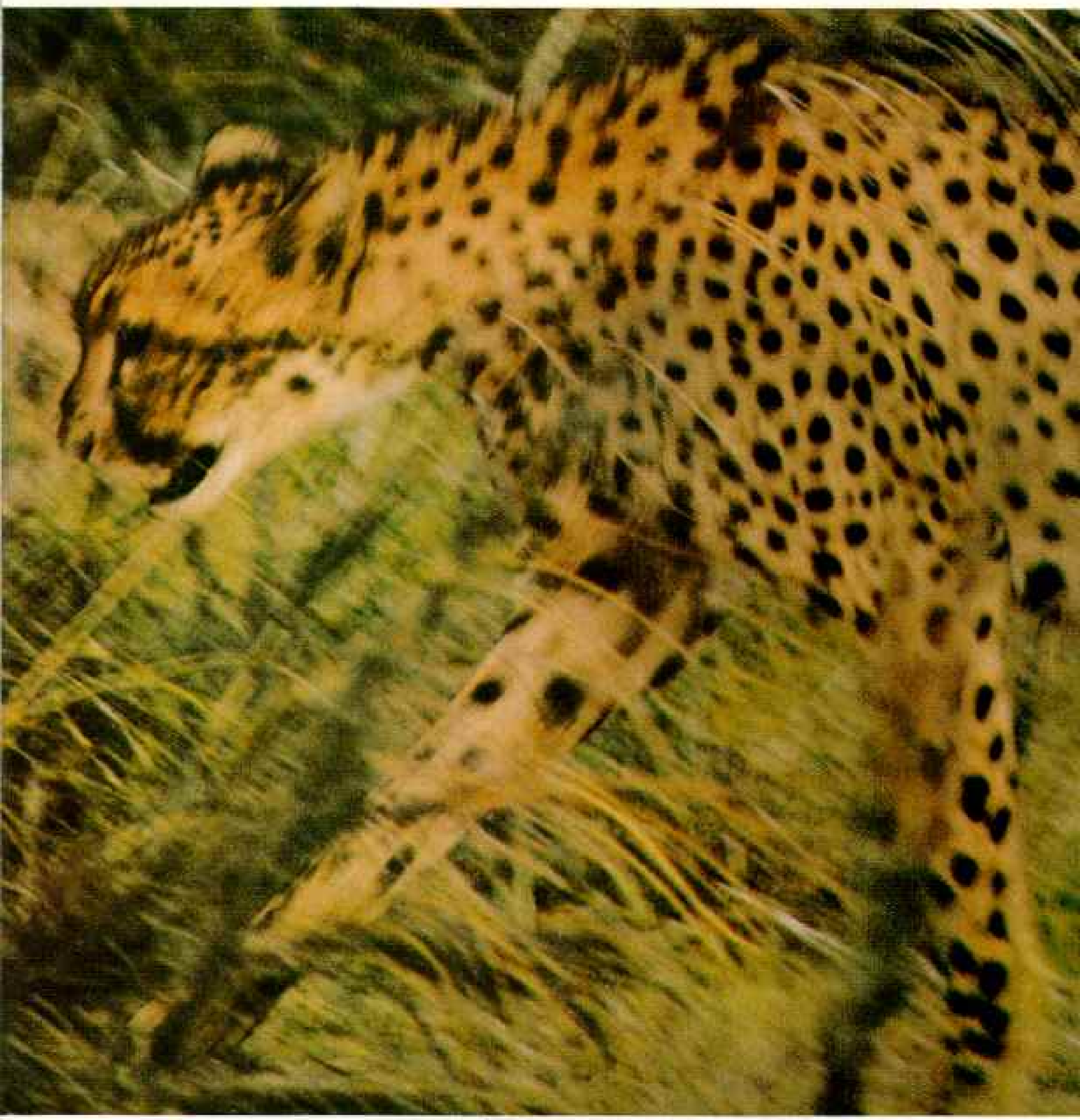
It's possibly the most exciting ride of your life.

And while you're out there, y have the comforts of home — surrounded by the wild.

In this, South Africa is almos unique. Because it doesn't simply consist of bush or desert or jungle, s as you find in vast parts of the con-tinent. It consists of contrasts.

Against the primitive back-ground, you get the attraction of So Africa's great modern cities — Johannesburg, Durban, Cape Town.

Prices for shopping in these places, for instance, are unbelievabl low. Only 75 cents for a bottle of vintage wine. Or two dollars for



A ride on

a fantastic Zulu axe.

In fact, a tourist can live extremely well here for about $10.00 a day.

Practically everybody speaks English.

The fastest, easiest way to go is with South African Airways. A Boeing 707 Stratojet will whisk you down from New York via the most direct route.

To get the most out of your stay, see your travel agent. And let him tell you about the wild sights in South Africa.

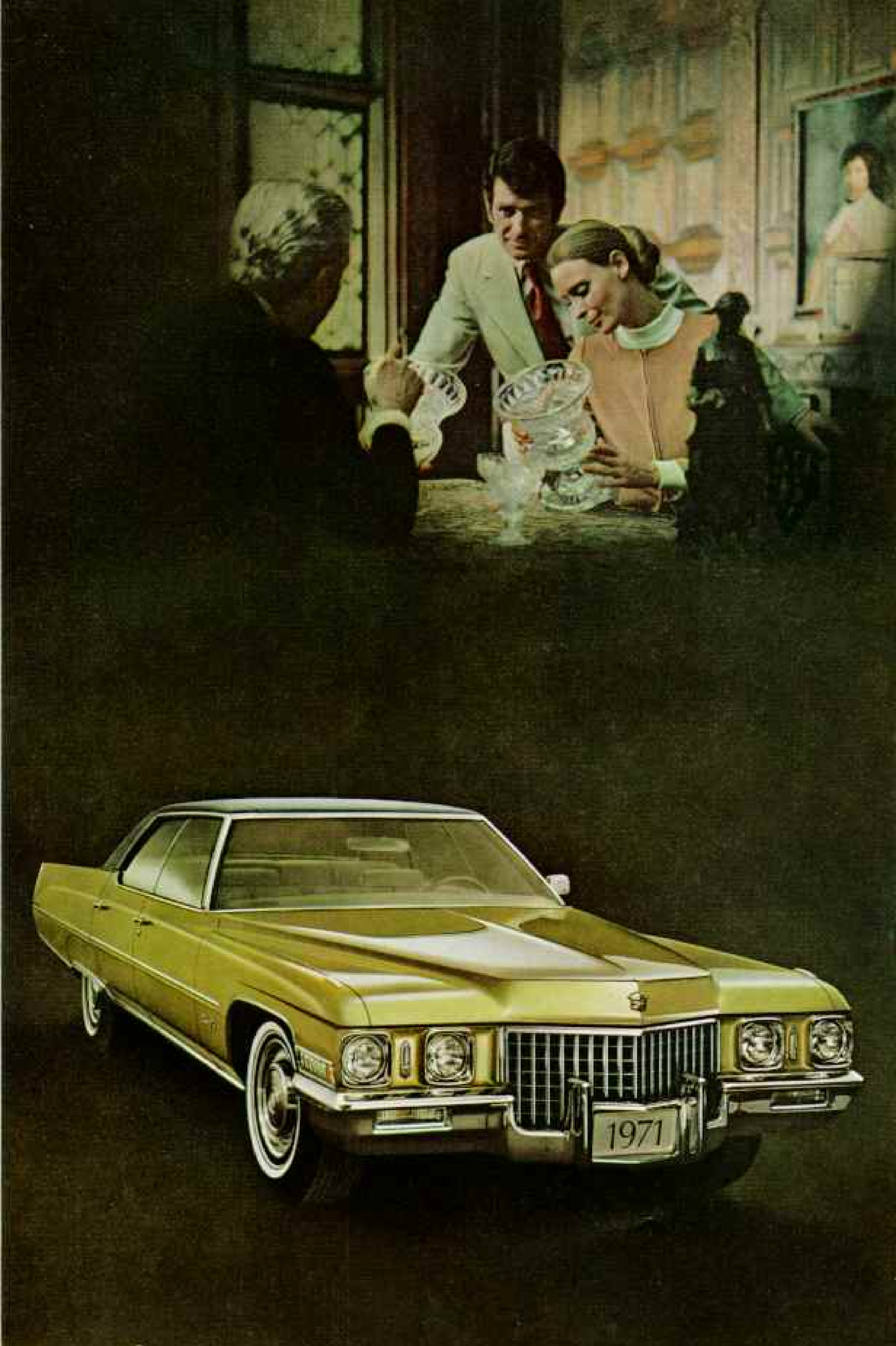
A lot of them are not in the bush.

SAA

SOUTH AFRICAN AIRWAYS 605 Fifth Avenue, New York, N. Y. 10017

Come with us.
A little off the beaten track.

the wild side.


1971

Surprising Cadillac. It turns out to be as practical as it is beautiful.

You know it well—this one side of Cadillac. For this is the Cadillac you see. The Cadillac that delights you with its form and grace, year after year. The Cadillac of unquestioned styling leadership. The Cadillac that says elegance, prestige and luxury. The Cadillac of lasting beauty.

This is the Cadillac most people bring to mind when you mention the world's finest automobile.

But there is another side of Cadillac that may not be as well known—yet it is every bit as impressive. For this is the Cadillac that puts the emphasis on beautiful engineering. The Cadillac of reliability and convenience. Driving peace of mind. The Cadillac of lasting value.

Take something as basic as front bumper guards. They do a lot more than look good. So much more that Cadillac makes them standard on all models. We do because, with their rubber impact-absorption inserts, they help prevent damage in parking.

And what could be more practical than the host of safety features that are an integral part of every new Cadillac? From side-guard beams to the energy absorbing instrument panel and steering column. From dual-action safety hood latches to easy-to-use seat and shoulder belts.

Or consider the fact that Cadillac's 472-cubic-inch engine not only operates efficiently on regular gas, but also on no-lead and low-lead gasolines that reduce exhaust pollutants.

Shown opposite is the 1971 Sedan deVille. Whichever Cadillac model you drive, be sure to use your shoulder/seat belts.

Or look at the practical side of the many other features available to you. Like Automatic Cruise Control that enables you to preselect your road speed with the touch of a finger. Or the Tilt and Telescope steering wheel. It adjusts for both height and reach for driver comfort and convenience.

Yet many of Cadillac's practical advantages are simply the result of superior Cadillac craftsmanship. Engine cylinder walls, for instance, are among the most precisely honed in the industry, accounting for Cadillac's outstanding oil economy.

And then, there is Cadillac's resale record. It is a fact that a Cadillac traditionally returns a larger proportion of investment than any other car built in the land.

One of the most appreciated new Cadillac luxuries available is the lamp monitoring system that tells you whether your headlights, rear lights and turn signals are functioning properly. The system also includes a warning light that tells you when your windshield washer fluid is low.

So if you add it all up—what you get out of your Cadillac now and what you get out of it when you trade it—you could be in for a very pleasant surprise. A Cadillac is not only beautiful but beautifully practical. It could well be your best car buy.

GM

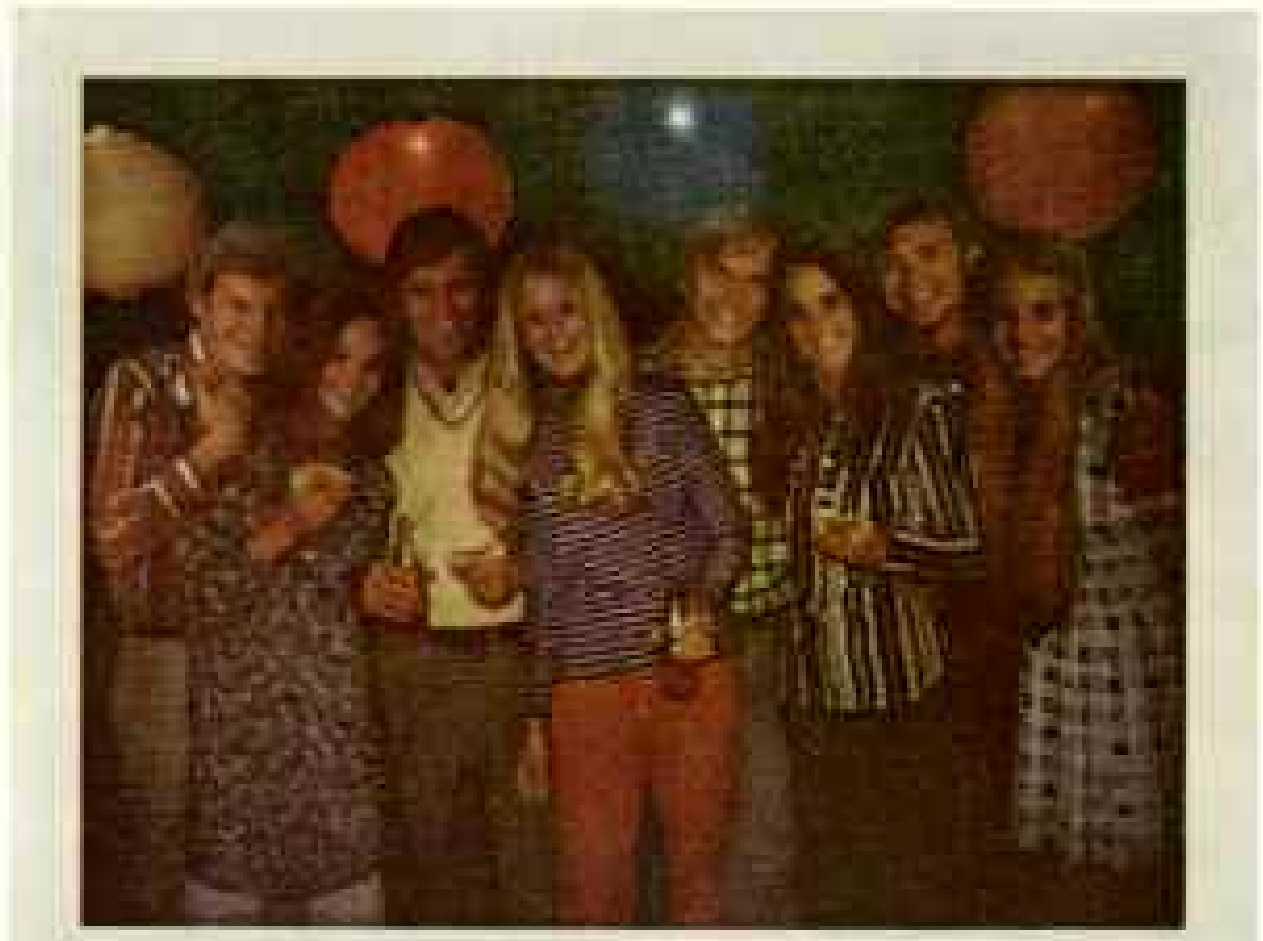
MARK OF EXCELLENCE

Cadillac Motor Car Division

Cadillac

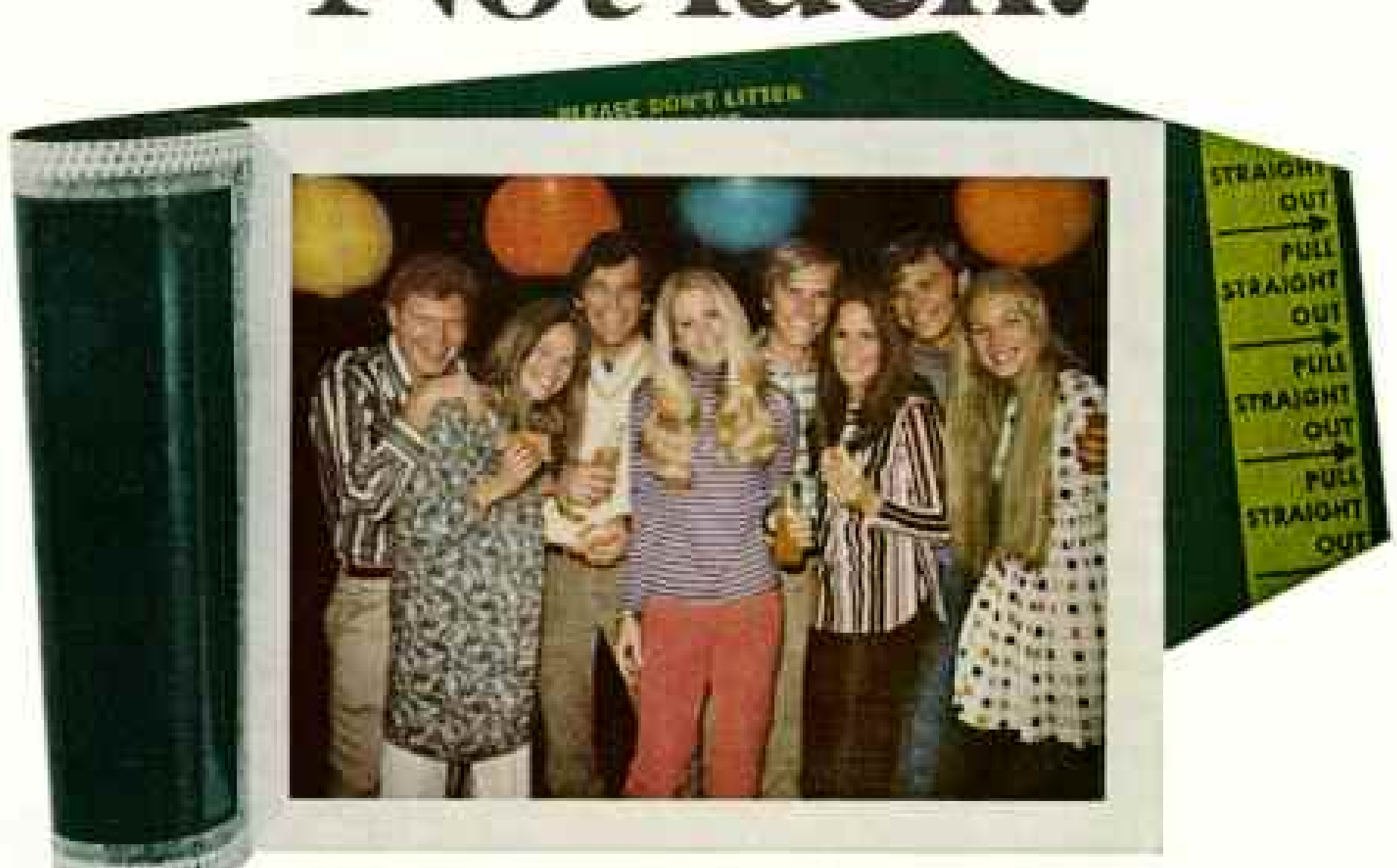
The leader . . . any way you look at it.

POLAROID®



Flash fall-off. Dark pictures far away.

Focused Flash. Not luck.



Do your flashcube shots ever come out like the one on top?

You are ready for one of our new 400s with Focused Flash.

Just shoot normally. As you focus, louvers automatically close over the flashcube for soft light in close-ups—or open wide for shots as far back as 10 feet. Your flash shots are superb.

Polaroid's 400 Land cameras (color pictures in a minute) start at under $70 with Focused Flash, under $60 without.

Spend the extra $10. Your nights will be beautiful.

On Polaroid's new 400s.

Getaway.®

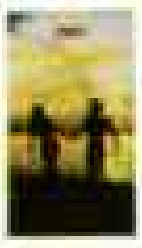
TWA's program to places you always wanted to see but never thought you could.

The Grand Canyon.

Every year thousands of people go there on vacation.

While thousands more get no further than their same old beach.

For them, TWA introduces Getaway. The most comprehensive vacation program in the world.



Send in the coupon and we'll send you back our free Getaway Vacation Kit.

It brings you a 224 page book on 19 of the great cities of the world.

A brochure on all the different kinds of trips you can take in Europe.

Another covering the United States. And a third on Asia, Africa, the Pacific, and the Orient.

There's also a brochure for those who would rather travel by themselves than with a group.

And to help make it all possible, there's our Getaway* Card.

So you can charge the whole thing And then take up to two years to pay.

TWA's Getaway Program also gives you TWA. America's number one vacation airline. The only one flying all over the United States, Europe, Asia, Africa, the Orient, Pacific, all over the world.

Send in the coupon, study the material, then call TWA or your travel agent.

And find out how easy getting away really is.

Free. The Getaway Kit.

U.S.A./EUROPE/ASIA/PACIFIC/AFRICA

TWA, P.O. Box 303
Farmingdale, N.Y. 11735
Please send me
TWA's free Getaway Vacation Kit.

TWA

Mr.
Mrs.
Miss

Address

City State Zip

My travel agent is

NGGB6R71

*Getaway is a service mark owned exclusively by TWA.

Monsieur André Landriot,
Directeur, Division des Arts Classiques,
Le Médaillier, S.A., Paris
is proud to announce

The Conservateurs' Collection of

Treasures of The Louvre

in Solid Sterling Silver

A limited edition of fifty extraordinary art medals

THE TREASURES IN THE LOUVRE are beyond all calculation. In the centuries since it was converted from a royal palace into France's national museum, the Louvre has acquired a collection of masterpieces that unfailingly speak the poetry and drama of man's existence—works of art that inspire the full spectrum of emotion in those who stand before them.

Some three million people from all over the world visit the Louvre every year, and come away enthralled by the majestic beauty of the works they have seen.

But great art, to be fully enjoyed, should be seen again and again—studied, explored and contemplated over the years, not just glimpsed for a fleeting moment during a holiday in France.

So it is that the masterpieces of the Louvre have inspired a new and unique collection of our own time—a series of 50 fine art medals that present the treasures of the Louvre in solid sterling silver.

Subjects Selected by Experts and Sculptured by Masters

The works to be included in this remarkable new series of fine art medals have been chosen by one of the most authoritative Advisory Boards ever assembled for any fine art project. Each of the seven members of this Board is a *Conservateur*—a curator of one of the seven Departments of the Louvre. These seven expert *Conservateurs* have devoted their lives to art; they are uniquely qualified to judge which of the masterpieces of the Louvre are most deserving of inclusion in this extraordinary medallic collection.

The original sculptures for these medals are being painstakingly modeled by a team of celebrated French medallists which includes the internationally renowned Roger Bertrand Baron. Monsieur Baron, for twenty years a professor at the École Normale du Professorat de Dessin à Paris, is a meticulous artist who has insisted upon beginning this project at the source, absorbing the full mood of each work. In the galleries of the Louvre, he and his colleagues have begun the long process of medallic sculpture. There they will give utmost attention to every detail, so that the Louvre masterpieces take on new dimension through interpretation in solid sterling silver.

A Continuing Labor of Love

One meticulously crafted medal will be produced each month for the next fifty months. Each of these solid sterling silver medals will measure a full 44mm in diameter and will carry a brilliant proof-quality finish—the exquisite finish traditionally reserved for masterworks of the minting art. And each medal will be accompanied by a detailed analysis of that work, written by a Louvre *Conservateur*.

The *First Edition* of this extraordinary set of fifty art medals will be distinguished by special hallmarking on each medal and by a special First Edition album to hold and protect the complete set. This most desirable of all editions will be available exclusively to advance subscribers and will be *strictly limited in quantity to one set per subscriber*. All subscriptions for the First Edition must be postmarked by June 30, 1971.

A sufficient amount of silver will be purchased and set aside to cover each subscriber, so that the original issue price of $12.00 per medal can be maintained for the entire series—no matter how high the price of silver may escalate while the series is being minted over the next fifty months.

You Are Invited to Become a First Edition Subscriber

As an advance subscriber entitled to a First Edition Proof Set, you will experience the satisfaction of being a Patron of the Arts in a fine art program of great significance. And when you receive each of these beautiful sterling silver medals, you will feel the great pride that accompanies ownership of objects of substance, intrinsic value—and imperishability.

As the years go by, your First Edition collection of *Treasures of the Louvre* will take on even greater significance and may well increase in value. You will never tire of looking through your album, admiring the great works and sharing with your family and friends the enrichment that a love of great art can bring.

To become a First Edition subscriber, fill in the application provided and mail it with your remittance for the first medal *by June 30, 1971*. Only subscriptions postmarked by that date can be accepted.

A complimentary First Edition album, designed to protect and display all fifty medals, is included with each subscription.

The Franklin Mint has been authorized to handle the subscription processing, minting and distribution of these medals for collectors in the United States. The Franklin Mint—an independent, publicly-owned corporation not affiliated with the U.S. Mint or any other government agency—is the world's foremost private mint and the world's leading producer of sterling silver commemorative coins and art medals.

The distinguished French artist Roger Bertrand Baron begins the long and arduous task of preparing original sculptured models for the First Edition of "Treasures of the Louvre."

Treasures of The Louvre

Privileged Subscription Form

The Franklin Mint
Franklin Center, Pennsylvania 19063

Please enter my subscription for a First Edition Proof Set of *The Treasures of the Louvre*. This Proof Set is to consist of all fifty sterling silver medals, to be issued at the rate of one per month beginning in July 1971.

If my subscription is accepted, I understand that the medals will be struck expressly for my account and I agree to pay for each medal promptly upon being invoiced on a monthly prepayment basis. Enclosed is my remittance for $12.00 plus my state sales tax, to cover the first medal in the series.

Mr.
Mrs.
Miss _____
PLEASE PRINT CLEARLY

Address _____

City _____

State _____ Zip _____

Signature _____

Valid only if postmarked by June 30, 1971
LIMIT: ONE PROOF SET PER SUBSCRIBER

L1

Cans.
Bad Guys or Good Guys?

A can is a nice thing when you want a soda or a beer. But it doesn't do much for a landscape or a highway. We know that better than anyone because we make cans. So here's the story. Both sides.

Cans are bad guys.

Cans are all over the streets and highways. Cans cause litter.

Cans are good guys.

Out of all the litter on the streets and highways, over 83% isn't cans.

Still, somebody has to do something. So we've been working with people who are developing a fantastic machine that can actually pick the litter off the roads. We call it the octopus.

One more thing about litter. Please don't. People litter. Not cans.

Cans are bad guys.

Returnable bottles were better. Return to returnables.

Cans are good guys.

The can is one of the safest, cleanest, cheapest containers ever invented. If we return to returnables, prices will go up. Because everything is set up for non-returnables, and it will cost money and jobs to change it.

Besides, people don't return returnables. That's why cans happened in the first place.

Cans are bad guys.

You use them once and throw them away. They can't be recycled.

Cans are good guys.

We've already set up recycling centers for used cans. (All used cans. Steel and aluminum. Beer and soda and food.) More are coming. This costs us money, but it doesn't cost you anything. You bring us the cans and we'll recycle them.

We know it would be easier and better if all you had to do was throw your cans in a garbage pail. So we're supporting the development of automated machines that can pick cans out of the rest of the garbage. And we hope that eventually every can in every city will be recycled and used to make new cans. You won't see it tomorrow. But you will see it. We promise you that.

We have more to lose than you do.

The Can People

We care more than you do. We have to.

The Can People: American Can Company, Continental Can Company, National Can Corporation, The Reeves Can Company.

Chevrolet Caprice. Looks and rides like twice the price.

Remember, buckling your seat and shoulder belts is an idea you can live with.

Caprice is as complete and luxurious as you'd expect it to be.

And nowhere near what you'd expect it to cost.

For instance, it gives you thick foam cushioning to sit on.

More room to get very comfortable in.

Standard front power disc brakes for excellent straight-line stopping.

A new double-panel roof that's been acoustically engineered to give you a lot more peace of ear.

A longer wheelbase and new suspension to smooth you over rough places.

Plus a new *power* ventilation system to refresh you constantly. By pulling outside air inside—even when the car's standing still and the windows are up.

'71 Caprice by Chevrolet. All it looks to be.

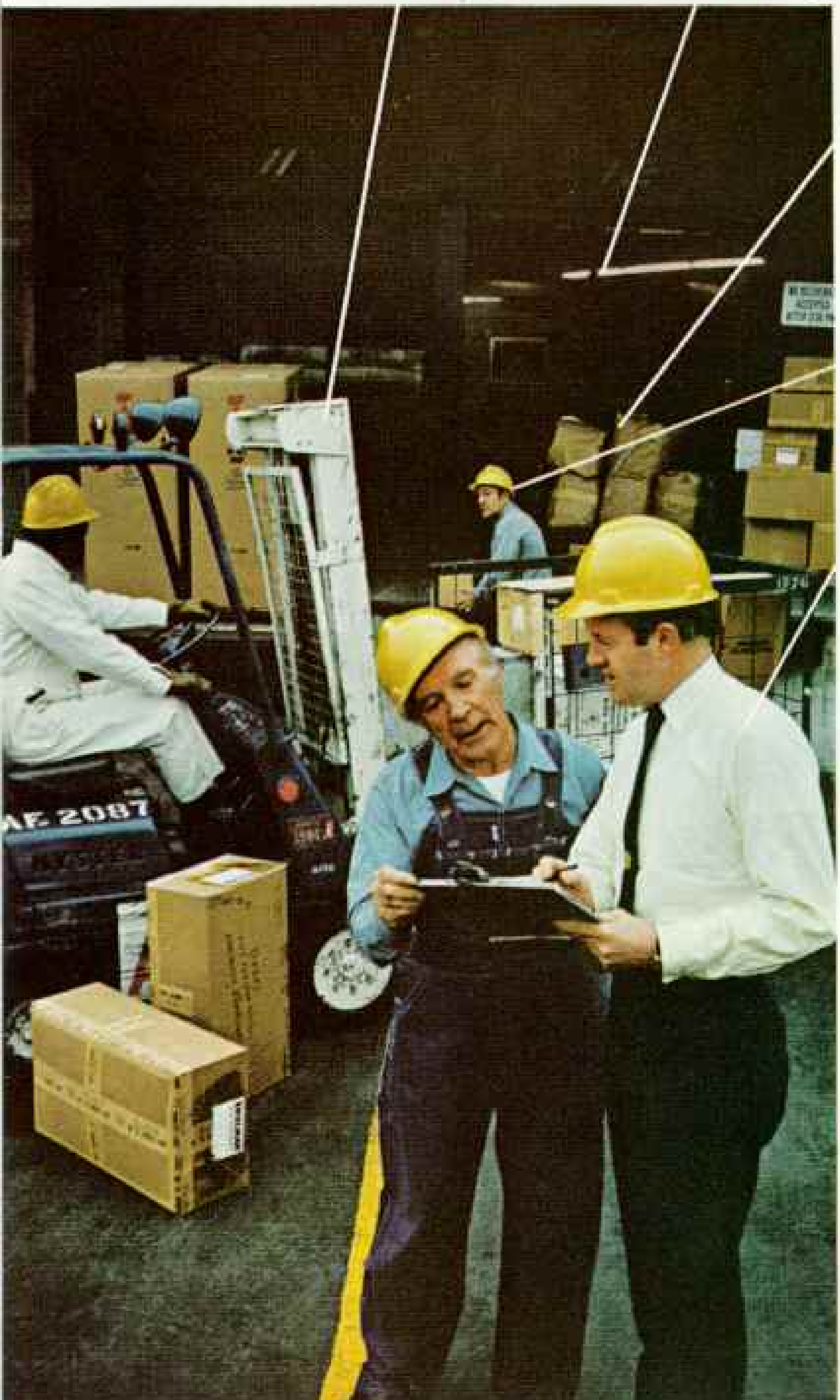
For nowhere near what it looks to be.

Caprice

YOUR USF&G AGENT CAN INSURE:

Present funds of plant equipment

The company and its warehouse



Property of other companies

Injuries to employees

The lives of key executives and their wife and kids

Businesses, buildings, lives: that's what your USF&G agent can insure. He's the insurance professional, the independent businessman you can trust for competent, personalized counseling that helps protect so much of what you value. Consult him with confidence as you would your doctor or lawyer. He's listed in your Yellow Pages.

The **USF&G** Companies

United States Fidelity & Guaranty Co., Fidelity & Guaranty Life Insurance Co., Fidelity & Guaranty Insurance Underwriters, Inc., Baltimore, Md., Thomas Jefferson Life Insurance Co., New York, N.Y., Fidelity Insurance Co. of Canada, Toronto. Casualty / Fire / Marine / Multi-Line / Life / Group Insurance / Fidelity / Surety Bonds.

NATIONAL GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE, VOL. 139, NO. 6

June 1971

Mexico to Canada on the Pacific Crest Trail

By MIKE W. EDWARDS
NATIONAL GEOGRAPHIC STAFF

PHOTOGRAPHS BY
DAVID HISER

ITS SOUTHERN TERMINUS lies upon a hill, a lonely, sun-scorched lump of chaparral and rock astride the border between California and Mexico. In the north it arcs across Oregon and Washington, touching Canada on a grassy slope where lavender asters race the autumn snows.

A 2,400-mile footpath, two-thirds complete, the Pacific Crest Trail keeps faith with its name. It seeks out, in the Sierra Nevada, the Cascades, and lesser ranges, the remote meeting places of stony spire and brilliant sky. But lest the hiker tire of heights and breathtaking vistas—an unlikely event—the trail also plunges down like a runaway roller coaster to nooks of wood and water.

On a warm day in May I first walked on this stairway to the heavens at a point 20 miles southeast of San Diego, California. As the wind shook the aroma of sage from the chaparral, I climbed the hill where the route begins (or ends, depending on your direction) and ceremonially set foot into Mexico (map, next page).

I remember, too, the September day when I reached the other end, tramping alone among the craggy peaks that hang over the border between Washington and Canada. That day the wind bore sullen clouds and slushy snow; in the gray gloom I felt an unexpected surge of fear.

Just ahead, a bear cub wandered across the trail. A city man, I have limited knowledge of bears, but I assumed that the cub's mother must be near too. Through my mind raced the warning printed on my U. S. Forest Service map: "Avoid a she-bear with cubs."

I walked on—warily.

Suddenly my backpack was yanked hard from behind. The she-bear! I leaped around, certain I'd find her snarling at my shoulder. But all I found was one of my own tent ropes trailing from my pack. Snagged on a limb, it had jerked taut as I walked past.

"I'm careful to give a she-bear plenty of room," Jake Pederson told me later. He's one of my favorite people in the rugged country the trail traverses. Just a stub of a man, five feet six—most of that concealed by boots, it seems—Jake shelters his wind-worn face beneath a big Western hat. Its brim curls up like the wings of an upside-down gull; I often thought he might blow away in a breeze.

For 35 years with the Forest Service, he has fought fire and cleared trail in the northern Cascades. For me, he expressed best the appeal of the peaks on the Pacific Crest.

Badge of scenic beauty marks the Nation's longest footpath, threading 2,400 miles from border to border.

Walkway to the clouds, the Pacific Crest Trail ribbons high ridges across the western United States. Near the Goat Rocks Wilderness in Washington's Cascades, glacier-helmeted Mount Rainier towers nearly three miles above sea level.

PAINTING BY DAVID WISER © N.G.S.

Oceans of space surround the author and his daughter Meridith near the Mexican border, a sand-and-chaparral segment where no official route yet exists. Leapfrogging to selected points, Mr. Edwards walked about 175 miles, and 10-year-old Meridith accompanied him a third of the way. The Pacific

"This high country," he said, "I can't get enough of it. Every time I go through it, I see something different—a rock, maybe, or a flower. If somebody said to me, 'Jake, you've gotta get out of the mountains,' I'd say, 'Boys, wrap me up and plow me under, 'cause there's nothing else to live for.'"

If you walked the entire route, you'd cross 23 national forests, 7 national parks, 5 state parks, a lot of ranches, and some bouldery badlands. At a brisk 20 miles a day, the trip would require more than four months.

You'd tread paths first used by Indians, or blazed by pioneers, trappers, and shepherds. You'd pass some of our country's most splendid sights—Mount Whitney, Yosemite Valley, Crater Lake, the glaciered bulk of Mount Rainier—and go near sagging ghost towns.

You'd climb to 13,200 feet above sea level at Forester Pass in the High Sierra and dip to 173 feet as you crossed the Columbia River between Washington and Oregon. You'd probably find passes blocked by snow before early July and after mid-October. You'd rejoice in solitude, refreshment, inner peace. And, occasionally, grieve at the sight of nature's handiwork undone by man.

Long Summer's Walk Spans the Route

Made up mostly of existing paths stitched together, the Pacific Crest constitutes the Nation's longest hiking trail.

"But the trail wasn't established to encourage border-to-border hiking," explained Jerry Gause, a Forest Service official. With the help of an advisory council, his agency supervises the route; much of it traverses the national forests strung along the mountain backbone. "We wanted to create a pathway of great length that would make more high

Crest Trail, now two-thirds complete, was created largely from existing paths. Conservationist Clinton C. Clarke proposed the border-to-border walkway in 1932, but not until 1968 did Congress designate it a national scenic trail, together with the 2,000-mile Appalachian route from Maine to Georgia.

country accessible. Most travelers will spend a weekend on it, or a week or two, at a time."

Most, yes. But the challenge of walking border to border was bound to tempt someone—someone like Eric Ryback of Belleville, Michigan. Eric is just 18 years old and weighs only 120 pounds, but he has legs of iron and lungs of leather (next page).

He already had hiked from Maine to Georgia on the 2,000-mile Appalachian Trail* when he appeared early in June last year at Manning Provincial Park in Canada's British Columbia. Eight miles south of park headquarters the Pacific Crest route begins.

Winter's snow—16 feet deep in places—hid the trail. Canadian authorities advised Eric that it would not clear before mid-July. Eric said he was going south anyway.

*Andrew H. Brown described this eastern pathway in the August 1949 GEOGRAPHIC.

He trudged off, lugging 80 pounds of food and gear—an incredible load, equal to two-thirds of his weight. "I couldn't see the trail in the snow, so I used my map and compass," he said. "But I'd end up in the wrong places. I'd reach a crest and find a 3,000-foot drop ahead. Then I'd have to backtrack."

Eric left snowshoes behind; he'd been told they'd be too cumbersome on rugged terrain. The first ten days were cloudy and he walked across frozen crust. Then the sun appeared, softening the surface. It hardened again at night, but by midafternoon he sank to his knees with every step.

For a month Eric met not another hiker.

"I was almost ready to give up when I reached the Columbia River," he said. "The mental strain of slogging alone through so much snow was almost too much."

He kept on anyway, replenishing his food

PHOTOGRAPHS BY ERIC RYBACK © N.G.S.

First to hike the entire Pacific Crest Trail in one summer, 18-year-old Eric Ryback sets up camp below Devils Peak in southern Oregon (upper). The top of his pack, right, bears a U. S. flag; he also sewed on the Canadian and Mexican flags to commemorate his international walk. The four-month odyssey led the Michigan youth through snow-choked passes in early June of 1970 and into 110-degree desert heat by late summer. Where the trail lapsed, he struck off cross-country. He sometimes trod paths blazed by Indians, trappers, and forty-niners.

Prospectors still seek gold in the hills, but Eric found other treasures. Near Mount Hood in the Cascades, he savored tree-framed Ramona Falls (right). For long breathless moments in a mountain glen, he witnessed the birth of two fawns, then photographed them beside his five-inch pocketknife (above).

from supplies cached by friends. He walked the soles off his boots three times. On his 129th day he reached Mexico—the first man to span the route in one trip.

Lest Eric's odyssey appear easy, let the novice beware: Traveling alone, fighting deep snow, he took extreme risks. Of such stuff are tragedies made—and great achievements.

Barry Murray of Home Valley, Washington, his wife, and their three young children also went all the way. But they traveled on horseback for two summers, a total of seven months—"a lot of that time spent looking for grass for the horses," Barry remembers.

A border-to-border trail was advocated as long ago as 1932 by Pasadena businessman and conservationist Clinton C. Clarke. He urged the Forest Service to knit together and extend the threads of high-country footpaths already existing, such as the Oregon Skyline Trail and California's John Muir route.

The father of the Pacific Crest Trail achieved partial success before his death in 1957; he prevailed upon the Forest Service to call the footpaths in Oregon and Washington by the collective name "Pacific Crest Trail System." But the realization of a border-to-border system had to wait until 1968 when Congress, responding to growing legions of hikers and horsemen, created the Pacific Crest as one of two national scenic trails, with the Appalachian as the other.

Trail Blazers Favor the Tenderfoot

As they laid out the trail, sometimes following the route Clarke had proposed, Forest Service engineers and recreation specialists kept in mind the average hiker, not the expert mountaineer. They skirted arduous rock climbs and placed signs so well that much of the trail can be followed without a map. But I always carried one for safety's sake—as well as a first-aid kit and two signal flares in case of emergency. Signs notwithstanding, hikers do occasionally get lost or break a leg. Even on a trail as safe as this one, rangers advise caution and preparedness.

The planners made the trail wide enough for single-file horsebacking or hiking, but no more. Who wants a highway intruding on his highland reverie? They tried to avoid roads, logged-over tracts, and other evidence of man's presence. However, they sometimes placed the route within a mile or so of campgrounds with fireplaces and log tables.

Now 1,500 trail miles meet the planners' standards, mostly in the Cascades and the High Sierra. Elsewhere the traveler must detour on roads and paths or go cross-country.

The Pacific Crest Trail doesn't exist yet in the Shasta and Trinity National Forests of northern California, for example, nor in parts of California south of the Sierra. Half a dozen gaps exist in Oregon and Washington. Completion will cost an estimated $5,000,000.*

Trek Begins in Withering Desert

I used the trail as the majority will, in short bursts, hitting high spots, passing a day or two seeking peace and pleasure in some grove of pine or fir, or a week in the fastness of a wilderness. Some of the trail's grandeur (and some of its sadness) I saw merely by walking from my car; regulations prohibit motorized vehicles on the route itself, but the trail occasionally crosses roads and superhighways. I viewed the lofty peaks from horseback and from a helicopter. For 175 miles I tramped with a pack on my back.

Meridith, my 10-year-old daughter, went with me as I explored paths from Mexico to the High Sierra (pages 744-5). In May we rose before the sun, the relentless sun that glazes the desert of southern California, and set out with our packs.

Lightweight materials and modern food-processing techniques have greatly lightened the load of the backpacker. Two freeze-dried pork tenderloins weighed no more in my pack than a few sheets of notebook paper. Our nylon tent added only 3½ pounds.

While horsemen often ride into the chaparral, few hikers other than Boy Scouts in quest of merit badges follow the dusty path Meridith and I took due east of San Diego—one of the most inhospitable trails I saw from Mexico to Canada (map, opposite). A blustery wind seared us. The earth radiated heat; blisters the size of quarters puffed up on the soles of my feet.

The heat wilted Meridith. "Dad," she sighed, fighting tears, "this hike would be a lot more fun if a blizzard came up."

What did rise up, and none too soon, was a string of mile-high peaks, snatching moisture from the clouds to nourish emerald meadows and cool forests. Ah-ha Cuyamac, Indians called this verdant highland: "Land of the

(Continued on page 753)

*Maps of the California sections of the Pacific Crest Trail, with detours shown, are available from the Forest Service Regional Office, 630 Sansome St., San Francisco, California 94111. Maps of the Oregon and Washington routes may be obtained from the Forest Service Regional Office, P.O. Box 3623, Portland, Oregon 97208.

KODACHROME © N.G.S.

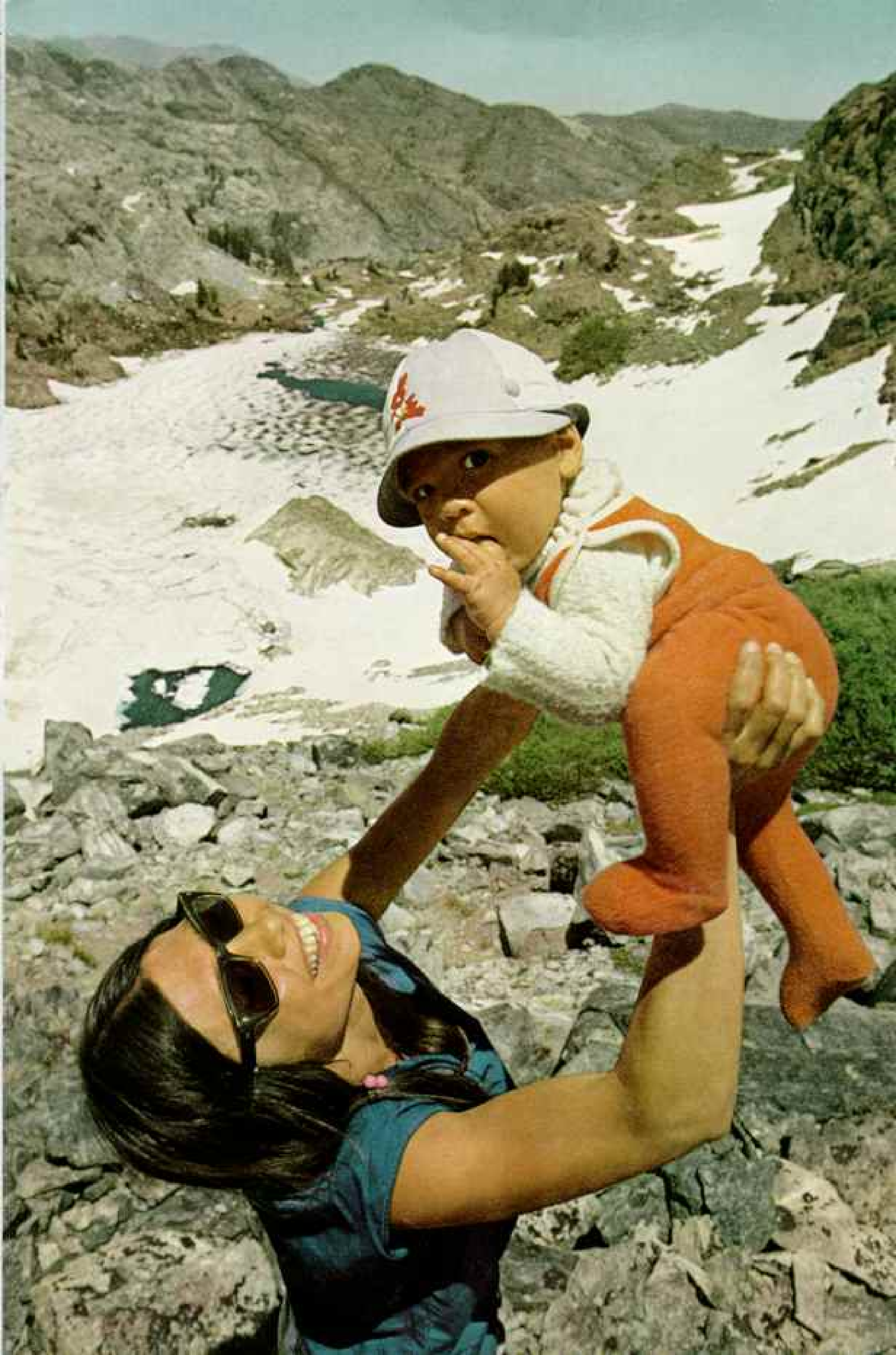
On the rooftop of the Sierra Nevada, hikers catch their breath above lakes fed by winter's lingering snow. They follow a side trail to 14,494-foot Mount Whitney, highest point in the contiguous 48 states. In this area the Pacific Crest Trail earns its name as lower desert (map) gives way to lofty panoramas.

Living legend at 86, Norman Clyde traded teacher's chalk for a mountaineer's ice ax nearly half a century ago. His unmatched knowledge of the rugged Sierra country has helped him reach many lost climbers and downed airplanes over the years.

"**A place for angels,**" wrote naturalist John Muir, remembering a flowering Sierra glade. Morning sun in Yosemite National Park adds fire to Indian paintbrush (right), a trail decoration from border to border. A member of the Sierra Club, founded by Muir to spur exploration and conservation, takes a song break (below) during a week-long cleanup of a segment of the trail named for Muir.

Half a million acres of national wilderness and 212 miles of footpath in California honor John Muir, lifelong champion of such preserves. But trail damage through careless use and heavy traffic may soon force limitation of the number of hikers. The 1964 Wilderness Act directs that wild areas remain as natural as possible, ". . . untrammeled by man, where man himself is a visitor who does not remain."

EKTACHROME (ABOVE) AND KODACHROME BY DAVID HISER © N.G.S.



Rain Beyond." Once their villages flecked the Cuyamaca Mountains, where they farmed, hunted, and gathered pine nuts and acorns.

I sought out Clarence Brown, a man with a large oval face that might have been carved of walnut. He is a leader of the Kumeyaay, also called the Diegueño, a tribe whose domain once included the Cuyamacas' loftiest peaks. Clarence and his family now dwell on a small reservation near those heights, but much of their former gathering ground lies within Cuyamaca Rancho State Park.

"Some of us go up to the park to gather acorns," Clarence told me. "Acorn flour was a staple a long time ago. The old folks still make pudding from it for ceremonial occasions."

Clarence is proud of the Kumeyaay heritage —he still speaks the tribal tongue—but he prefers not to dwell upon the past.

"We must look forward," he said. "We have a hard time just trying to get such things as a better education for our children. Things like that are more important than harking back to the old days."

Meridith and I crossed a meadow aglow with tidytips and buttercups, then switchbacked down a thousand feet, out of the somnolent Cuyamacas, back to blazing chaparral. Up a dusty road, we came to Stan Kotval's house and found him bent over a drilling rig.

"It'd be good if I hit water," Stan explained. "I need water out here. But I'm panning the dirt I bring up. A man never knows when he'll strike gold."

A man never knows.... Men have repeated those words in Stan's neighborhood ever since a prospector first hit pay dirt 101 years ago. Before long, 800 others arrived—"turned loose in the mountains with as little sense and as much 'friskyness' as so many wild horses," said a newspaper. Over four decades gold worth $5,000,000 or more was dug out.

Stan has prospected for eight years. "I've blasted, drilled, and used a pick and shovel," he said. "The trouble is, this country's broken up with faults. You might hit gold any time. Or you might never see color. But even if I don't find gold, this is a cheap place to live for a man on a pension."

City Smog Takes a Wilderness Toll

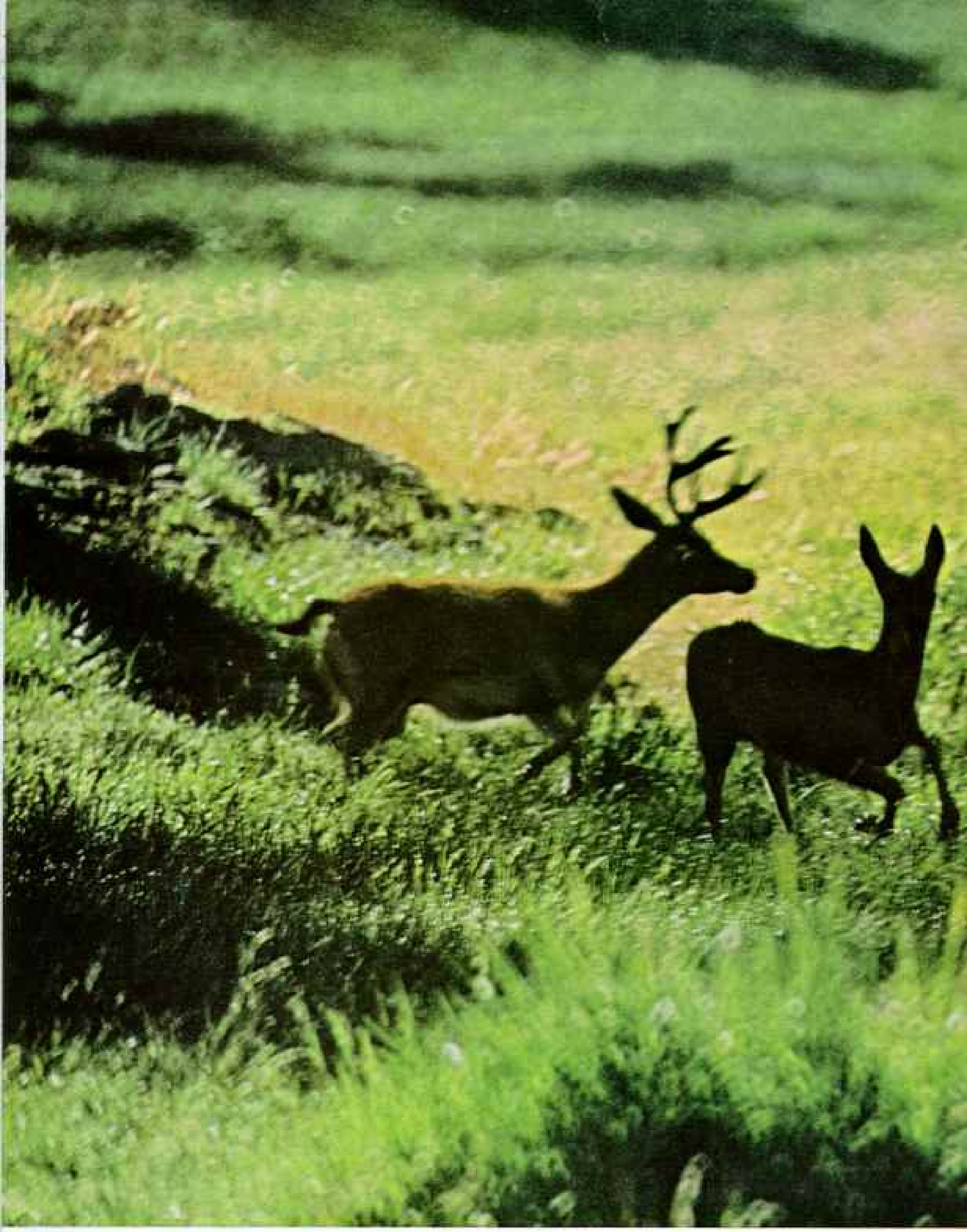
On a hot July day I drove into the San Bernardino Mountains, 60 miles east of Los Angeles, and sought the languorous shade of pines towering a hundred feet above the trail —elegant giants that have known a century and more of California history.

Many of them won't know much more of it. In their branches the summer breeze sounds a death rattle.

"From May to October the wind blows smog this way from the Los Angeles area,"

Pint-size alpinist, Jan Erik Kwak, 5 months old, takes a lofty look at California's Minarets, in the High Sierra southeast of Yosemite National Park. Ice locks Iceberg Lake.

Bright July sun piercing the thin air at 10,300 feet keeps Mrs. Kwak comfortable in a sleeveless blouse. With young Jan slung in front (right), she manages a 20-pound pack; her husband Jan follows with 40 pounds of additional provisions on their four-day hike to Cecile Lake, also known as Upper Iceberg Lake.



Darting shadows, black-tailed deer flee human intruders in Lassen Volcanic National Park. The trail passes through six life zones, ranging from desert to arctic

REDACHROME BY DAVID HISER © NATIONAL GEOGRAPHIC SOCIETY

alpine. Coyotes and desert reptiles roam the lowlands; marmots, bears, mountain goats, and herds of elk share the high country. The trail boasts a variety of birds.

said Hatch Graham, resources officer of the San Bernardino National Forest. "The trees most affected are ponderosa and Jeffrey pines, the dominant species. In 15 years half to two-thirds of these trees probably will be dead."

Hatch talked about this new scourge of the woodlands as we drove along the rim of the mountains near popular Lake Arrowhead.

Beneath us a soupy gray blanket obscured the hills and valleys stretching to the Pacific shore. As the smog rose, my eyes stung.

"We first noticed a yellow mottle on the pine needles in the 1950's," Hatch said. "We suspected the cause might be a new disease or insect. But gradually we eliminated all the possibilities—except one."

Ozone. Ninety percent of the pollutant in Los Angeles smog is exhaust spewed out in horrendous clouds by six million cars, trucks, and buses. Ultraviolet light from the sun changes it chemically—with ozone an end product. This gas destroys the food-making cells in the needles of ponderosas and Jeffreys; in turn, their root systems decline. The more susceptible trees gradually die or become so weak that insects finish them off.*

I saw young pines and firs being tested for ozone tolerance; with the hardier seedlings the Forest Service will reclothe the land. But many years must pass before they attain the stature of century-old forest giants.

Her First Trout a Golden Beauty

Untangling itself from the spaghetti of highways leading into Los Angeles, the Pacific Crest Trail skirts the Mojave Desert, spirals into the peaks of the Tehachapis, then vaults into the Sierra Nevada, California's great mountain backbone (map, page 749).

On our way to rejoin the route, Meridith and I hiked a feeder trail into the Sierra's soaring eastern flank. We stopped beside Cottonwood Creek in the Inyo National Forest.

"Yippee! Yippee! I caught one, Dad!" My daughter's shout bounded out of the creek's willow canopy, and she came right behind. "It's the first trout I ever caught, Dad! Isn't it a beauty?" She held up a wiggling flash of olive-gold and orange—seven inches long—and implored me to remove it from the hook.

Snatching up my rod, I joined Meridith in the willows. That afternoon is a memory we will cherish all our lives. We drifted salmon eggs over riffles into shady pools. Though we landed only a panful, nearly every pool yielded a spine-tingling watery explosion as a golden trout snatched the bait.

How many others will cherish that memory in the years ahead? Fewer and fewer, fishery biologists say. The reason is a road, the same road Meridith and I took from Highway 395 to the Cottonwood Creek footpath.

"Only a handful of people fished there before it was built," said Phil Pister of the California Department of Fish and Game. "Now they go up in droves."

Mr. Pister told me the road was built at the urging of people living east of the Sierra, in the Owens Valley, people who make their living serving users of the outdoors. The new route succeeded—all too well. Now the Forest Service has approved extending it and constructing the Trail Peak winter-sports area at road's end. The extension makes it easier still for fishermen to reach the ancestral waters of the golden trout—streams draining into the Kern River.

"We've already reduced the limit on goldens from ten to five," Mr. Pister said. "The time may come when we permit fishermen to take only one, or catch just one and put it back."

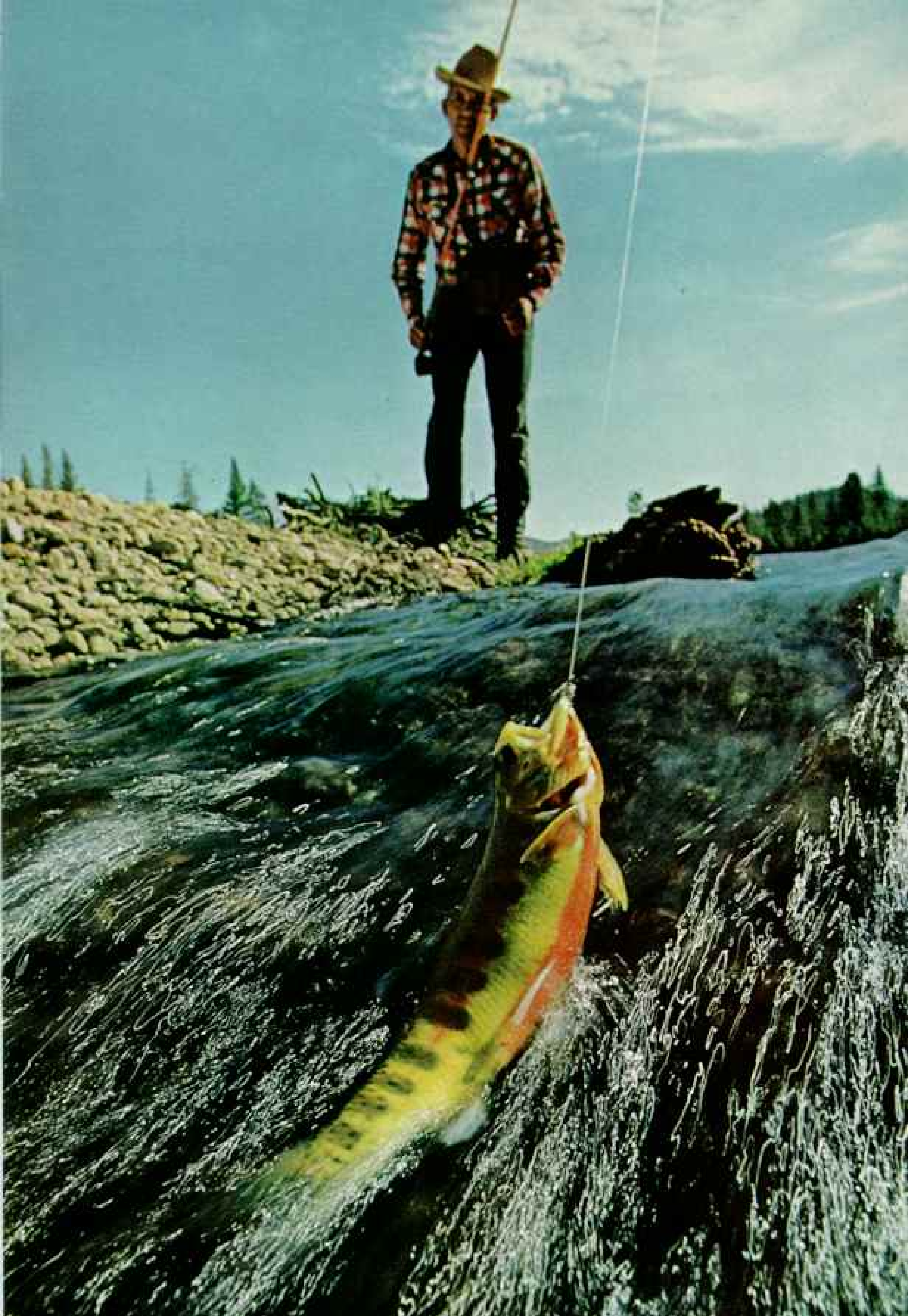
Game experts believe the additional traffic will further restrict the few bighorn sheep left in the area. "Bighorns won't tolerate human use of their land," a wildlife biologist told me. The Forest Service maintains that the Trail Peak development will little affect wildlife—a contention clearly in dispute.

Beyond Cottonwood Creek, New Army Pass blocked our way to the main trail. A harsh moonscape tilted on end, all rock and sand and whining wind, it nearly bested me.

As we toiled up its switchbacks, my heart pounded and my lungs burned; in the thin air of 12,000 feet a heavily laden flatlander with

*Photographs of tree damage appeared in the article "Pollution, Threat to Man's Only Home," by Gordon Young, GEOGRAPHIC, December 1970. See page 749.

A spent fighter yields in its ancestral home, Golden Trout Creek in central California. Isolated thousands of years ago in pure, cold streams when erosion carved impassable falls, colonies of trout evolved into a dazzling species called the golden. Their numbers now decline as a new road brings fishermen thronging to a wilderness where few ventured in the past. Access by automobiles also threatens shy bighorn sheep, which flee as human presence increases.



"Climb the mountains . . . get their good tidings," urged John Muir. Heeding his advice, these hikers break camp beside Ediza Lake as sunrise tips the jagged Ritter Range. The heavily

a tobacco habit knows purgatory on earth. The sky boiled as we reached the crest, and a shower of hail drove us, bone-tired, down the other side to shelter at timber line.

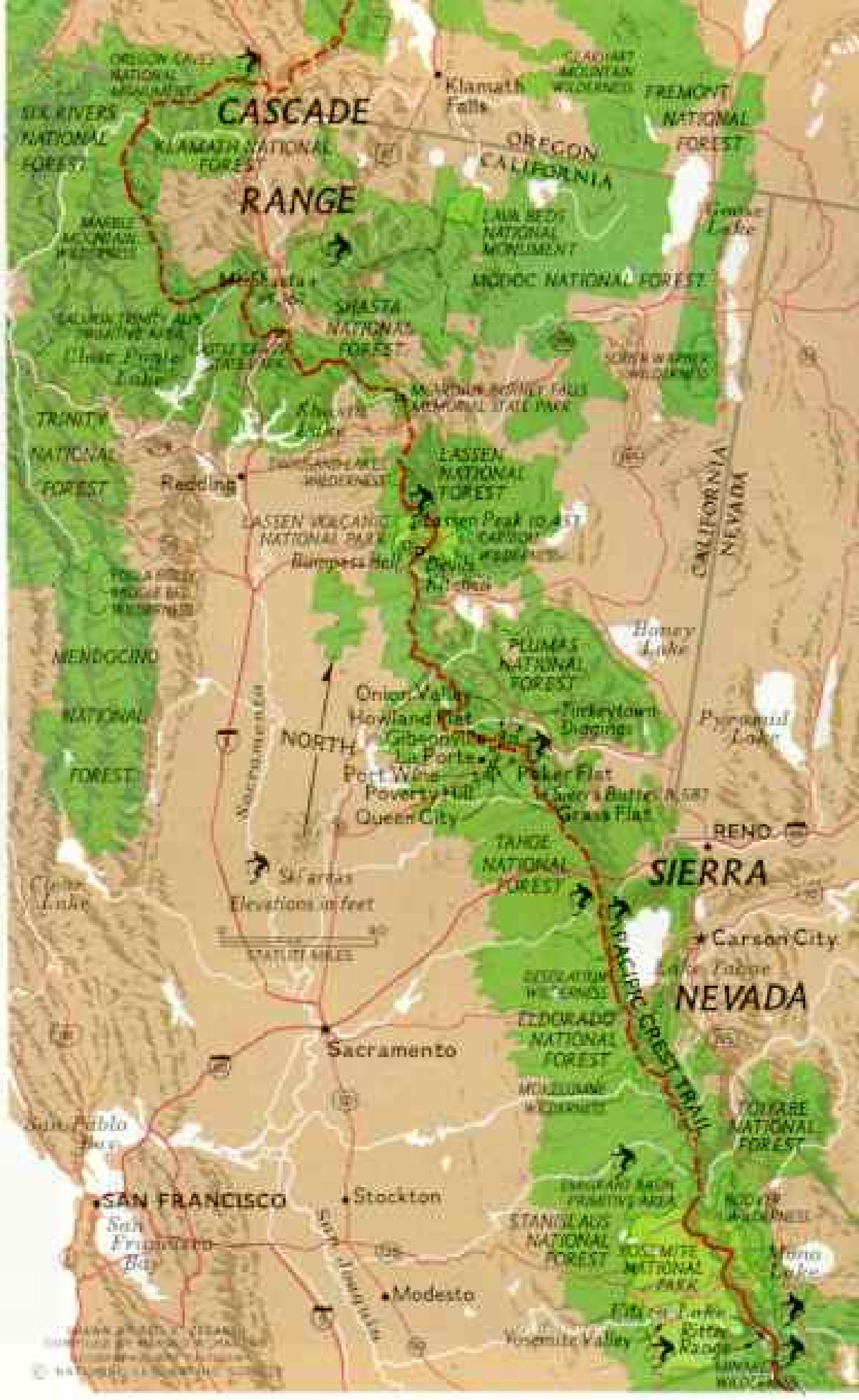
Girl Finds Mountains Safer Than City

We hit the Pacific Crest Trail again beside Rock Creek. Does a prettier stream flow anywhere? Pinioned between mountain flanks, she purls down stairsteps of lush meadow, singing all the way.

We climbed through stubby foxtail pines. In Crabtree Meadow we fished again for goldens. Eastward and upward, the fluted mass of Mount Whitney burned crimson in the sunset. We turned off the main route and started toward it.

No strangers walk trails. When they meet, backpackers plunge into enthusiastic conversation about where they have been and where they are going. When we came on Dawnetta Winters near a lake that mirrored Whitney's bulk, naturally we flung off our packs, shared candy bars, and talked for an hour.

Twenty-three years old, willowy, with dark hair in a long braid and smooth skin burned



timbered Cascades extend northward from Lassen Peak (map).

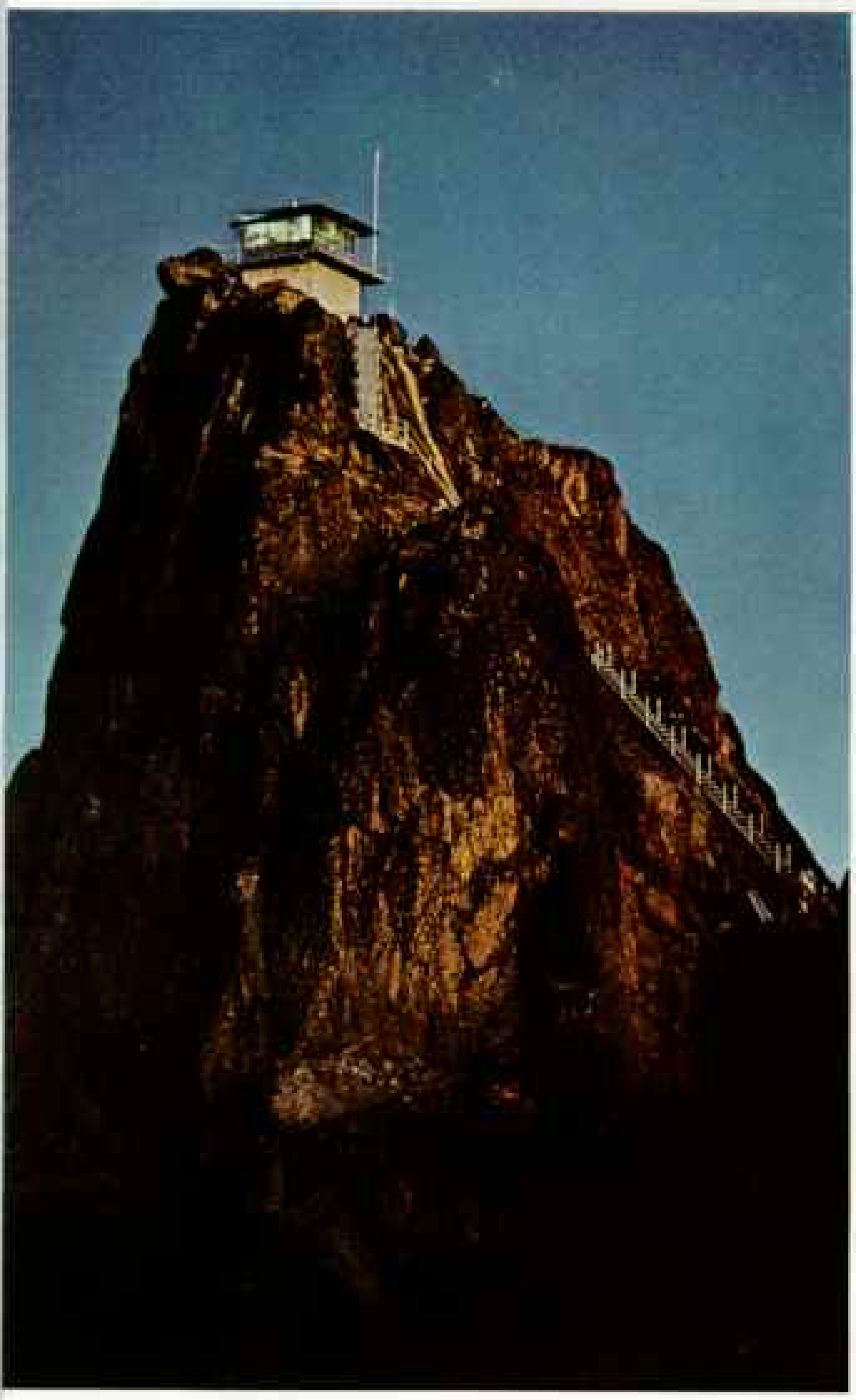
brown by the sun, Dawnetta had been roaming the Sierra for six weeks. "This is my church, my school," she said, touching fingers to the grass. "Up here you find everything has a reason. After I've been here awhile, I can go back to Los Angeles and understand so much better what life's all about."

A furry marmot waddled into view. He paused to consider whether we were friend or foe. Friend, he decided, and went back to nibbling green shoots.

"I enjoy hiking alone," Dawnetta continued. "I'm afraid to go out alone in the city, but in the mountains you're taken care of. Nights are as beautiful as days."

Our legs and lungs now adjusted to high altitude, Meridith and I ascended the steep granite shelf to the summit of 14,494-foot Mount Whitney. From the top we looked westward at peaks stabbing the sky, trailing fingers of winter's snow. In the east the sun-baked Owens Valley held back the Inyo Mountains. Far beyond, ropy clouds obscured the ranges enfolding Death Valley.

An afternoon's walk up the spur trail clinging to Whitney's near-vertical walls holds



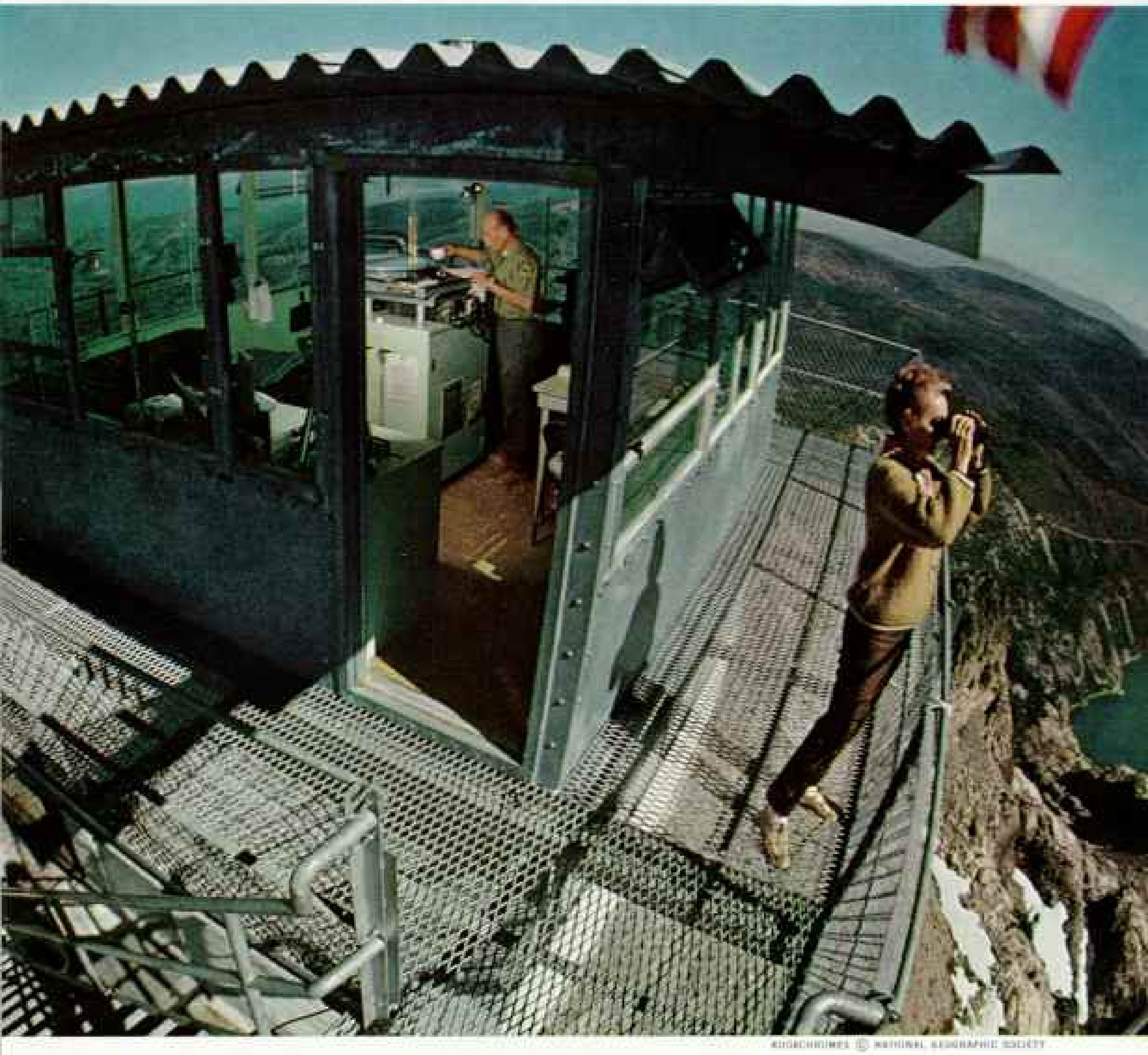
Like an eagle's eyrie, a fire lookout perches atop 8,587-foot-high Sierra Buttes. Gilda Davis scans for "smokes" (right), while her husband John mans a locator for pinpointing forest fires; wide-angle lens curves the horizon. A visitor climbs the last of 173 steps to share the view.

The access trail to the butte, half a mile off the main footpath, offers one of many scenic side trips for hikers. Trail officials stress that the walkway was not designed primarily for hiking border to border, but for jaunts of only a few days.

little appeal for Norman Clyde: "That's just putting one foot in front of the other." His voice conveyed no disparagement of those who take the easier way; Clyde simply has been up Whitney so many times—about fifty—and by so many precipitous routes, that a mere walk to the top holds no excitement.

"I was on the first ascent of what they call the fresh-air traverse," he said. "It has that name because there's a place where you take a rather long step with nothing but a thousand feet of fresh air below."

A howling snowstorm caught him, alone, at the summit one January evening. He scurried into a near-vertical avalanche chute on the leeward side and—no mean accomplishment—descended 800 feet to a ledge



KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

by cutting steps in the wind-packed snow.

Clyde's climbing days are largely behind him, but at 86 he remains a legendary figure among mountaineers, credited with 200 first ascents and more than a thousand climbs of Sierra peaks above 10,000 feet.

Outdoor "Bedroom" Serves Sierra Veteran

When I reached his home near Big Pine, the figure that greeted me held an armload of firewood. The face peering from beneath an old campaign hat bore the blush of a lifetime's exposure to wind and sun (page 749).

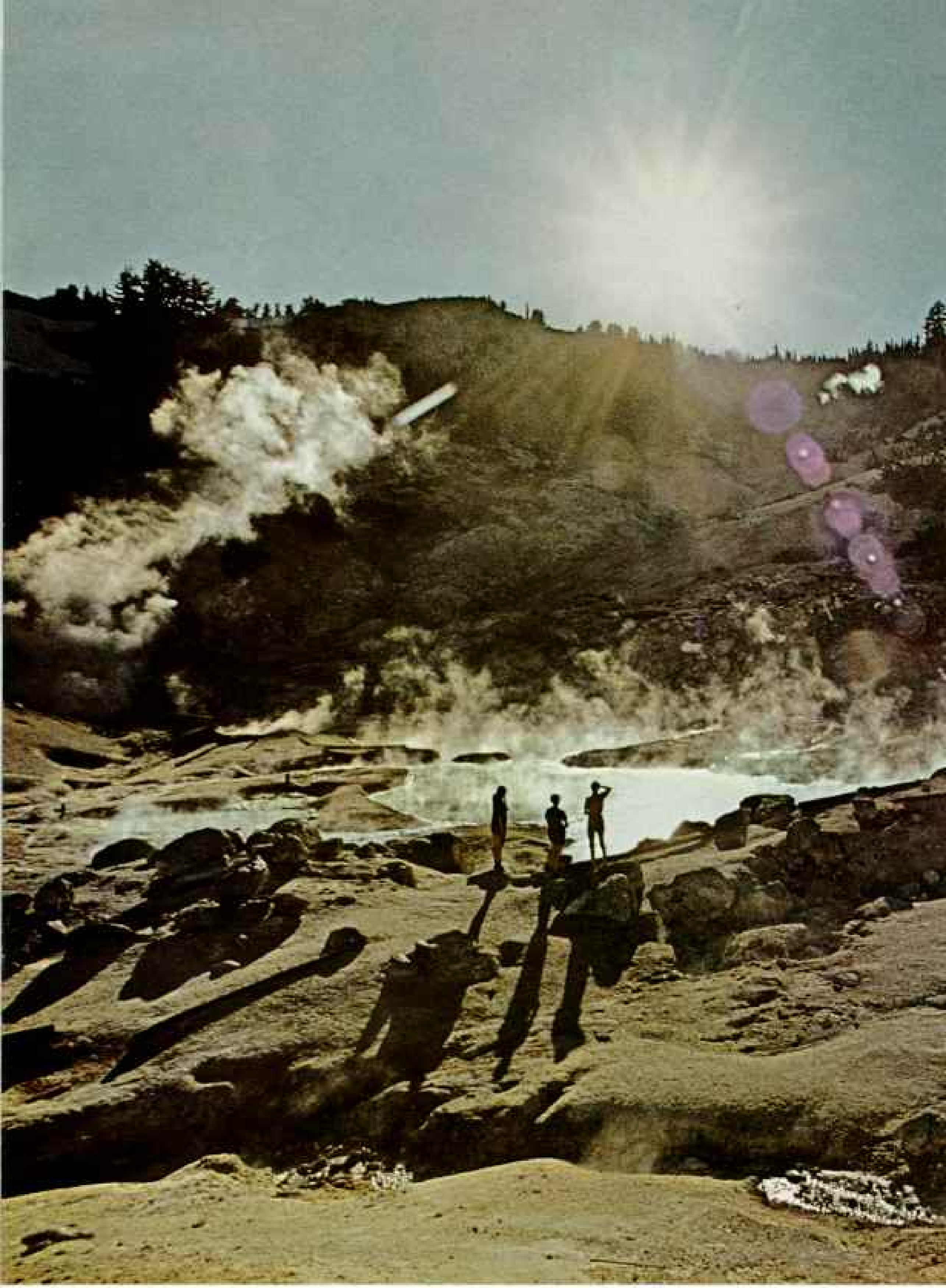
We sat in his yard and talked of many things: his life, the mountains, the habits of bighorn sheep, eagles, and hawks. No other man knows so much about the High Sierra.

"I *should* know," he acknowledged. "I've been climbing these mountains since 1914. The mountains always appealed to me—I don't know exactly why. I suppose, as they say, a mountain is a challenge."

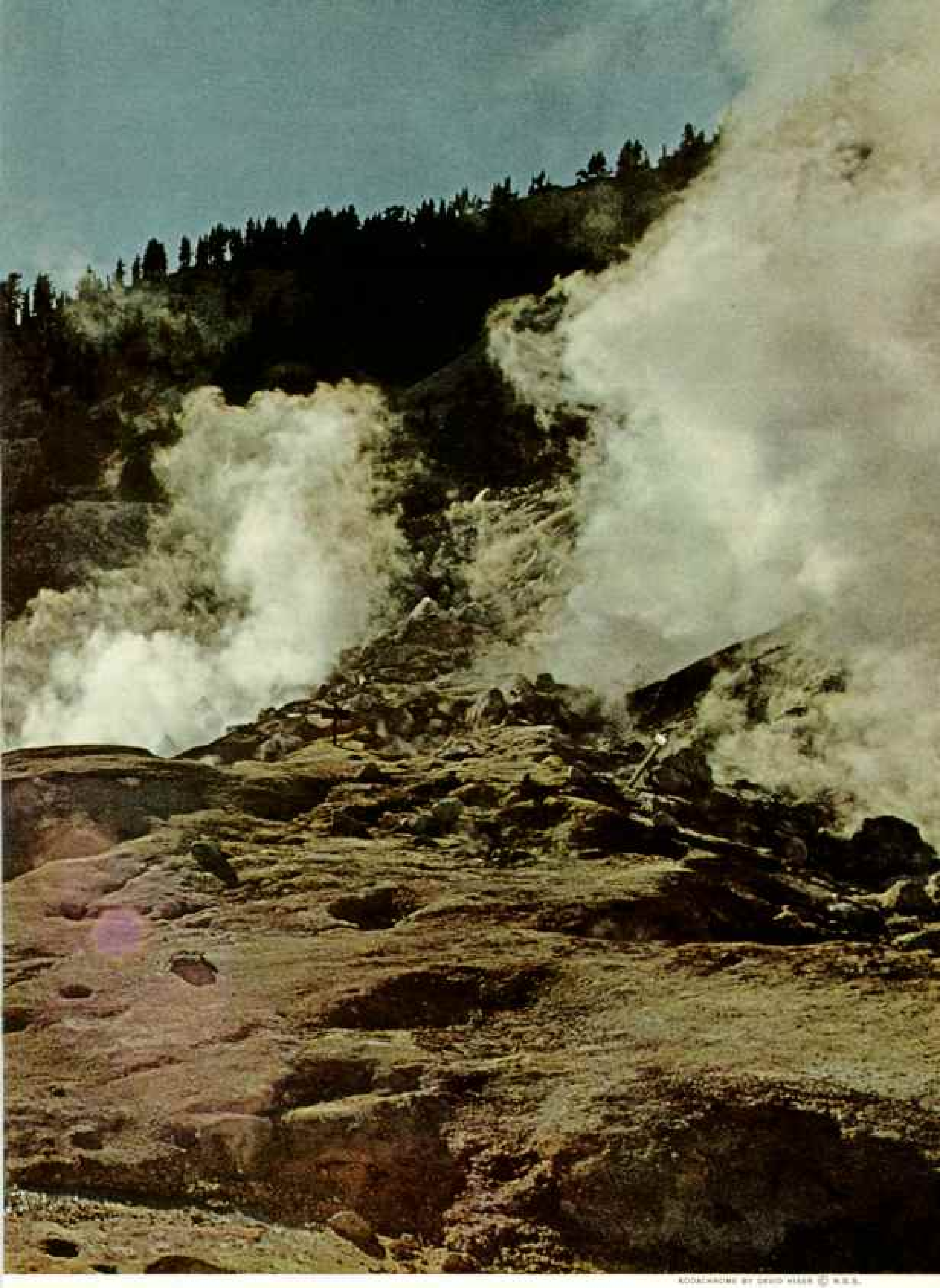
Clyde lives the solitary mountaineer's life every day, sleeping outside even in winter. "I don't mind the cold," he said. "But sometimes it gets pretty windy, and these old locust trees have a bad habit of blowing over."

As I left his humble home, my thoughts turned to another Sierra naturalist. Death ended John Muir's great work the year Clyde climbed his first Sierra peak.

Muir: The name endures in Sierra country. It adorns a mountain, a wilderness preserve, a grove of sequoias, and the 212-mile trail



Earth's caldrons blow off steam at Bumpass Hell in Lassen Volcanic National Park. Pools boil and mud pots bubble in this major thermal area near the trail.



The most recently active volcano in the 48 contiguous states, Lassen Peak awoke from years of slumber in 1914 and erupted sporadically until subsiding in 1921.

completed in 1938 from Mount Whitney north to Yosemite National Park—now a part of the Pacific Crest Trail.

Born a Scot, reared in Wisconsin, Muir set out to learn nature's secrets "from many a weed's plain heart." He saw the High Sierra in 1868 and soon wrote his credo: "I am hopelessly and forever a mountaineer."

Muir earned renown as a naturalist, but today he is remembered chiefly for the prose—eloquent, powerful, enduring—that began to flow from his pen in the 1870's. Few have written so movingly of mountains, or in doing so have moved mountains so formidable.

Not many men cared in that unfettered era that the Sierra was imperiled by timber and mining interests and stockmen pasturing herds in fragile meadows. Muir's articles made them care. While battling to save a forest, he stated his viewpoint thus: "Through all the wonderful, eventful centuries since Christ's time—and long before that—God has cared for these trees . . . but He cannot save them from fools—only Uncle Sam can do that."

Reacting to clamor generated in large part by Muir, Congress saved Yosemite and Sequoia as national parks and passed legislation allowing the President to preserve vast tracts as national forests. The Sierra Club, which Muir founded, carries on his work today.

Hikers Imperil the Wilds They Love

Guarding a third of the 504,000-acre John Muir Wilderness in the Inyo and Sierra National Forests (map, page 749), District Ranger Arn Snyder pursues his work with as much love as Muir pursued his. For five days Meridith and I followed Arn on horseback among the bald granite peaks and timbered valleys of his district—one of the most splendid areas within the National Wilderness Preservation System. We saw him several times dismount, take a sack from his saddle, and, sighing, pack up garbage left by a thoughtless hiker. Menial work for a man with 20 years on the job? To Arn it's part of the job.

Nature built in the Muir Wilderness a temple to glorify herself. Where mountain meets sky, ancient glaciers polished the stone, grinding broken rock against soaring boulder. The smooth walls gleam in the alpenglow. Buttercups gild the meadows beneath the temple, and in annual celebration of all this opulence shady bogs sprout fireworks of delicate shooting stars.

Some conservationists say the Muir Wilderness is too magnificent for its own good. Riders and hikers by the thousands pummel the John Muir Trail each summer, seeking beauty and solitude. The Forest Service believes steps must be taken soon to limit traffic.

Arn tackled the problem a few years ago by providing rustic accommodations—pit toilets, log tables, stone fireplaces. He hoped the heavy use and litter would be confined. But wilderness management is a subject on which many disagree. The Forest Service now sees the building of even minimal facilities as in conflict with its mandate from Congress to maintain wilderness "with the imprint of man's work substantially unnoticeable."

"Despite the traffic, you can still find solitude," Arn said. "Off the main trails."

Erect in the saddle, as if sculptured there from a slab of Sierra granite, he led half a dozen of us to a route that appeared not to have known a footfall all summer. "Not many, anyway," Arn said. "I doubt if 200 people go up toward Seven Gables in a year."

The horses trod gingerly over treacherous talus. When the trail became too rugged, we dismounted and hopscotched up a tumbling creek's bed. The trees shrank to brushy stubble under many-spired Seven Gables.

Arn finally stopped beside a crystal lake. "You can have all the solitude you want here," he said. "But you have to work for it."

The six of us who followed him went our separate ways, urged by something within us to seek quiet communion. A marvelous thing, solitude. I was glad we had worked for it.

Ghost Towns Recall a Frenzy for Gold

To her sorrow, Meridith's adventure was over now—school would start soon—but mine still had six weeks to run. I skipped northward 200 miles in California to keep company with ghosts in Plumas National Forest.

Queen City, Poverty Hill, Grass Flat—the names of gold-rush towns leaped from my map. And the loveliest of all, Port Wine. Old-timers say that name originated the day a cask fell from a mule and burst in a creek, bringing miners in a rush with bottles and pans.

Little remains now. Gibsonville is rubble, Onion Valley nothing more than a memory. A few dwellings stand yet in Poker Flat (whose name calls to mind Bret Harte's tale of outcasts). LaPorte, once the home of 2,000 people, musters just 26 permanent residents. But who can resist ghost towns? Not I.

"Some of the early miners made $300 a pan," Truman Gould told me in LaPorte. "I remember my father saying he helped my granddad

Modern wilderness scout, Cascade Crest Patrolman Leyton Jump radios a warning of a thundercloud buildup. Mount Rainier, sheathed by 41 glaciers, looms behind him. Alerted fire-watchers will scan the storm area for forest fires ignited by lightning.

The U. S. Forest Service supervises the entire trail; 80 percent of it traverses federal lands. Officials hope to acquire privately owned sections or obtain easements for the remainder.

The Cascades (map), severed by the Columbia River, include three mountain systems. More than a hundred volcanic peaks spike the southern segment, while the northern portion has a mixture of sleeping volcanoes and Sierra-like ridges. In the middle, gentler, lower mountains form a backdrop for a few spectacular volcanic cones such as Rainier, Adams, and Hood.

Hikers planning to cross into Canada should first write the Canadian Department of Manpower and Immigration at Vancouver, British Columbia, and check with U. S. customs and immigration officials at Oroville or Sumas, Washington.

Giant chalice of the Cascades, a six-mile-wide basin cups Crater Lake, shimmering ink-blue above 2,000-foot depths. A volcanic cone towered here 6,600 years ago; then

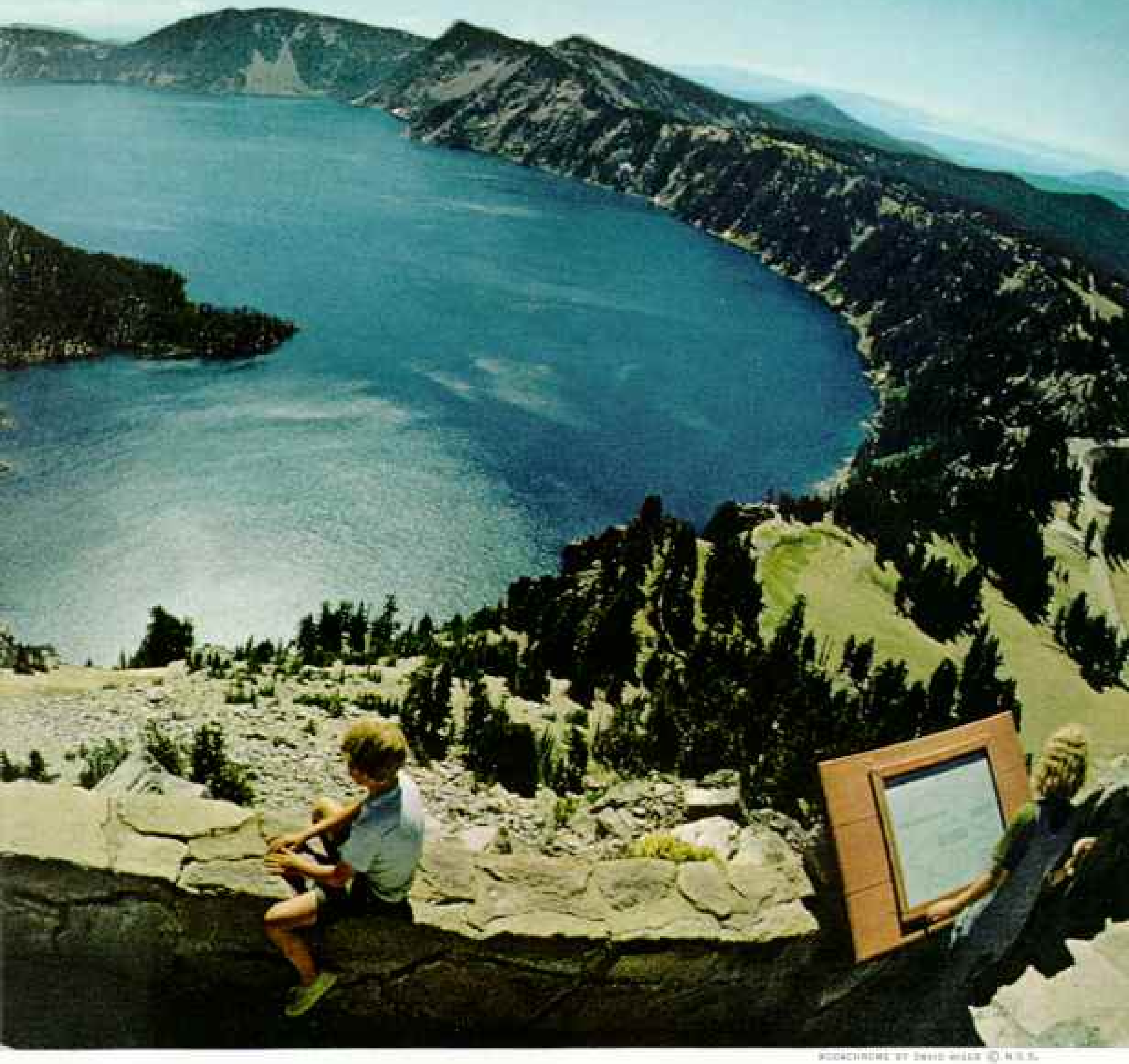
take $11,000 out of the Turkeytown Diggings in six weeks." That was at the turn of the century. Mr. Gould's grandfather arrived in 1855, five years after the region's boom began.

The mines yielded gold worth $93,000,000. Many believe metal could be dug out today, if the price of gold made the work worthwhile.

I spent a night with a man who nourishes such a belief. Ray Bittman passes solitary summers among the ghostly memories of Howland Flat, until driven out each fall by snow. His modern two-room cabin stands not far from stone walls that once held the Wells Fargo office. Half a dozen old houses remain.

In the light of a gasoline lantern Ray's hair showed streaks of gray and red as we talked into the night. "The old miners were plenty smart," he said. "But they didn't get it all. I've got gold on my two claims, and if the price ever goes up, you bet I'm going to mine it."

Picking up the trail again in California's Lassen Volcanic National Park, 60 miles north of Ray Bittman's claims (map, page 759), I strolled with Bea Telfer to a denuded valley floor called Devils Kitchen. Bea has passed ten summers and autumns putting Lassen's



fissures let molten rock drain from its interior, and the peak collapsed. Later eruptions raised the smaller cone at the center; rain and snow gradually filled the caldera.

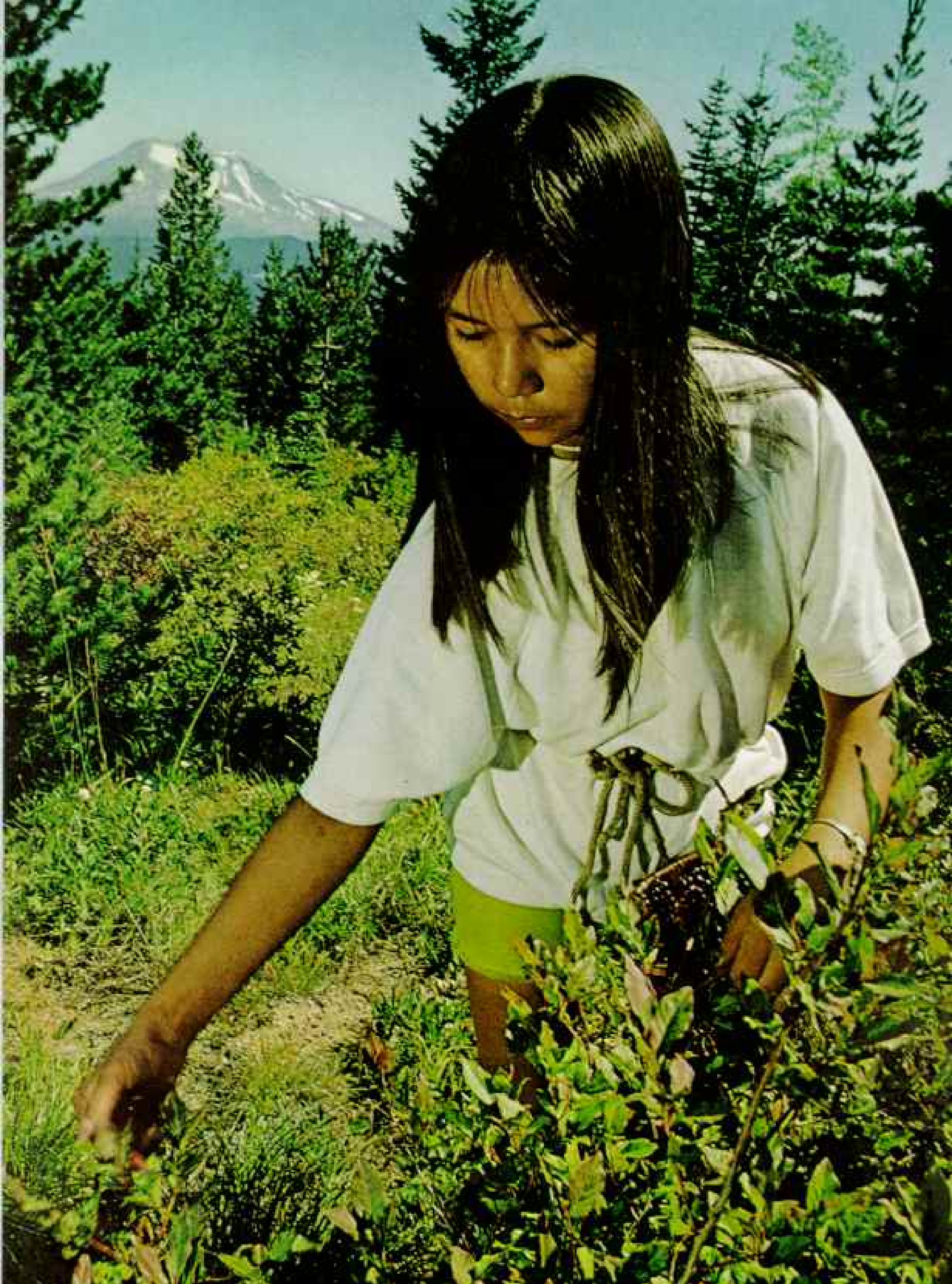
sun-splashed meadows and handsome conifers on canvas; the park boasts orthodox beauty as well as nether-world manifestations of volcanic and hydrothermal activity. We peered into fissures where mud bubbled and water boiled. The exhaled steam assaulted our nostrils; the devil in the kitchen cooks with brimstone (pages 762-3).

Volcanoes Spike the Horizon

Southernmost great peak of the Cascades, Lassen anchors a procession of volcanic cones studding that range: Shasta in California; Three Sisters, Jefferson, and Hood in Oregon; St. Helens, Adams, Rainier, Glacier Peak, and Baker in Washington (map, page 765).

At an estimated 12,000 feet, Oregon's Mount Mazama stood as tall as some of these until its top collapsed—17 cubic miles of volcanic rock tumbling with a horrendous roar into the maw that birthed it. What now remains of Mazama, rising to a mere 8,156 feet, holds Crater Lake (above).

Volcanoes excepted, the Cascades cannot boast the height of the Sierra Nevada. "But who's to say which range is more beautiful?"



Berried treasure draws Indians of several tribes to the Gifford Pinchot National Forest. Basket slung from her waist, Janice George, a 19-year-old Yakima, gathers huckleberries, a fruit some tribesmen revere —with venison and salmon—as sacred food signifying nature's providence. Indians pitch tepees within sight of 12,307-foot Mount Adams at harvest time.

Red men and white once disputed picking rights. Now the Government reserves 800 acres beside the trail for Indian use only.

challenged Sam Frear of Oregon's Willamette National Forest. We flew in a helicopter over the Mount Jefferson Wilderness, part of which lies in the Willamette. I tracked the Pacific Crest Trail as it transited broad flats of grass and touched glassy lakes. As we landed, I told Sam I wouldn't attempt to say one range possessed greater beauty than the other.

Both man and nature left lasting marks in McKenzie Pass in central Oregon, 25 serpentine highway miles into the mountains from the McKenzie River Valley. From an observatory at the crest I looked out on a sea of sharp-edged lava. When I left the trail, the rock lacerated my boots.

Dream of a Road Becomes an Obsession

I often heard stories of pioneer grit along the Pacific Crest, but none so poignant as the story of John Templeton Craig, who lies at peace on a hummock above the lava. In 1862 he found work building a wagon road across the Cascades, not far from McKenzie Pass. But that first route was so laborious and demanding that hardly any freighters traveled it. Craig had found his task in life.

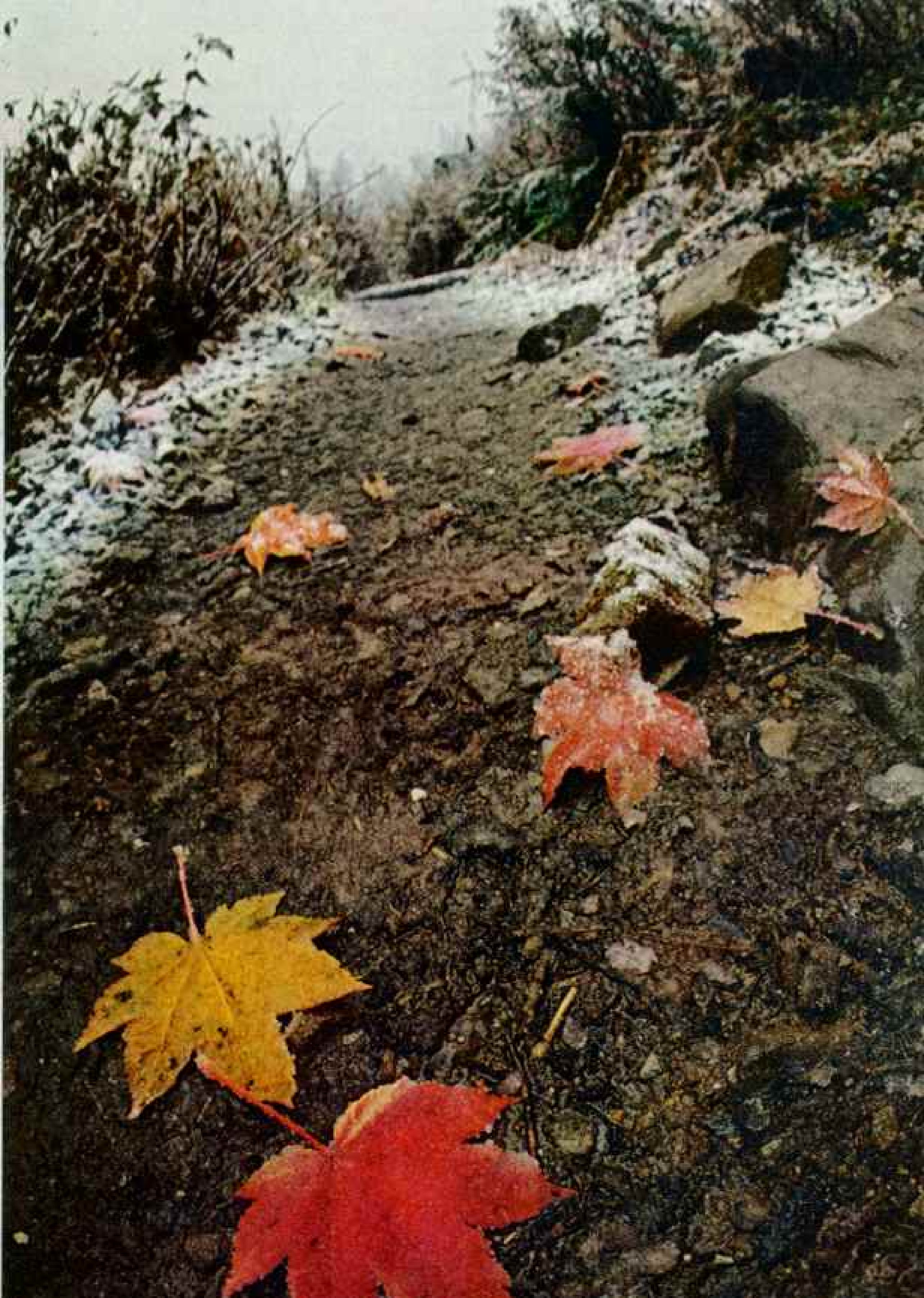
For 11 years, sometimes working alone, he cleared rock and felled trees to make a better road uniting eastern and western Oregon. So intense was his dedication that some people thought him demented. But finally wagons rumbled across McKenzie Pass.

Later Craig was hired to deliver mail over his route. Around Christmas in 1877 he set out on his first trip. Weeks passed; he neither reached his destination nor returned. Searchers ventured out. They found Craig's body in a cabin at the summit, in the ashes of the fireplace. Matches littered the earth floor; when the searchers tried them, they would not strike. No one knows exactly what happened. The searchers surmised this:

Fighting a blizzard, the 56-year-old road builder reached the cabin exhausted. He lit a fire, then fell asleep, neglecting to restore his matches to their container. Awakening later, he discovered the blaze was out and his matches were damp. He sought the warmth of the ashes—in vain—and froze near the route he'd labored to build.

From John Craig's final resting place I wandered north again in my car. I stopped 6,000 feet up the slope of snow-mantled Mount Hood, just 200 yards from the Pacific Crest pathway, to visit Timberline Lodge.

Crew-cut Dick Buscher looks after that unique resort hotel—unlikely duty for a



As autumn slides toward winter, freezing rain and slush glaze fallen leaves in the Cascades' Snoqualmie Pass (opposite). Each year as much as 50 feet of snow falls on the Cascades, all but halting traffic over the trails. To avoid being caught by a blizzard, the occasional winter hiker relies on advice from the weather station at Washington's Stampede Pass before setting out.

An overnight ski tour in April hones survival techniques of the Mazamas, a Portland mountaineering club, in Oregon's Deschutes National Forest. In an outdoor kitchen surrounded by natural refrigeration (left), a pancake browns over a camp stove. Excavated snow cave (below) provides club members with warm sleeping quarters: 41° F. against 24° outside. Club members dug this shelter for four in two and a half hours.

ENTACHROME AND KODACHROME (TOP) BY DAVID ROSE © N.G.S.

Invasion of flames brings an army of saviors to Wenatchee National Forest, east of Seattle. Some 8,600 fire fighters battled 91 blazes started here by lightning in August 1970.

Six miles east of the Crest Trail, a crew tosses dirt on flare-ups (left) along a fire line cleared to check the flames; lunches and canteens hang at their belts. Face drawn by fatigue, a volunteer takes a break (above).

Encircling flames nearly trapped author Edwards as he followed the action. The fires blackened 112,779 acres, 20 percent of the national forest-fire loss in 1970.

A quieter enemy stalks California's San Bernardino Mountains: Smog drifting in from the Los Angeles area threatens to kill more than a million trees.

Forest Service district ranger, but a job Dick relishes. "After a while, you get to love this old barn," he said with mock irreverence. His gaze swept the Bunyanesque proportions of Timberline's hexagonal central hall: iron gates weighing half a ton, massive timbers, a stone chimney soaring 92 feet.

Timberline is a monument to the depression of the 1930's; the Works Progress Administration built it to create jobs for the unemployed. For $94 a month, 450 men labored to raise it; more than a hundred artists and artisans embellished it with paintings, panels of wood marquetry, carvings, mosaics, woven draperies, and hooked rugs.

Today many persons speak reverently of Timberline as a museum of vanishing craftsmanship—some even call it the world's most magnificent wooden building—and legions of skiers, mountain climbers, and hikers reckon make-work a laudatory concept.

It was not always so. "When World War II began, this building was virtually forgotten," Dick said. Water pipes froze and burst, the roof sprang leaks, and the rugs and draperies were damaged. Concessionaires could not breathe life into the hotel after the war. Timberline was, in short, a turkey—neglected, disintegrating.

Luckily the Forest Service found in Richard L. Kohnstamm a hotelier determined to see Timberline succeed.* Now a four-and-a-half-million-dollar program is planned to enlarge the lodge and add other facilities to serve the ever-growing number of outdoor enthusiasts.

Thunderstorm Triggers a Retreat

Crossing the Columbia River into Washington, I drove to Chinook Pass, strapped on my pack, and hiked to a rocky knoll that looked toward the eastern face of Mount Rainier. That night I went to sleep contemplating the sight awaiting me when dawn broke against glaciers on the Northwest's highest peak.

I awoke at 4 a.m.—greeted not by dawn's early light but by a rumble like the tattoo of muffled drums. Blobs of fire glowed eerily through the nylon of my tent.

Emerging, I beheld the horizon: a seething caldron of mountain and cloud, now purpled by violent explosion, now creased by jagged tongues of lightning. Sometimes not one but two bolts flicked down, joining peaks in a fiery parabola. The thunder roared with

*See pages 89-90 of "Oregon's Many Faces," by Stuart E. Jones, in the January 1969 GEOGRAPHIC.

heightened fury. The wind came on with a sinister whine. I collapsed my tent and struck off for the valley below.

An hour later it was over and I climbed back to the knoll. Rainier floated high over her sister peaks in a sea of golden light, her glacial raiment gleaming like lacquered metal. If there is a sight more glorious on the Pacific Crest Trail, I don't know it (pages 742-3).

Foresters dread such storms as had chased me down. One morning I arrived at the headquarters of the Wenatchee National Forest, invited to accompany rangers on a leisurely horseback trip through alpine meadows. Instead I found myself following 25 hard-hatted men furiously clearing a fire line through a thicket of lodgepole.

Only a few hours before my arrival, a lightning storm had rolled over the peaks on the eastern tier of the Washington Cascades. Ninety-one fires burned (page 772).

The next day camps sprang up for the 8,600 men who would try to control the blazes. I got to such a base as it took shape; soon it would teem with 1,400 fighters massed to halt the Slide Ridge-Entiat fire.*

Under a tree, maps spread out, Fire Boss William Knechtel conferred with his staff. Around them carpenters hammered and sawed, piecing together a headquarters and a kitchen. Sleeping bags, canteens, hard hats, shovels, saws—all the tools of the fire fighter's trade poured out of trucks. Helicopters—the seven-league boots of forest-fire fighters—hauled men to the battle lines as quickly as buses brought them to the mushrooming camp.

By the third day the Slide Ridge fire had consumed 5,000 acres. I climbed into a helicopter to join the men trying to contain it. We landed in a cloud of smoke on a mountaintop strewn with fallen timber.

*For more about the Forest Service's fight against fire, see "Forest Fire: The Devil's Picnic," by Stuart E. Jones and Jay Johnston, GEOGRAPHIC, July 1968.

Governor hits the forest trail: The State of Washington's chief executive, Dan Evans, and his family don packs for a weekend in the Goat Rocks Wilderness southeast of Mount Rainier. Young Bruce, 4, feeds a bold camp robber (above), while his father fixes breakfast in the mountain-goat preserve. An experienced mountaineer, the 45-year-old governor has hiked stretches of the Crest Trail since boyhood.

Down a steep ridge, Maurice Chavez's crew cleared a wide lane through trees, undergrowth, and grass. Smoke rolled up from below; the men chopped and shoveled in sight of flames leaping into tree canopies. The pall overhead dimmed the sun into a dull orange disk.

A helicopter whirled low, Fire Boss Knechtel's arm waving frantically from the canopy. The chopper veered off, returned, and dropped a message, hastily scribbled on the softest bomb available, a roll of toilet tissue: *Get your men out of there. They're about to be trapped. The fire has crossed the canyon below you. Build your line down the next ridge.*

We would have been trapped by flames had there been no warning. The crew worked until dark to build a new fire line.

Nineteen days after the lightning storms, the last fire was controlled. The blazes, among the worst the Northwest had ever known, devastated 177 square miles of land; suppression efforts cost $13,000,000; one fire fighter lost his life.

Nature Provides the Perfect Antidote for a Chill Trek

While the Wenatchee forest suffered drought and fire, mountains and valleys on the western side of the Cascades soaked up rain wafted from the Pacific. Following the trail that threads that moist terrain to Glacier Peak, I trekked a forest unimaginably luxuriant. High as factory smokestacks, the trees made my route a shadowless tunnel. Ferns, berrybushes, and fledgling evergreens wove a lush trailside carpet.

From a meadow daubed blue by gentian I watched three mountain goats, then five more, wander across a streak of green under Glacier Peak's ice-crusted summit.

Then it began to rain. All night the drops pattered on my tent, and all the next morning on me as I broke camp and started down the trail. By noon I was shivering, soaked to the skin.

But relief—ah, such relief!—awaited me a mile off the Pacific Crest route. No doubt the forester who built a five-foot-deep pool around the bubbling fountain of Kennedy Hot Springs had in mind the refreshment of rain-chilled travelers. Stripping, I soaked for half an hour in the 96° F. waters.

Two days later I drove east across the mountains and turned north once more. A biting wind whistled as I took the narrow gravel road spiraling up to Harts Pass on the southern edge of the Pasayten Wilderness.* Ahead of me, the last 32 miles of trail struck out through virgin fastness to the Canadian border.

A young hiker, out for a stroll, joined me as I shouldered my pack. We walked together to a meadow and then said goodbye. I felt a twinge of loneliness as he turned back.

An hour later all loneliness vanished. From a ridge I looked backward on the path I had traveled and ahead to the switchbacks that would lower me into a valley's dense forest. Not a soul in sight. I had the joyous sensation that the Pasayten was mine alone.

It was. I met no other person until I reached Canada two days later. From the crests I gazed at peaks rising like breakers in a stormy sea.

*"New National Park Proposed: The Spectacular North Cascades," by Nathaniel T. Kenney, in the May 1968 GEOGRAPHIC, describes the mountains west of the Pasayten.

Through ice gnomes of frosted firs, touring skiers weave downhill near Chinook Pass. Pristine slopes drew John and Karen Beebee from Seattle, 75 miles away. After trudging uphill on skis fitted with climbing skins, they have removed the covers to swoop down again. KODACHROME © N.G.S.

Trail's end brings the author to the Canadian border after a 32-mile hike through some of the most primitive terrain in the United States. A few days earlier he was filled with "an exhilarating loneliness" while camped in craggy Glacier Peak Wilderness (right), here softened by moonlight and a dying sun.

"I was deeply impressed by the contentment I found alone in the wilderness," he says. His words mirror those of John Muir, spoken half a century before: "Nature's peace will flow into you as sunshine flows into trees."

PHOTOGRAPHS BY DAVID HISER © N.G.S.

Somber under scudding clouds, they shone with glaciers and autumn's first snow as the sun reappeared.

Massive towers frowned down darkly as I passed below—great slabs of rock made 135 million years ago from small rocks, cemented together on an ocean floor, hoisted up, set rakishly atilt. Stunted conifers strove for a foothold on these heights, playing a game of king of the mountain, the game boys play. Rock usually wins.

I watched an eagle, graceful in flight; heard the shrill cry of hawks; was surprised by a doe and her fawn clopping past as snowflakes glazed the trees.

With mixed emotions I crossed the border: happy to finish my journey on the Pacific Crest, sad to leave Pasayten's solitude (left).

Vision of High Trail Ahead of Its Time

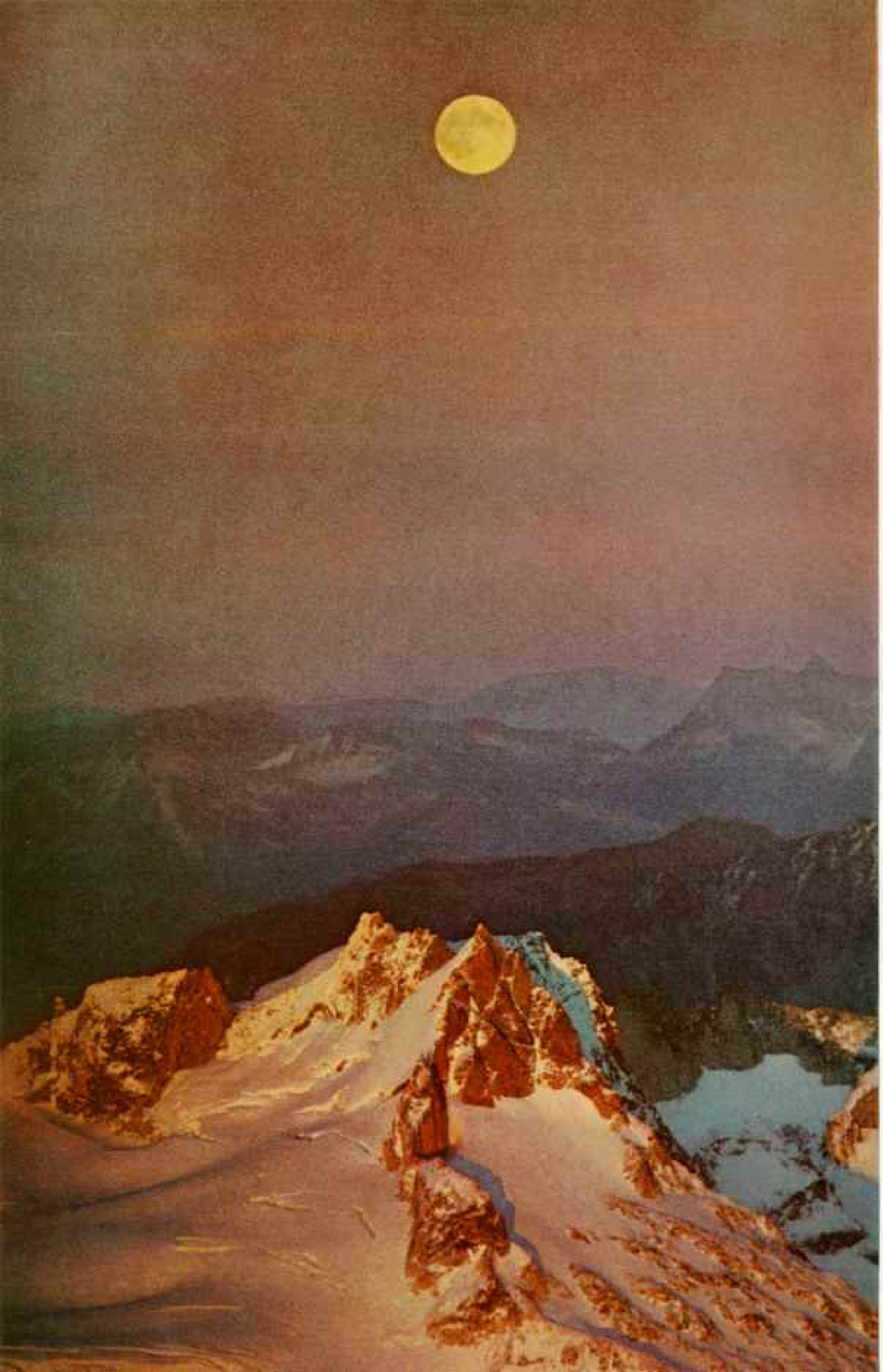
Far from these mountains, I had one more stop to make. I wanted to know more about Clinton C. Clarke, the father of the Pacific Crest Trail. So I went to the Los Angeles suburb of Santa Ana to look up Warren Rogers, a graying, affable outdoor type who worked with Mr. Clarke in the 1930's.

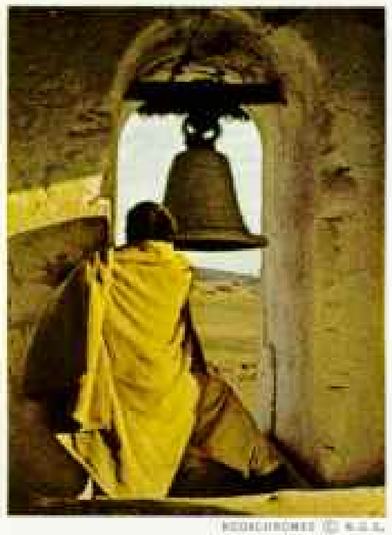
Warren Rogers was a young YMCA secretary at that time. Mr. Clarke prevailed upon YMCA's to send their youngsters in relays to explore the route he'd mapped, each group walking a few days, then handing a canvas-bound logbook over to the next. To provide continuity, Warren Rogers went along as trail guide. During four summers, he backpacked more than 2,000 miles.

We talked of Clarke, dead these 14 years. "He wasn't a hiker himself," Warren said. "But he wanted to make it easy for others to get into the high country. He envisioned a ten-mile-wide corridor set aside for hikers and horsemen."

Why didn't his grand scheme take hold in the America of the 1930's? Perhaps the answer lies in the era itself—an era dominated by rural values, a simpler life-style, and hard times. Few men could foresee the enormous complications that would attend the mass movement to cities.

But man's values change as his life changes. The deeper he plunges into the whirlpool of modern living, with its speeding transport, vexing problems, and harassing pressures, the more he prizes the escape of an adventure as old as mankind itself—a solitary walk in the wilds. Mr. Clarke's idea has reached its time at last. □





Mesa del Nayar's Strange

Holy Week

ARTICLE AND PHOTOGRAPHS BY GUILLERMO ALDANA E.

ONLY A HANDFUL of Cora Indian children gathered at the primitive airstrip when we landed. They stared with suspicion and distrust, their faces as forbidding as the rugged mountains around us.

Down a trail worn through the sere grass, a group of men approached. Curtly one of them asked what we wanted. I replied that we had come with the hope of witnessing the Cora celebration of Holy Week.

Almost haughtily the spokesman directed us to follow him. No one offered to help with our heavy baggage—mostly my photographic equipment—as we trudged up the slope toward Mesa del Nayar, a village nestled in the highlands of Mexico's Sierra Madre Occidental (map, page 786). This ritual center for the 8,500-strong Cora tribe lay more than a mile away. It consisted of some 25 stone or adobe huts with roofs of thatch palm or rough clay tile. A whitewashed church of massive construction stood off to one side (page 795).

We were led to a house, no different from the others, that was the residence of the Cora governor of the community. As we passed through the village, children came out of the houses to look at us, while adults peeped from behind the doors.

The governor, an old man, gaunt and thin, spoke to us through an interpreter (even though, as I later learned, he spoke

Shadows flung wildly before them, Cora Indians portraying Christ's tormentors race screaming through the Mexican village of Mesa del Nayar during Holy Week. Bell of the village church (above) tolls the start of the Easter festival. Four centuries ago, Roman Catholic missionaries taught the Indians the drama of Christ's Passion. During two centuries when the Coras had no priests, the Passion play evolved into a bizarre rite that fuses elements of Christianity with the Coras' original faith in Tayau, the sun god.

THIS PAGE FOLDS OUT

His identity symbolically concealed by soot and mud, a *borrado*—literally "erased one"—waits in line for a drink spiked with peyote, a drug that sustains him and fellow youths for three days of running, feasting, and roughhousing. Caricaturing the mob that demanded Christ's Crucifixion,

borrados harass all who get in their way during this combination Passion play and coming-of-age rite.

adequate Spanish). I assured him that we had come as friends and that we wanted permission to photograph his people during the festival. With me was Jorge Hernandez Moreno, Director of the Mexican Regional Museum of Anthropology and History in Tepic, capital of Nayarit State.

The old governor looked disapproving and, through the interpreter, bluntly told us: "We cannot accept you here. We do not care for strangers. You will have to leave."

I could not hide my disappointment, for I had heard that the Coras, one of Mexico's most isolated tribes, had evolved Holy Week ceremonies that sounded to me nothing short of fantastic.

The village normally houses a scant 200 people, but for Holy Week the population swells to 1,500 with the arrival of family groups who live in isolated *rancherías*—hamlets—where they grow corn and beans and raise a few pigs, chickens, and cattle. Holy Week is the only time of year when they all come to the village, and thus the occasion takes on a social as well as a religious significance.

While Señor Hernandez tried to persuade the governor to let us stay, I took the opportunity to have a look around. I left the governor's house and walked to the church, where I found Father Pascual Rosales, a Franciscan missionary who has lived among the Coras since 1969.

Coras Adapt Christianity to Old Religion

The priest, a short, thin, kindly man, told me something of the history of the Cora tribe and the meaning of the Holy Week ceremonies.

"Jesuit missionaries first came in contact with the Coras in the 16th century and remained with them for 200 years," Father Pascual told me. "Then, in 1767, the Jesuits were expelled from Mexico for political reasons, and for nearly two centuries the Coras were left almost entirely to themselves until I came here two years ago.

"What I found was truly amazing," he continued. "Over the decades, the Coras had preserved many Roman Catholic traditions, but they had made them uniquely their own. For example, they had come to identify Our Lord Jesus Christ with their ancient deity Tayau, the sun god. In their minds the two became interchangeable.

"They took elements from the story of Christ's Passion, death, and Resurrection and made them into a ceremony apparently designed to ensure the renewal and continuity of their community life. And yet, while they altered many rituals, others they kept intact. I was astounded to find that some Coras could recite the Mass in quite passable Latin—two hundred years after the last priest left!"

Señor Hernandez now joined us to say that the governor had changed his mind and had decided to let us stay. Father Pascual seemed quite surprised.

"I did not really expect them to accept you," he said. "The first year I was here they would not allow me to leave my quarters during Holy Week. I wasn't even permitted inside the church, which they used for their own rituals.

"Last year, for the first time, they let me lead them in prayer at the Stations of the Cross, which in the Roman

IN REMOTE SECLUSION, 8,500 *Coras live in hamlets scattered over 1,800 square miles of Mexico's Sierra Madre Occidental. Each Easter they congregate at centers such as Mesa del Nayar, there to renew tribal ties.*

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Threatened by angry Indians while taking photographs, the author smeared his face as they had done. Later winning their trust, he became a borrado and spent frenzied hours running and yelling with them.

About to be transformed, Cora youths gather to stain themselves with soot and mud. They brandish weapons suggestive of those borne by the mob that accosted Jesus at Gethsemane.

Catholic liturgy represent the successive stages in Christ's Passion. I was then able to see how much these people had changed the ceremonies taught them by the early missionaries. The arrest, persecution, and Crucifixion of Christ came to represent the triumph of the powers of death and darkness; the Resurrection became the renewal of life and the victory of good over evil.

"In their Passion play a young boy represents Christ, but there is no Pilate; there are Apostles, but no Judas. And a new element has been added, a group called the *'borrados'* who represent the Judeans."

"Borrados?" I asked, surprised. The word means "erased ones" in Spanish.

"You see," Señor Hernandez broke in, "centuries ago, church teachings blamed the people of Judea for the Crucifixion. You remember how Pilate 'washed his hands' of responsibility when the Judean mob refused to allow him to release Jesus and demanded that he spare Barabbas instead. When Spanish priests brought the story of Jesus into these mountains, the Coras identified the Judeans with the forces of evil. They still do.

"For three days, starting tomorrow—Holy Thursday—all authority, civil and religious, passes to a man called the Captain of the Judeans. He and his borrados—young men of the region—will darken themselves with soot and mud and thus 'erase' their own personalities and their personal responsibility for whatever they do.

"They will run around the town day and night to prove their strength and endurance, for being a borrado is not only a part of the religious observance of Holy Week but also an initiation into manhood. On Holy Thursday the borrados capture a boy who plays the role of Christ. The next day, Good Friday, they symbolically crucify him. And on Saturday

Church of two faiths rings at times with Christian prayers, at times with Cora chants. Rosettes made of cactus leaves and offerings of fruit adorn the altar, where Father Pascual Rosales celebrates Mass. Village officials at left later turned over temporal power to the leader of the borrados. For three days the Coras banned the priest from the main part of the church—reserved for their own ceremonies—but let him use an adjoining chapel.

an official called the Centurion—actually the village governor—will defeat the borrados in battle, thus marking Christ's Resurrection and the triumph of good."

As Señor Hernandez spoke, I noticed that in the courtyard of the church a group of Coras were building a strange dome-shaped structure of bamboo. We watched them decorate this with elaborate rosettes made of cactus leaves. When I took pictures, the Indians gave me surly glances. Then they carried the dome into the church and placed it on four spindly bamboo columns above the altar (left).

People streamed into the church and brought offerings of fruits and flowers to their dual deity, Christ-Tayau. The pungent smoke of burning incense permeated the air, mingling with the smell of flowers and fruits—truly a rainbow of scents.

Father Pascual told us that the next day he would be permitted to celebrate a Mass —not at the main altar but in a small chapel to one side of the nave. I had the impression that in his missionary work the priest was proceeding very slowly and with great care, in the hope that the Coras would gradually accept more orthodox ways.

Father Pascual Prays by Starlight

That night Señor Hernandez and I stayed with Father Pascual. Awaking to the ringing of bells at dawn on Thursday, I walked out to the church courtyard. The sky was filled with stars that looked like a rain of fireworks frozen in midair. Next to the large stone cross in the center of the courtyard I spied Father Pascual's silhouette. The priest stood still as a statue, head bowed in prayer.

The ringing of the bells grew louder as the blue light of dawn slowly became a long white arch above the mountains in the east. Smoke from cooking fires began to seep through the thatch-palm roofs of the village houses. Cocks crowed. Cows, pigs, and chickens began to stir.

At about six in the morning many young men appeared, wearing white shirts and white trousers and carrying long bamboo spears and wooden sabers. These were the borrados. I asked them where they were going, but they took pains to avoid me.

I followed them at a distance to the edge of a pool in a stream. The group grew steadily in size until it contained about 400 men. They all talked excitedly. Suddenly they fell silent and formed two long columns. The

captain went to the pool, while the rest bowed their heads with great respect. Then the columns began to file past him. The captain would touch each man on the head and say a few words in the Cora language.

The borrados removed their clothes and entered the pool. When they came out, they began covering each other with a black mixture of mud and the soot of burned corncobs (pages 786-7). A new personality seemed to emerge in them as they started to leap and yell. For the first time they directed their attention to me. A few stones whizzed past my head.

I felt I had to do something, so I walked to the pool, picked up some soot and mud, and covered my face with it. The borrados became quite angry about my intrusion and ordered me to leave. Then they arranged themselves in two rows again and ran toward the village.

On my way back I found one of the borrados resting in the shade of a small tree. He was about twenty years old, handsome, and strongly built.

I asked him where he came from, and he pointed to the east. He told me in Spanish that his house was three days' walk away.

"My family and I come to Mesa del Nayar every year for Holy Week," he said. "But this is the last year I will be a borrado. All young Coras are obligated to play this part for five years, otherwise the Devil will take possession of their souls. I have already served four times.

"Now I must go and drink atole with peyote [he referred to a corn-meal mush mixed with bits of the hallucinogenic peyote cactus]. We must dance the whole evening and night, and it will give me strength."

As he left, he warned me:

"Be very careful with the Captain of the Judeans. He is a wicked man."

Peyote Spurs Frenzied Running

Outside the church I noticed a small army of boys carrying old rifles and sabers and led by three adults. These people, I was told, were the "Pharisees." Their ceremonial duty was to keep order and to guard the church against the borrados, who were even then running around the village and through the courtyard of the church with incredible energy. No doubt the peyote was having its effect.

From within the church came a strange, monotonous music. I went in and climbed to the choir loft, where I found two old men and a boy playing a homemade violin, a small drum, and a triangle.

"We must play for two days," one of them told me, "until the heavens open up." The phrase referred to Christ's Resurrection, which the Indians observe on Holy Saturday.

I glanced out a window that overlooked the courtyard and saw Father Pascual with six Coras who wore simulated crowns of thorns and held palm-frond scepters. These Coras were acting as the Apostles. They knelt with the priest in front of a small niche that marked one of the Stations of the Cross (pages 794-5).

Young "Jesus" Chased and Captured

Later I discovered that the borrados were running a four-mile circuit past Stations of the Cross outside the village. At four in the afternoon all the borrados gathered in the village, looking for Jesus in order to arrest him. Jesus was portrayed by a small boy, about 7 years old, dressed in a white shirt and white trousers.

The borrados found the boy on the edge of the village and started to chase him (following pages). The boy climbed a tree and brandished a small wooden cross, and the borrados all fell to the ground as though struck by lightning. Three times—in the name of the Father, the Son, and the Holy Ghost—the borrados chased the boy, and three times they fell writhing to the ground at the sight of the cross.

The fourth time, they caught him in the courtyard of the church, knocked him to the ground, and tied his hands. Then the youngsters who acted as guards, the women, and the older men assembled in a procession, with the captive boy at its head. The group went around the village, pausing at the Stations of the Cross. The borrados kept running around, jumping and yelling, and sometimes hitting people with their spears. When the procession reached the church again, everyone went home except for the borrados, who stayed up all night rushing and screaming around the village and drinking atole with peyote.

Next morning, while the borrados kept up their frenzied racing and harrying, the church began to fill with people. The music continued exactly as before. The Pharisees were active, constantly changing guard.

The borrados then approached the church, yelling and raising their spears and sabers.

Everyone ran out of their way. I decided to come closer so I could get better pictures, and the borrados suddenly became still and glared at me angrily.

Without warning, about fifty of them came at me, leaping and shouting as they ran. Afraid to turn my back, I stood my ground. The Coras, surprised, stopped just short of where I stood, then circled me, making a frightful clatter by whacking the ground with their wooden sabers. One struck me a stiff blow on the back.

Just as unexpectedly as they had come, they ran back to the main group to confer with one of their leaders, who wore a horned devil's mask and a reed-grass vest. The tension mounted.

I felt that if I showed any sign of fear, the Coras would notice and perhaps do me harm. As calmly as I could, I walked the twenty yards or so to where they were talking. To my amazement, they asked me whether I was willing to become one of them.

Stranger Joins in Cora Feast

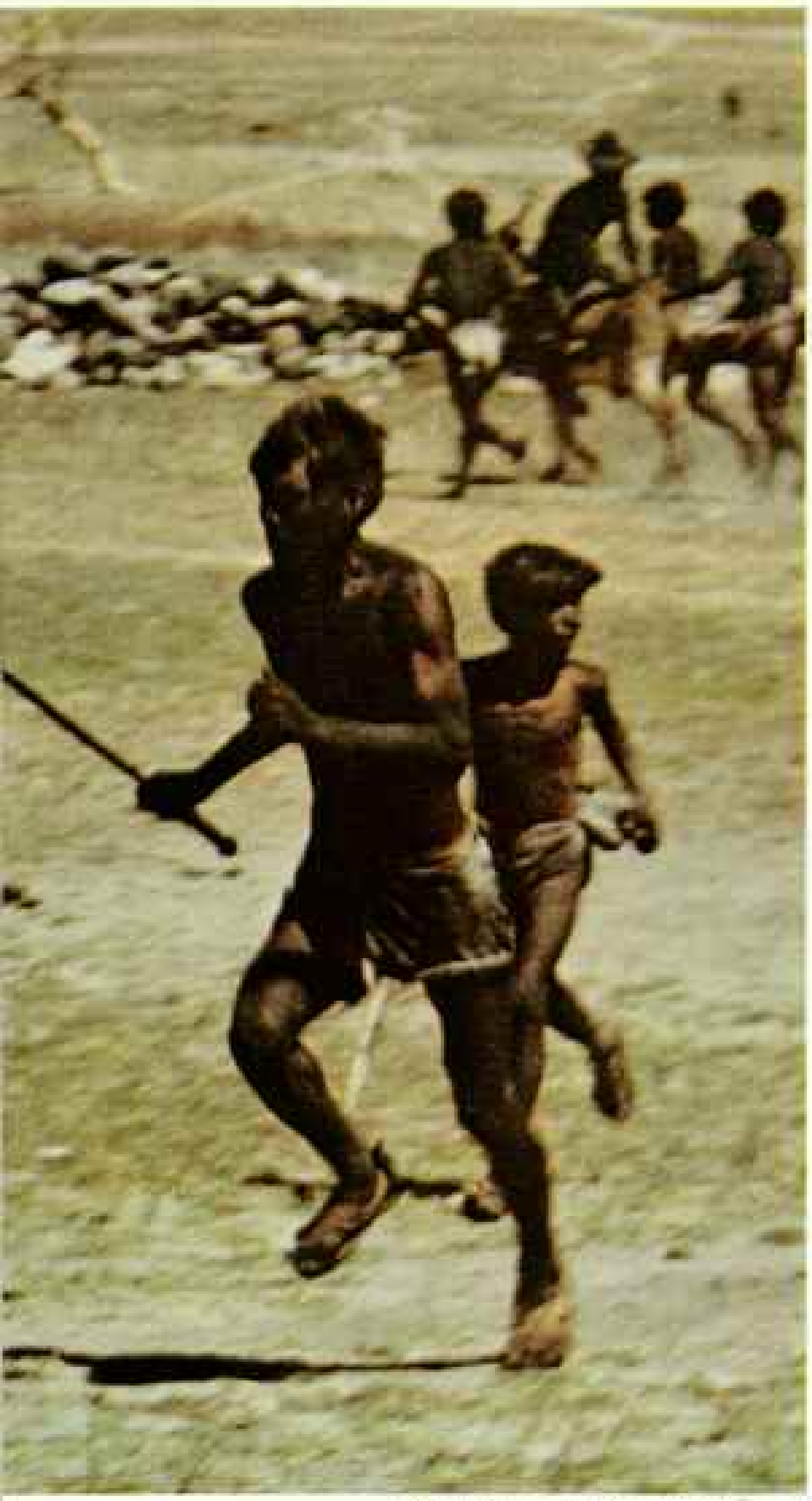
I went to the mission, left my cameras, and stripped to my shorts. The Coras took me to the stream and began to blacken me, vigorously rubbing dirt into my face and body, hurting my eyes and pulling my beard.

At an order from their captain they stopped. One man brought me a saber, a mask, and some sandals. The borrados then resumed their dancing and yelling.

The dancing lasted all morning. Then we ran to the river, where the borrados had left bowls of atole, bunches of bananas, and other food. I sat down next to a Cora who spoke halting Spanish. "You are lucky to have been accepted," he told me. "Strangers have never taken part in our ceremonies."

Soon the governor, the *mayordomo mayor* —the community's religious head—and the village elders arrived and we began to eat. Besides bananas, we feasted on pieces of chicken cooked in egg, tortillas, dried beef, cooked squash, and honey.

Keeping just out of their clutches, the lad portraying Jesus races from his persecutors. Cora tradition decrees the 7-year-old must escape three times before they catch him. The fourth time, he is captured and the next day symbolically crucified. After playing Jesus for five years, he, too, will become a borrado.



KODACHROMES BY GUILLERMO ALIANA E. © N.G.S.

In a topsy-turvy world where evil rules, borrados ride backward as they race burros. This commotion rages just before the observance of Christ's Resurrection on the last day of Holy Week. Afterward, the erased ones will cleanse themselves of soot and mud.

Awaiting normalcy's return, Cora women and children watch their menfolk's antics from a discreet distance. At ceremony's end, families scatter to their homes in the wilds. Not until next year will they all congregate again to renew tribal bonds.

As the meal progressed, I realized I was in a fix. If I stayed with the borrados, I would not be able to take photographs, which was what I had come here to do. So, as soon as I could, I stole away, washed, and headed for the mission.

In an open space west of the church I found Señor Hernandez watching a fascinating scene. A dozen children frolicked on all fours, occasionally bleating and butting each other. Some even nibbled on the sparse grass.

From behind a tree an older man—also on hands and feet—approached in the stealthy manner of a jungle cat. His skin was darkened and painted over with white circles.

"Jaguar" Treed by Borrados

I looked inquiringly at Señor Hernandez.

"This is pure theater," he said. "The boys have assumed the role of lambs, and the man is a jaguar. It is the Coras' way of teaching their youngsters how to care for valued animals. They make the children experience the dangers to which the lambs are exposed. And, of course, since today is Good Friday, the powers of evil are still at large."

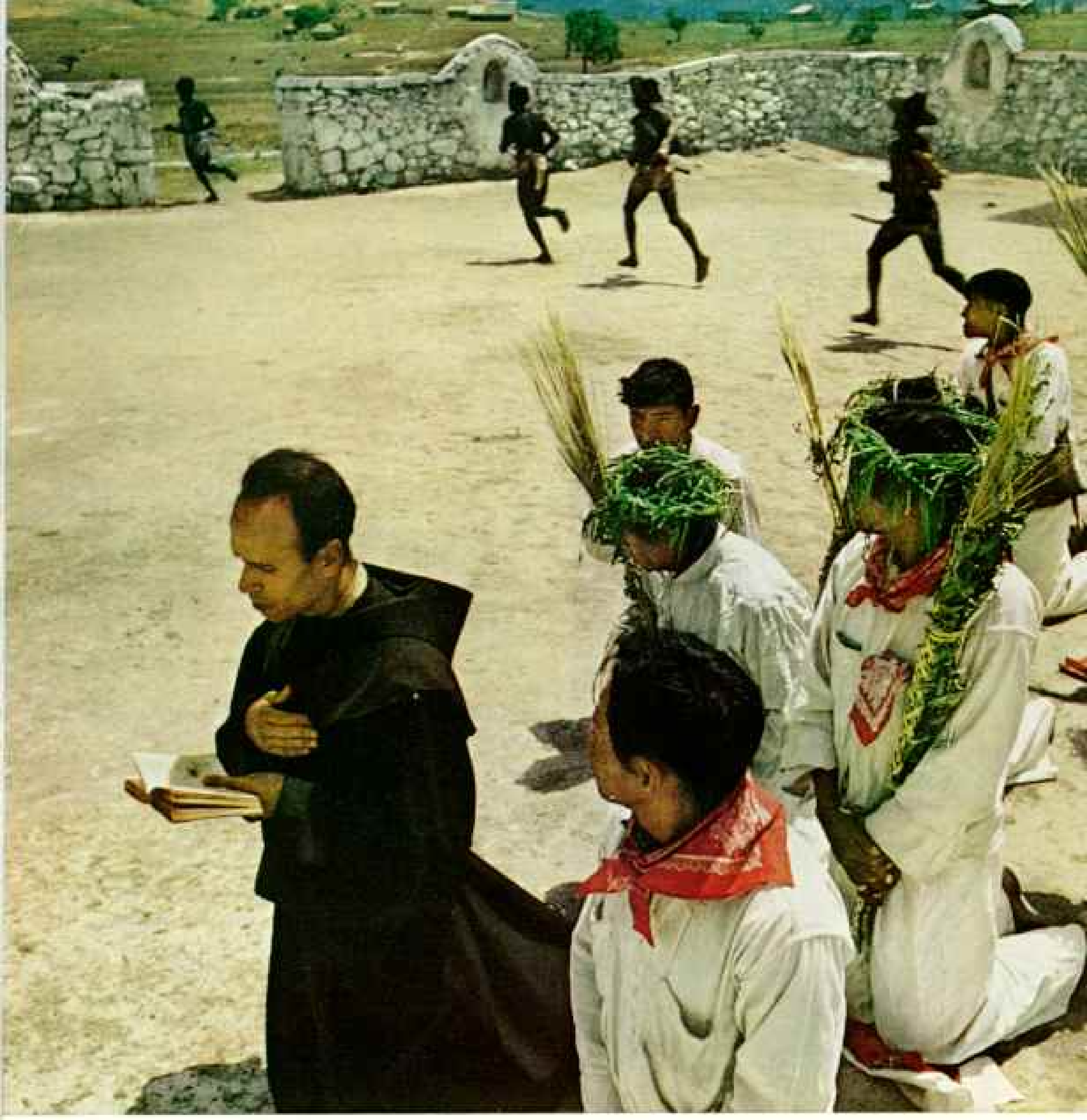
The "jaguar" leaped on the bleating "lambs" and pretended to kill them, one by one. Then he slunk off lazily, licking his chops. Next, several borrados ran out, flapping large blankets like wings. These were "buzzards," come to feast on the flesh of the slain lambs.

Two "shepherds" who had been feigning sleep all the while now awoke and called for help from the borrados. A group of borrados chased the jaguar three times—as they had done with the young Jesus. The fourth time, they caught him as he climbed up a tree, and carried him off.

The outdoor performance ended thus, and we walked to the church, where many Coras were gathering. The men now wore brightly colored shirts with their white trousers, the women full blouses and long coarse cotton skirts. The babies had their hair done up in bright ribbons.

Inside the church the women were grooming the boy who had played the role of Jesus. Then the men, joined by the borrados, brought him out to the courtyard and stood with him before the large stone cross. This was the simulation of Christ's Crucifixion. It seemed to me a curiously quiet bit of symbolism, considering the wild behavior that had preceded it.

Next day was Holy Saturday, and the Indians would celebrate Christ's Resurrection at noon. In the morning, however, the



borrados were still in charge, still running through and around the village. Later they gathered all the burros they could find, mounted them, facing backward, and raced them with great whoops of laughter (preceding pages). Señor Hernandez told me this indicated that the world remained "upside down"—that the powers of evil still ruled.

After the donkey races were finished, the village governor arrived on horseback. Now he would enact the role of the Centurion, who would destroy the evil ones in the name of the resurrected Christ.

The church bells pealed, and the Centurion rode among the borrados, breaking their long bamboo spears. The borrados fell writhing to the ground, pretending to have been smitten by the Centurion's huge wooden saber. Evil had been conquered and the doors of heaven had opened.

The borrados now got up and marched off to the stream for their ritual purification bath. For the first time they were orderly and silent. Near the church all was mirth and happiness. The children played among the broken spears. The older men conversed and smoked corn-leaf cigarettes. The women laughed among themselves and commented on the defeat of the borrados.

Holy Week was over in Mesa del Nayar. □

Luminous dawn breaks over Mesa del Nayar's whitewashed church, built in the early 18th century, when Jesuit missionaries ministered to the Coras.

Undistracted by a band of borrados yelping through the churchyard, Father Pascual prays at the Stations of the Cross with villagers portraying the Apostles. Thorny crowns and braided palm-leaf maces symbolize those thrust at Jesus by Roman soldiers mocking him as "King of the Jews." Until Father Pascual's arrival in 1969, the village had been without a priest since the 1760's. A year passed before the Indians let him perform services during Holy Week.

Defeat of the evil ones comes with Christ's Resurrection, as Holy Week reaches its climax. The borrados, after reigning as the powers of darkness, writhe in simulated agony as good finally prevails.

ВОЗНЕСЕНИЕ ИИСУСА ХРИСТОВА (ТОП) © В.Е.Б.

FRANCE'S PALACE OF THE ARTS

THE LOUVRE

By HEREWARD LESTER COOKE, JR., Ph.D.

CURATOR OF PAINTING, THE NATIONAL GALLERY OF ART
SMITHSONIAN INSTITUTION

THE WORLD'S greatest treasury of art sprawls in the heart of Paris like a gigantic letter A.

This is the Louvre, where the care of art has long been recognized as a national responsibility and the enjoyment of it as an unalienable right of every man. It is a museum that holds impressive records: First in works of art generally regarded as masterpieces—sculpture, paintings, and other objects that since the dawn of history man has fashioned to reflect beauty; first in archeological expeditions sponsored, research published, educational programs offered, and numbers of scholars trained (in its famed École du Louvre).

Supported by taxes, owned by the people, and open to the public, the Louvre stands at the administrative apex of more than 600 French museums—44 in Paris alone. With almost 3,000,000 visitors a year, the Louvre has no rivals among the museums of France.

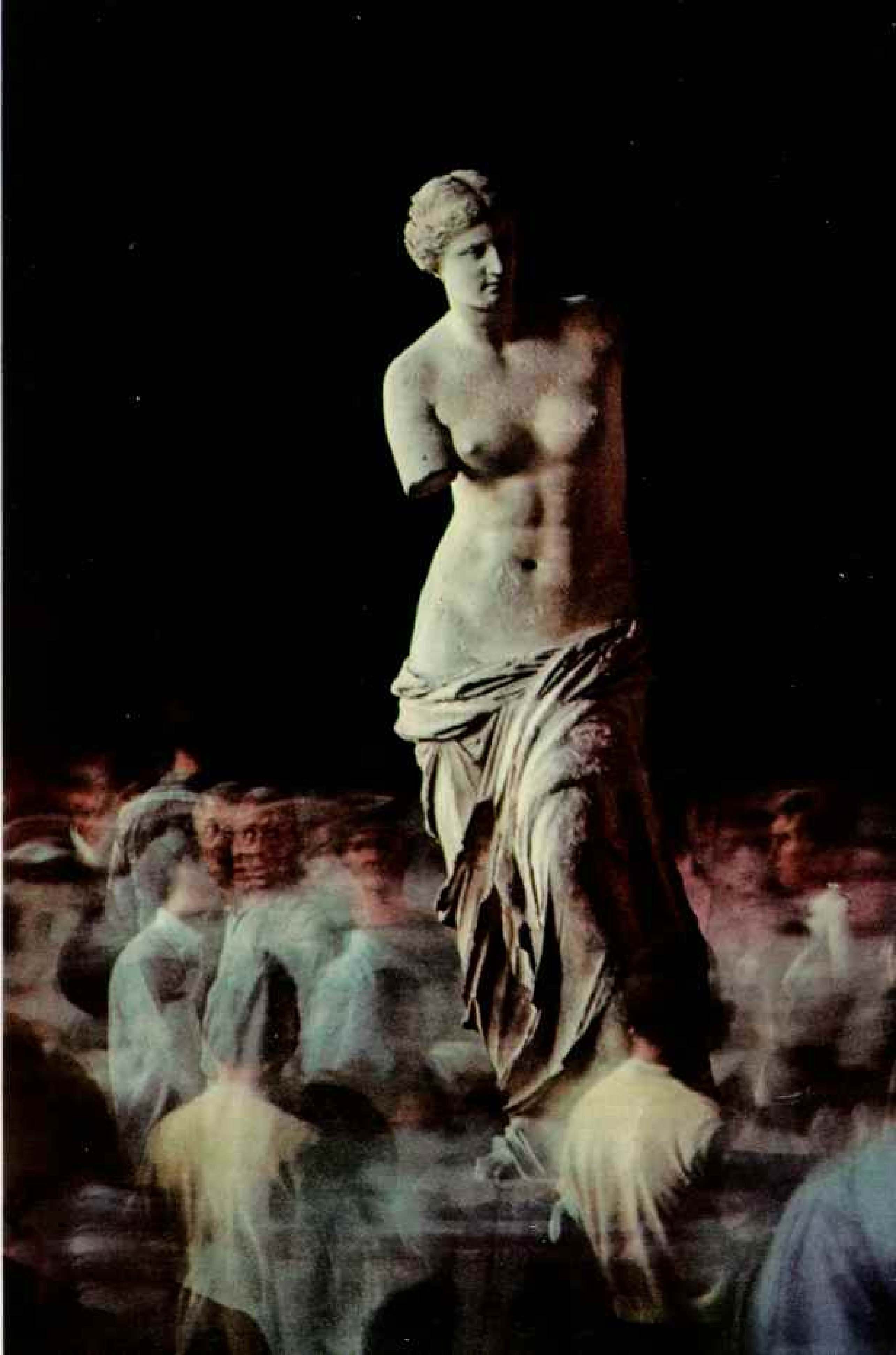
The most astounding statistic of all is that the Louvre now enjoys the happy prospect of doubling its exhibition areas without adding new buildings. Underway for the past several years, this miracle of expansion is possible because, though the collections are vast, the palace that houses them is even vaster.

The Louvre is one of the largest palaces ever built. One side stretches nearly half a mile along the Seine—longer than two Eiffel Towers laid end to end, TV antennas and all. The outer walls enclose an area of more than 40 acres, including gardens (see diagram, pages 798-800). To go through all the rooms would mean a walk of eight miles.

The seemingly endless façade is decorated with fluted columns, statues of heroes, sculptured ladies symbolizing skills and virtues, ornate chimneys, and fantastic water spouts (pages 804-805). All shelter immense flocks of pigeons, whose fluttering wings blend with the wings of cherubs and with graceful swags of stony fruit.

There are eight entrances. Seven are used mostly by scholars and students, who must show their passes to the guards. The eighth,

Art lovers pass in a blur of time before the eternally serene "Venus de Milo." Unearthed in 1820 on an Aegean island, the 2,100-year-old Grecian beauty found a permanent home in the Louvre, the vast Paris museum that shelters an incomparable collection of masterpieces.



in the Pavillon Denon, is used by most tourists. It faces a magnificent equestrian statue of the Marquis de Lafayette, a gift from school children of the United States.

The huge flagstones leading to the main entry support a horde of vendors who know well the buying habits of visitors. Postcards and ice cream rate high. There are also artists who, in vivid pastels, draw on the pavement more or less accurate renditions of the great masterpieces within, and folk singers with guitars who hope that a franc or two will land in their hats.

I stopped before some etchings propped on a bench. The 20-year-old artist said he was a Tunisian refugee attending the École des Beaux Arts across the Seine. "You'll see," he prophesied as I bought a print for 25 francs ($4.50). "Someday my work will be inside. . . . Pardon me," he added, hurriedly throwing a cloak over his exhibit as a policeman approached, "I must have a hawker's permit to sell my work here."

THE FIRST VIEW of the Louvre's interior is of a cavernous hall, which in fact was once a riding school. A century ago on rainy days the chargers of Napoleon III thundered over hurdles or high-stepped on a sawdust floor where I now bought my entrance ticket for three francs. Admission is free on Sundays, and on Tuesdays the Louvre is closed.

"Is Sunday then your busiest day?" I asked a blue-jacketed guard.

"Oh, yes, thousands come."

"How many?" I asked.

He shrugged: "On free days we don't have to count them."

My destination was a desk under a school bell, where I signed up for a tour at three francs. As a curator of the National Gallery of Art in Washington, D. C., I know how valuable museum tours can be.

I could have spent my money on a taped lecture in a little black box, but I chose a live tour in English. I might also have had one in Italian, Spanish, German, or Russian from one of some forty guides selected in nationwide competitions. I could have chosen any of 25 different lecture subjects, from ancient Egyptian sculpture to 19th-century Impressionist landscape painting.

Mine was a general tour, and when the school bell sounded I set out with a column of co-linguists at the heels of our guide. She

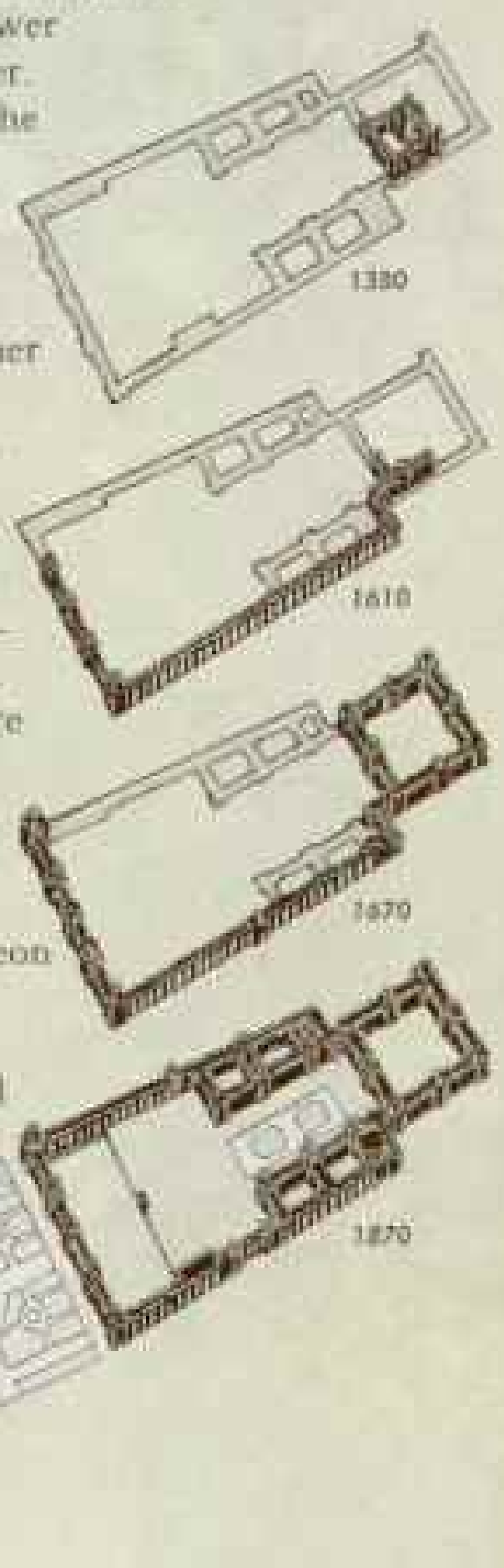
(Continued on page 804)

François I (above, attributed to Jean Clouet) ordered a major expansion of the Louvre in the 16th century after razing the original castle tower begun some 350 years earlier.

Charles V had enlarged the grim castle in the 14th century, attempting to transform it into a royal residence, but following his death it reverted to its former uses as a fortress, prison, arsenal, and treasure house.

The expansion fostered by François I continued under succeeding rulers, and by 1610 the long Seine-side wing had been erected. The Cour Carrée, the square at the east end, took form during the rule of Louis XIV, 1643-1715.

Enclosure of the great quadrilateral during Napoleon III's empire, 1852-1870, completed the Louvre. In 1871, however, a fire gutted the Tuileries Palace that connected the north and south wings.



THE LOUVRE

MAJESTIC both in size and content, the Louvre—extending for nearly half a mile along the Seine—houses more great works and trains more scholars than any other art museum.

François I, patron of the arts who persuaded Leonardo da Vinci to move to France, formed the nucleus of the Louvre's treasury with his collection of works by Italian Renaissance masters. Louis XIV, the next great royal collector, added hundreds of European paintings.

Eager to increase France's art collections, Napoleon Bonaparte funneled the spoils of his conquests to the nation's museums, including the Louvre. His enemies later reclaimed 5,233 items, but many others remained.

Now closed to the public, the north, east, and west wings of the Cour Carrée's top floor will house northern European paintings.

NORTH

PAVILLON DE MARENGO

RUE DU LOUVRE

LA COLONNADE

MINISTRY OF FINANCE

RUE DE RIVOLI

COUR CARRÉE

PAVILLON DE L'HORLOGE

PAVILLON SULLY

SALLE DES CARYATIDES

PAVILLON DE ROHAN

MUSEUM OF DECORATIVE ARTS

LAFAYETTE MONUMENT

PAVILLON DARU

PAVILLON DES ARTS

PAVILLON TURGOT

PAVILLON DU ROI

PAVILLON DE MARSAN

PAVILLON DENON

GALERIE D'APOLLON

PLACE DU CARROUSEL

PAVILLON MOLLIEN

ARC DE TRIOMPHE DU CARROUSEL

PORTE BARBET DE JOUY

QUAI DU LOUVRE

PONT DES ARTS

PAVILLON DES ÉTATS

JARDIN DES TUILERIES

AVENUE DU GÉNÉRAL LEMONNIER

PORTE DE LA TRÉMOILLE

QUAI DES TUILERIES

RESEARCH LABORATORY

DEPARTMENT OF DRAWINGS

PAVILLON DE FLORE

PONT DU CARROUSEL

SEINE

KEY TO COLLECTIONS OF THE LOUVRE MUSEUM

- Greek and Roman antiquities
- Egyptian antiquities
- Oriental antiquities
- Sculptures
- Works of art and furniture
- Paintings and drawings

SCALE IN FEET

DRAWN BY SHERMAN STEPANOFF

800

GHOSTS OF KINGS and angry rebels mingle with tourists and copyists in the enormous Grande Galerie, the largest of the Louvre's more than 200 exhibit rooms. Here, in the 1840's, King Louis-Philippe chugged about on his model train. Here, too, rebellious soldiers bivouacked in 1848, their flickering camp stoves endangering precious works of art. French and Italian masterpieces now hang in the 900-foot-long hall.

Gardens frocked in autumn finery brighten the setting for the Louvre, whose walls gleam after a recent scouring. These buildings embody more than 300 years of French architecture, from 16th-century Renaissance to Napoleon III's favored "wedding-cake"

led us first to a pure-white marble goddess at the end of a long gallery.

"Venus de Milo" ranks high among the world's famous women, symbolizing in her strong yet graceful body a perfection every mortal longs for, yet none can attain (page 797). When she was carved, or for what purpose, or by whom, we do not know. Scholars surmise that she is a work of the late second century B.C., but the first record of her is in 1820, when a peasant named Yorgos, working in his fields on the Aegean island of Melos, dislodged a boulder and peered into an underground chamber. There he saw what was to become the world's most famous ancient Greek statue, lying broken.

Yorgos knew it was the custom to turn over archeological treasure-troves to the Turkish overlords. Still, he tried to hide the lovely marble in his barn. But it was taken from him and loaded onto a Turkish sailing vessel for shipment to the sultan's capital.

The Turks had reckoned without the zeal of local French agents. A French man-of-war dropped anchor off Melos, and the statue was transferred from the Turkish vessel to the French frigate. To this day no one knows for sure how it happened. French authorities maintain the statue was purchased in a perfectly normal manner. In any case, Venus sailed for France. The Turkish administrator was publicly whipped for allowing such a treasure to slip through his fingers, and in Paris a medal was struck to commemorate the great moment when the long-lost beauty was presented to King Louis XVIII.

The Louvre authorities of that day agreed that the missing arms of the "Venus de Milo" should be restored. They tried on plaster arms in all conceivable positions—carrying robes,

style, reflected in the façade of the Ministry of Finance, left. The Louvre, which in 1793 opened its doors to the public, will eventually almost double its exhibition space by taking over the Finance wing. Scaffolding lattices a section undergoing routine repair.

apples, and lamps, or just pointing here and there. None looked quite right. Finally the king, tired of having to judge the difficult problem, decreed that "the work of no other sculptor must ever mar her beauty." This precedent had worldwide repercussions. From then on, classical works of art which had hitherto been patched, polished, and rebuilt like wrecked automobiles were left practically as they were found.

As we stood before Venus, one of my tour companions spoke up. "What's she worth?"

The guide gestured impatiently.

"Well, what's she insured for?"

"Sir," said the guide, "she is not insured at all. None of our masterpieces are insured. They are priceless."

Our next highlight, the winged "Victory of Samothrace," seemed to be soaring from the head of a majestic flight of marble stairs (page 811). This wonderful statue, our guide explained, also came from an island in the Aegean, and again a French official was responsible. Government agents in the free-booting days of 19th-century art collecting were expected to act as treasure scouts, and M. Charles Champoiseau, French consul at Edirne (Adrianople), was both alert and lucky. His hobby was archeology, and he himself found the Victory, headless and in 118 fragments, on a lonely hillside of Samothrace. At the Louvre the statue was put together.

IN CONTRAST TO THE MYSTERY of the "Venus de Milo," there is reasonable certainty of the appearance of Victory's missing parts, for a Greek coin struck in the name of Demetrius Poliorcetes, a Macedonian king early in the third century B.C., shows a similar figure holding aloft a

trumpet in the right hand and a standard in the left.

But still nobody knows what great triumph the fiercely proud, wind-swept figure commemorates, or what bloodshed, valor, prizes, and enslavements. All we can be sure of, after 21 centuries, is that the marble still expresses a paean of fierce pride, a tribute to the courage and skill that lead valiant men to victory.

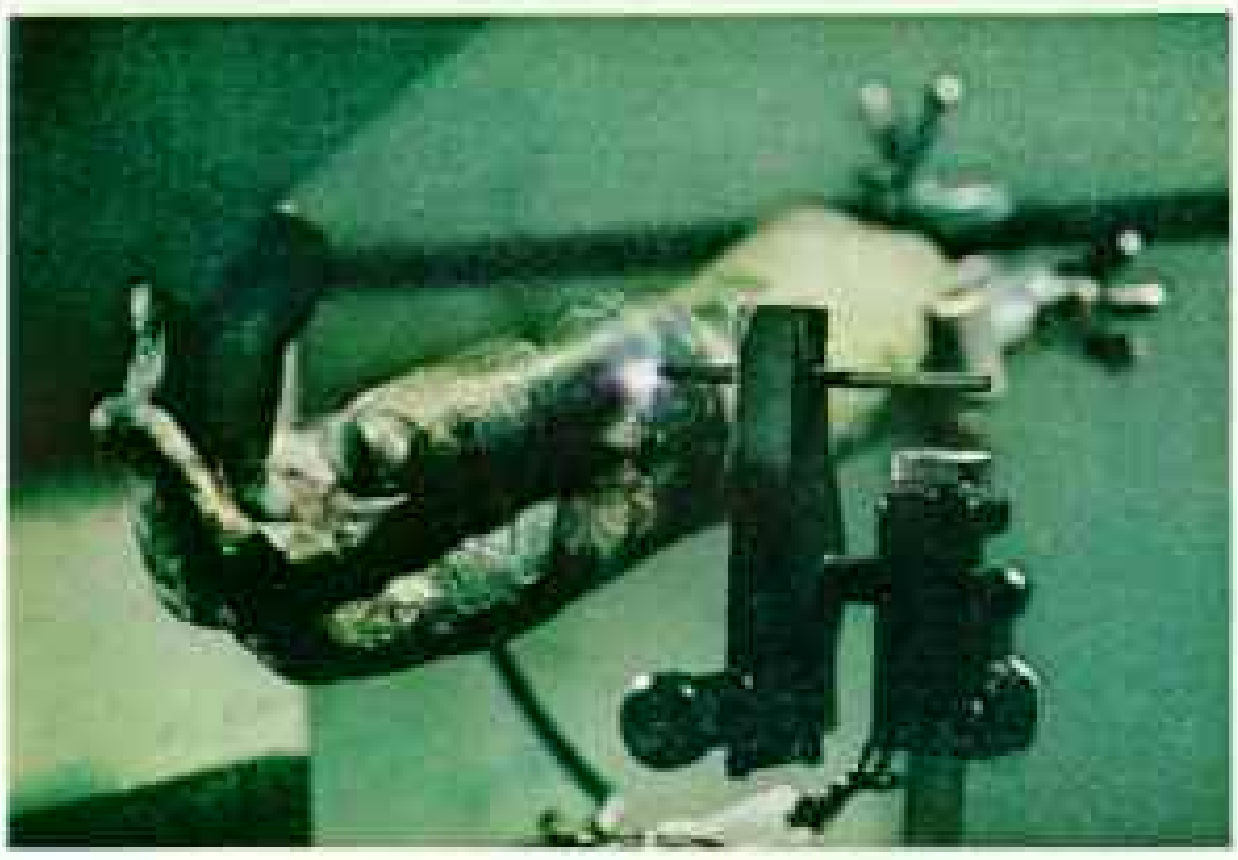
THE LOUVRE'S vast collection of Greek and Roman antiquities encompasses more than 20,000 objects: coins, jewelry, and an array of gods, goddesses, warriors, senators, and horses—in marble, bronze, clay, and mosaic. Installed in 37 galleries, the cream of this vast crop alone would rank the Louvre among the foremost museums in the world. Yet it is only a prelude. More precisely, it is merely one department. The Louvre has six others.

The Department of Egyptian Antiquities (pages 822-3) emerged from the booty of exotic statues, mummies, and artifacts sent back to Paris by Napoleon's agents in the wake of his conquering armies. The visitor enters the Egyptian section through a darkened sunken tunnel. From the depths of a cavern a monumental red sphinx smiles. Opposite, the graven image of a long-dead pharaoh, arms crossed, stares through the sphinx with shining mother-of-pearl eyes.

In the brightly lighted main Egyptian galleries, the forbidding atmosphere of sphinx and pharaoh fades quickly away. Thanks to the ancient Egyptian passion for creating facsimiles of almost everything that

Lustrous as a jewel, "The Madonna of Chancellor Rolin" shows the 15th-century Burgundian praying before the Virgin. Flemish master Jan van Eyck achieved the luminous effect by brushing newly developed oil paints over traditional egg tempera.

The painting, in the opinion of author Lester Cooke, is among the finest in the Louvre's collection of more than 300 Flemish works.



Wedding of art and science unlocks the past in the Louvre's research laboratory. Technicians trying to trace the origin of a Greek statue's bronze hand use spectroanalysis, measuring wavelengths of light, to determine its precise metallic content.

Nicknamed "the witch doctor" by Louvre colleagues because of her many technological discoveries, Mme Madeleine Hours finds from X-rays of Rembrandt's "Bathsheba" that the artist had gradually lowered the head, evoking a more contemplative mood.

First Lady of the Louvre, the ever-enigmatic "Mona Lisa" is taken from the wall for an annual check of her condition and for cleaning of the frame's glass.

The artist, Leonardo da Vinci, dearly cherished this portrait, with its gentle emphasis on womankind's intellectual and emotional sensitivity. Executed between 1503 and 1506, it accompanied him in all his travels—even when he moved from Italy to France in 1516.

made life pleasant here on earth, then placing them in tombs for the use of the dead in the next world, we can reconstruct everyday life along the Nile down to the smallest detail.

Those Egyptians were not so unlike us. The spoons for eating honey, the delicate applicators for eye makeup, the dice, all were very much like those sold in today's department stores. The affectionate gesture of Mersankh, wife of the civil servant Raherka, as she puts her arm around her husband, is as tender today as when the sculptor first shaped his creation 4,500 years ago.

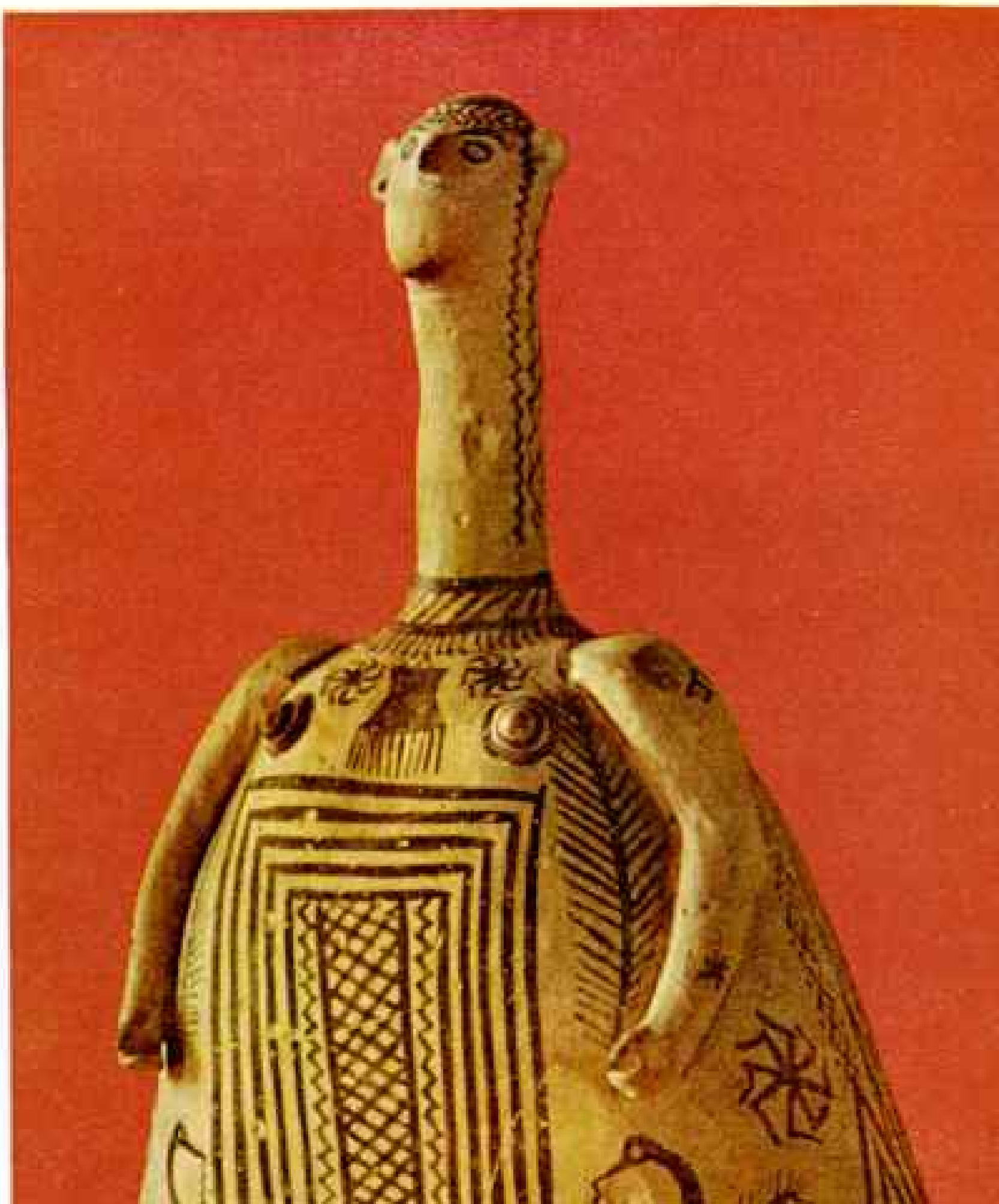
Threading through some of the 26 rooms and 7,500 exhibits in the Egyptian section, I entered the narrow doorway of a mastaba, or tomb, and looked around at the delicately incised reliefs of livestock, servants, boats, hippopotamuses, and game birds which a long-departed high official had owned. I was not the only viewer impelled to make a comparison with our own lives. "I wonder," sighed a compatriot as she squeezed through the tomb doorway, "if all those dancing girls really had such wonderfully slim figures."

The marvels of the Louvre's other departments are also on the grandest scale. Oriental Antiquities re-creates the ancient life of the Near East, especially in the Tigris-Euphrates Valley, with 3,000 objects in 24 galleries. Objets d'Art, in 43 paneled, draped, and gilded galleries, displays an unbelievable assortment

THE LOUVRE MIRRORS MAN'S CHANGING

Essence of woman, this 10½-inch marble idol (above) dates from the third millennium B.C. The symbol of fertility, found on the Aegean island of Paros, exemplifies the excellence of the Louvre's Departments of Oriental, Egyptian, and Greek and Roman Antiquities. Such early stylized figurines inspired modern artist Amedeo Modigliani.

Long-necked idol, dangling movable legs under her bell-shaped tunic, probably hung by a nail through her head in a 700 B.C. grave. The 15⅞-inch clay tomb protector came from the hands of an artist in Boeotia, Greece.



PHOTOGRAPHED BY EDDY VAN DER VEEN, EXCEPT "VICTORY OF SAMOTHRACE" BY BRUCE DALE

IMAGE OF HIMSELF THROUGH MILLENNIUMS

Handmaiden of the dead, a graceful Egyptian from a tomb in Asyut bears a leg of beef on a tray and a vase for libation. Anticipating a pleasure-filled life after death, ancient Egyptians took symbols of food and possessions with them to the grave. This 41-inch painted wood carving reflects fashions of 2000 B.C., the dress is patterned to resemble the embroidered linen of the time.

Greek ideal of beauty stands perfected in the monumental winged "Victory of Samothrace." An unknown sculptor of the second century B.C. captured the sense of movement as the goddess alights. Drapery clings as if wet, accentuating the figure's motion. Such achievement reflects ancient Greek belief that the human body is the ideal of artistic expression. Other Greek and Roman treasures in the Louvre, many of them uncovered by archeological excavations in the 19th century, include Greek vases showing battle scenes, Roman jewelry, and portrait busts.

Medieval mysticism permeates "Saint Stephen," an 18-inch gilded wood statuette carved in France. The first Christian martyr, he holds rocks symbolizing his death by stoning. For 1,000 years after the fall of Rome, European art served its major patron, the Roman Catholic Church, as a means of teaching Christian ideals.

HENRY BEVILLE

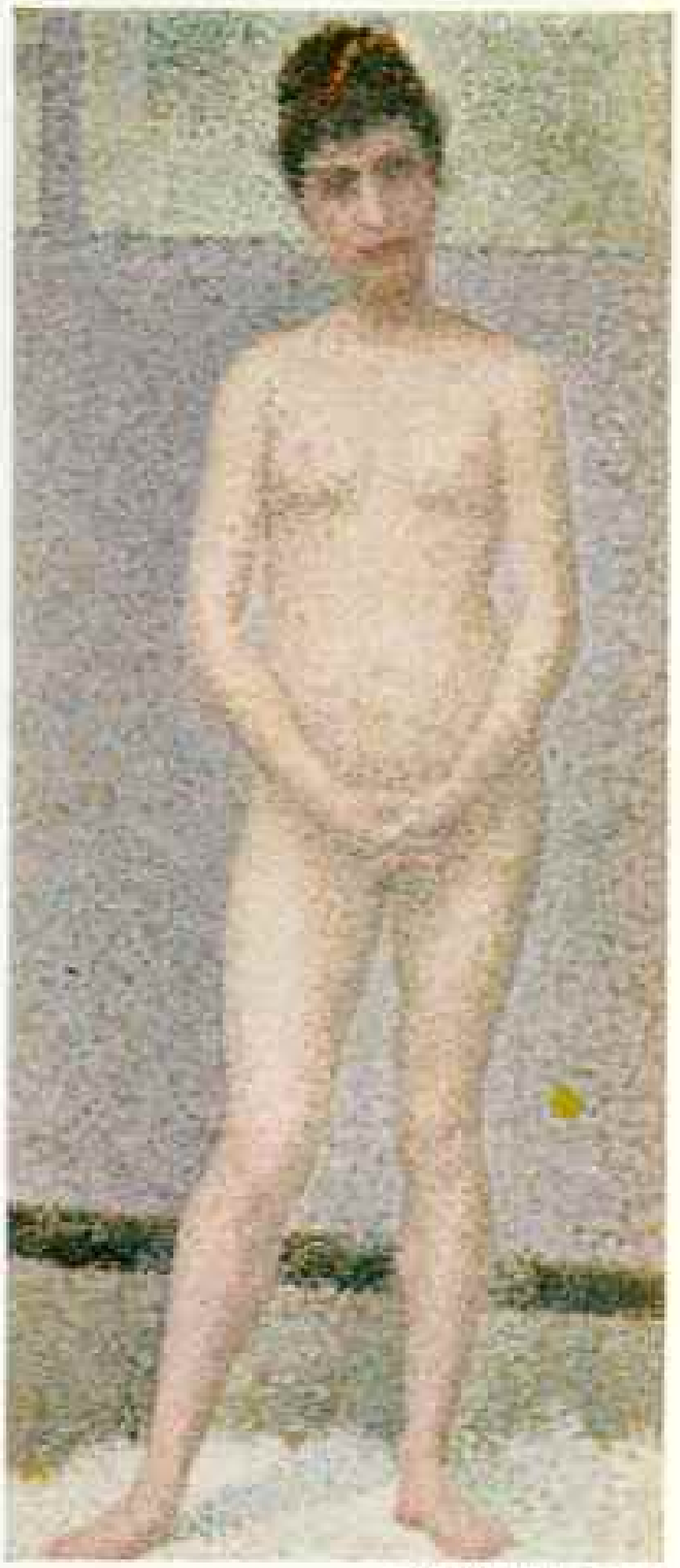
Antiquity reborn: When 15th-century Italian Andrea Mantegna painted "Saint Sebastian," he portrayed the Christian martyr as a Greek statue bound to a column. Renaissance artists, spurred by discoveries of classical sculpture, re-emphasized the body, but added landscapes in true perspective. This work came to France in 1481.

HENRY BEVILLE

With royal egotism, Louis XIV, the Sun King, raises his ermine cape to reveal shapely legs, of which he was inordinately proud. Court artist Hyacinthe Rigaud painted the 63-year-old monarch in 1701; the sword now rests in the museum's Galerie d'Apollon, treasure room of the kings of France.

GIRAUDON

"A new authentically French style of art"—thus poet Stéphane Mallarmé hailed the works of Édouard Manet, who painted "The Fifer" in 1866. But others grumbled. "Flat as playing cards," said artist Gustave Courbet. Manet copied old masters in the Louvre, but he ignored modeling and perspective to concentrate on harmonizing large patches of color. With the recently invented camera capturing reality, subject matter became less important than color and light. The Louvre's Impressionist museum, the Jeu de Paume, contains works by Manet and his contemporaries.



LA PHOTOTHÈQUE © N.G.S.

With myriad dots of color, Georges Seurat boldly portrayed a nude in a new way. Instead of blending paints on his palette, he counted on the viewer's eye to mix the tones in this pointillist painting of 1887. Seurat sold only two of his pictures before he died at 31. But, says a former Louvre curator, he "pinned down the passing moment and made it eternal."

of things of beauty made by master craftsmen—ranging from a 12th-century ivory chess pawn small as my thumb to Louis XVIII's truly king-size bed. The Department of Drawings has more than 92,000 drawings, pastels, watercolors, and thumbnail sketches stashed away in long rows of steel boxes behind fireproof walls; the public sees a sampling of these in a rotating exhibit. Sculpture displays statuary from the Middle Ages and the Renaissance, including masterpieces of Benvenuto Cellini and Michelangelo.

BUT, SURPASSING ALL THESE in fame, because it is what most people think of when the word Louvre is mentioned, is the Department of Paintings. Here in 50 galleries—15 devoted to French art—about 3,000 paintings are on display. Of all places on earth this is painting's Hall of Fame: Raphael, Titian, Watteau, Poussin, Rubens, and Rembrandt jostle each other, vying for the spectator's eye.

With all this to see, there are also guide services in French, but few Frenchmen take them.

"I don't need a guide in my own home," explained a mustachioed Parisian in a beret. "When I come to the Louvre I know exactly what I want to see. I come to compare something I've bought in the Flea Market with the things here." He eyed me appraisingly.

"I've seen you admire those little Persian vases," he went on. "I happen to have one just like that. In case you are interested, here's my card."

But it is not only the art dealers who don't need to be told what to see. A guard informed me that parents in search of lost boys do well to head for "Saint Sebastian," by 15th-century Paduan master Mantegna. I saw a small boy silently counting the arrows that pierced the body of this early Christian martyr (opposite). He counted over and over, while his mother grew impatient. There were ten arrows, four of them dripping blood.

No matter what one's favorite, almost every visitor drifting along with the crowd eventually finds himself before a face he has known all his life. Standing in front of Leonardo da Vinci's "Mona Lisa," I was one of a continuous procession. I was glad to see that no one seemed disappointed, for no reproduction of the painting can fully convey the transparency of the colors, the infinitely subtle gradations of the modeling, or the magic of her spell.*

Tradition holds that musicians, singers, jugglers, and clowns performed in the studio to amuse the model and provoke the enigmatic smile. But however it was produced, Leonardo gave it a deeper meaning. To me, the "Mona Lisa" is a pioneer of women's rights. Feminine beauty since the dawn of time has inspired artists, but before Leonardo painters or sculptors sought to reveal almost invariably the appeal of woman's physical beauty. By hinting at the depths of thought and tempered emotions, Leonardo presented woman as the intellectual equal of man, a concept that began to change her status in the eyes of artists (page 809).

The paintings of the Louvre have been celebrated for

*See "Escorting Mona Lisa to America," by Edward T. Folliard, NATIONAL GEOGRAPHIC, June 1963.

centuries; the magnitude of its sculpture collection has only recently been demonstrated. In 1970 the art world was stunned when the new sculpture galleries were opened. Great masterpieces in marble, bronze, and wood lined 23 split-level galleries stretching along the Seine. Many had been hidden away in the *réserves*, or storage depots, and some had not been exhibited within memory. The art world had forgotten that the Louvre had the best. Great works of genius from the 11th to the early 20th century stood in beautifully lighted exhibition areas specially designed for each piece.

MONUMENTAL SCULPTURE seems the most indestructible form of art, and yet when danger threatens, it cannot be spirited away. I saw some grim examples of the ills to which sculpture is heir. A long row of headless saints from the tympanum of a Romanesque church bears testimony to the blind rage of revolutionary mobs of the 1790's. The crumbling surface of Carpeaux's great stone composition, "The Dance," finished in 1869 and rescued from the façade of the Paris Opéra in 1964, reveals how rapidly ice, wind, and pollution-laden air can corrode.

One of the two great bronze lionesses by the sculptor Auguste Cain, crouching outside the Jaujard entrance to the Louvre, is mute witness to a hairbreadth escape when the juggernaut of World War II rolled through the grounds. A high-velocity bullet drilled the noble beast. I sighted through the neat round hole and saw rows of tulips.

"Over there," the guardian explained, pointing to the flowers of the Jardin des Tuileries, "was a blockhouse and a parking area for tanks. Hitler had ordered the burning of Paris, including all its principal buildings. . . . Those times were not gay," he added, patting the punctured lioness with affection. "We were lucky not to have more damage."

Leaving the lionesses, I followed the Parisian custom of seeking a secluded spot for a midday alfresco meal, where I might munch reflectively on freshly baked bread and pungent Camembert cheese. The place I liked best was a park bench under the spreading chestnut trees beside the Seine. This waterfront has long been known as the cheapest hotel in Paris. Groups of students, hobos, and waifs camp, talk, sing, and sleep under the archways.

I noticed a bearded hippie in a faded U. S. Army jacket thumbing through a tattered guidebook to the Louvre.

"Which section do you like best?" I asked him.

"The Impressionists," he answered promptly. "They didn't have any money either; all they do is show us how beautiful the world about us really is. They don't try to give us lectures about history and such—they're groovy."

The Impressionists and their contemporaries, not all of whom were quite destitute, now have a building to themselves, standing apart in the Tuileries—the Jeu de Paume, where courtiers of the 18th century had played a kind of tennis. History must smile looking down on the long queues of visitors waiting to pay their three francs to see the Impressionists. Two generations ago the Louvre's acquisition committee had refused to accept gifts of works by these

Grime, time's dirty legacy, disappears from the façade of the Pavillon Sully under the gentle brush strokes of a raincoat-clad workman.

Before the scouring began in 1962, cleaners tested steam, abrasives, chemicals, and pressurized water. Nothing worked as well as brushing a section after water had flowed over it for 24 hours. The Pavillon de l'Horloge in the Cour Carrée (right) illustrates an early stage of the transformation.

ILLUSTRATIONS BY BRUCE SALT JANSEN AND ART LAWSON © N.G.S.

Wardrobe aglitter with ornamentation reveals the elegant detail that French furniture makers achieved during the reign of Louis XIV, 1643-1715. The distinctive designs fostered in France dominated continental Europe for 150 years.

Crafted in the Louvre's workshops by the king's cabinetmaker, André-Charles Boulle, the ebony cupboard features inlaid tortoise shell, copper, and pewter, with gilt-bronze appliqués on its doors.

Boulle, working in the style of painter Charles Le Brun, expressed hunting, fishing, and farming motifs by the use of pistols, horns, oars, nets, and garden tools.

same artists. Today the Jeu de Paume's scintillating display of Impressionist art is second to none.

As I savored my lunch, I wondered what the scene around me had been like when the first Louvre was built, eight centuries ago.

Across the river—on the Left Bank, where the chimney pots of Paris now loom—there were then only vineyards. Where I sat, fields of grain grew. Where the Louvre stands, King Philippe-Auguste in the 1190's built a square fortress. From its center rose a round tower with grim battlements overlooking all the buildings of Paris, including the rising walls of Notre Dame Cathedral.

After more than 150 years as a bastion, the Louvre became simply a royal residence. In 1415, when English bowmen skewered the pride of French knighthood at the Battle of Agincourt, the victors looted the palace. It crumbled into ruins, and not until a century later did a royal master again interest himself in its fate.

This king, François I, ordered the great tower razed. The only trace of it today is a circle of stones inlaid into the Cour Carrée, or Square Courtyard, serving the gamins of Paris as boundaries for their "futbal."

François commissioned the most talented French architect of the day, Pierre Lescot, and the sculptor Jean Goujon to create a new Louvre, a gem of Renaissance design. Thus in 1546 began the making of the Louvre as it now stands, and Lescot's original façade can be seen in the Cour Carrée.

MY PICNIC FINISHED, I mingled with the visitors ascending the great staircase to the upper halls. None of them seemed to know where they were going. To the uninitiated the Louvre may seem a royal rabbit warren of echoing hallways, worn marble steps, and dead ends. This blueprint of frustration is being corrected through expansion and more orderly floor plans.

For almost a hundred years lights burning far into the night have marked the domain of the Ministry of Finance, occupying more than a quarter of the Louvre's total area. Another large section was ceded to the Museum of Decorative Arts, a private organization that displays in supermarket fashion everything from Chinese carved rhinoceros horns to exquisite French porcelains.

Now the Ministry of Finance yearns for more-modern office space, and the curators of the Louvre joyfully anticipate possessing the tax collectors' wing, which almost matches their own part, as well as a portion of the Decorative Arts wing, and some attic space.

"And how long will all this reorganization take?" I asked Louvre Director M. André Parrot, whose strong hands and sunburned skin bore evidence of his many years of archeological work in Mesopotamia.

"We will never finish," he replied. "No one can foretell what new treasures will come to the Louvre or what future generations will want to see. I was appointed director," he continued, "as the result of a gentlemanly discussion among the senior curators as to the best plan for improving our museum. A plan I proposed won acceptance, and it is now being carried out."

As a first step, part of the long wing stretching along the Seine has been ceded by the tax collectors, and this space is being converted to house paintings, drawings, and sculpture. Workmen are also digging new cellars to enlarge the crammed réserves. Until recently there were more than 1,200 reserve pictures in the Department of Paintings alone.

WHEN 700 PAINTINGS from the réserves were put on exhibition in 1960, the art world gasped. Superlative paintings, including seven Rembrandts, that would be prestige items in any lesser museum had been stored for years. In spacious new galleries most of those long-hidden masterpieces are again on public view.

M. Parrot is not overimpressed with his achievement. As we talked in his office, his eyes rested on a lovely landscape by Impressionist Alfred Sisley, propped on a stack of papers. "We museum directors dream of ideal settings for our exhibits," he said, "but a great work of art creates its own museum. It makes a magic circle into which you enter. Inside, it reaches out, and—how shall I say?—embraces you, and will not let you look to left or right. Luckily"—he smiled at the thought—"I have many such beautiful tyrants."

One morning I was privileged to visit a part of the Louvre the public never sees. With a guard at my side, I threaded sepulchral corridors studded by "*Passage Interdit*" signs, and at last entered the Service de Restauration.

A painting, like a person, has a life span; pigments fade, varnish cracks, and canvas rots. A particularly vulnerable part of most paintings is the linen-canvas base. Flax dries and crumbles, and without fresh support the paint it holds will flake off. Louvre technicians

were among the first to perfect the incredible operation of transferring old masters to new canvas.

I watched with excitement as men in spotless white wheeled a patient into the bright light of the operating room. They had covered the painting with special paper, held on with wheat-flour paste so that not the tiniest sliver of surface paint could move. They laid the ailing picture face down on the operating table. Painstakingly wielding scalpels and tweezers, they flayed the canvas thread by thread—unwove it, so to speak—from the back.

Then they applied new fabric and fastened it with an adhesive. Turning the patient over, they gently dissolved the paper from the surface with a mixture of liquids, and *voilà*—the old master had a new lease on life. The same technique is used, with variations, for paintings on rotting wood or even on crumbling plaster walls.*

TO REPLACE SECTIONS of the paint surface is a still more delicate procedure.

"It is like operating on the eye of a person you love," said M. Jean-Gabriel Goulinat, chief restorer, now in honored retirement, but still the final court of appeal when difficult decisions must be made. In the lapel of his smock he wore the rosette of a Commander of the Legion of Honor, one of the highest awards given by France, attesting to the importance of his work.

"For 11 years," he confided, "I refused to work on one painting by Watteau, even though I had been ordered to restore it. There was only a tinted varnish over the foreground. If I went too far, think of what might have been lost forever. A few years ago science provided me with new solvents and new microscopes, so I went ahead, but you can imagine how my heart was beating."

He continued, "We never allow our restorers to go beyond the last layer of varnish. Here you can see what we do."

M. Goulinat was working on a picture by Claude Lorrain that I had known from my childhood. Near the edge normally covered by the frame he pointed to a dark-green spot the size of a dime.

"This is the way the whole picture looked when I first worked on it 15 years ago. This," he said, pointing to another spot only slightly yellower than the surrounding area, "is

*Similar miracles of reclaiming old or damaged art were described in "Florence Rises From the Flood," by Joseph Judge in the July 1967 GEOGRAPHIC.

Stirring call to freedom, Eugène Delacroix's "Liberty Leading the People" commemorates street fighting that forced the abdication of King Charles X in 1830. The people of Paris rebelled after he had dismissed their representatives, curtailed freedom of the press, and drastically reduced the electorate. Liberty, portrayed as a classical figure brandishing the Revolution's tricolor, strides over realistic corpses near Notre Dame. The Romantic painter intended the contrast between idealism and reality as a shock that "opens up the secret paths of the soul."

Invisible to the eye, subtle alterations in François Perrier's "Acis and Galatea" are checked photographically under ultraviolet light (right).

Where flaking portions of the painting (lower left) have been touched up, the changes, under ultraviolet illumination, show as dark splotches (lower right), helping to bare a chronology of restoration. About a fifth of the Louvre's 5,000 paintings have been photographed in this fashion.

Museums throughout the world now use the method, pioneered by Louvre technicians, to study proffered art as well as their own collections.

The author considers ultraviolet photography an art museum's most valuable analytical tool.

EXTRACTED AND ADAPTED (BELOW RIGHT) BY ROBB MOULTIT © N.G.S.

$20

what the surface was like when I took some of the old varnish off last month. You see, we do not like to hurry here, and we want to be sure," he added with a chuckle.

In another part of the backstage area, I visited the research laboratory, installed in the Pavillon de Flore, at the end of the wing along the Seine. Its sloping roof encompasses the top five stories of a nine-story chateau. For almost a century this had been a ghost tower, with no heat, light, or water. The Finance Ministry used it as a vast filing cabinet and stuffed it with canceled checks.

Today it has been remodeled into a scientific laboratory dedicated to prolonging the lives of art works. Among the devices used is a unique climatization room that serves the same purpose as a decompression chamber for a deep-sea diver. Works from outlying provinces, where temperatures and humidity differ from those of Paris, are brought to the Louvre in sealed trucks and gradually acclimatized in the chamber. This treatment helps prevent wood cracks and dangerous fissures in canvas that can result from sudden changes of temperature and humidity.

X-RAY EQUIPMENT makes up an important section of the laboratory. Scars left by fires, floods, wars, vandals, and careless hands stand starkly out on the film. Questions of authorship are also often decided by studying the characteristic brushwork of an artist, revealed in luminous streaks by the penetrating rays.

Mme Madeleine Hours, who is the director of the research laboratory, achieved one of her most striking triumphs through the application of X-rays to several three-century-old works of Rembrandt. A classic example is his "Bathsheba."

A dozen X-rays, put together to cover all 21½ square feet of the painting, reveal numerous transformations made by Rembrandt as he improved his picture of the Biblical heroine. From one stage to another, we notice the shoulders becoming rounder, the waist slimmer, and the thighs more defined as draping is removed. At the same time Rembrandt eliminated detail, applying bolder and broader brushstrokes. Most intriguing is the changing position of the head. It moves lower and lower, making for a more contemplative pose.

"We can follow Rembrandt's innermost thoughts as he seeks just the right position," said Mme Hours.

Thanks to the scientific magic of her laboratory, we see Rembrandt at work (page 808).

Another day, while wandering with no fixed purpose, I wound up in the barrel-vaulted white room called the Salle des Caryatides. It is named for four 12-foot marble figures that support its minstrel gallery.

Sorting through my market bag of guidebooks, I realized that I had stumbled into the heart of the palace of François I. In this hall in 1558 the future King François II of France married the ill-fated Mary Queen of Scots. During the reign of Henri IV, four rebellious notables of Paris were hanged here.

BUT NOT ALL the past of the Salle des Caryatides has been grim. Charles IX held a pickpockets' ball here, inviting the light-fingered waifs of Paris to a state reception and ordering them to fleece the guests. They lifted jewels and 300 gold coins without arousing suspicion. Then they handed their spoils over to His Majesty, who returned everything to the astonished aristocrats.

As I sat on a marble bench, watching carefree visitors wander among the marble figures, I could imagine the glittering life this room had seen—the courtiers with their ostrich plumes and satin robes, their swords and silver buckles. Amid all this splendor, plumbing was virtually unknown. Once a year, when the cesspools were cleaned, the stench was so overpowering that the court would leave the palace for three weeks.

I wandered up flights of marble stairs and looked down into the Jardin de l'Infante.

"This is where the bird-hunting casement was," volunteered a guard.

Hunting in the Louvre? I had heard a story that the name Louvre derived from the Latin *lupara*, after the wolves hunted in this area, but that had been in the dim medieval past, and no one is certain of the origin. Yet this window's name supposedly derives from a different kind of hunt, and my spine chilled as the guide unfolded its tale of horror.

The same Charles who gave the lighthearted pickpockets' ball had quite another side to his nature. A Catholic, he suspected that his Protestant subjects—the Huguenots—were plotting against him. His reaction was terrible. On August 24, 1572, a shot rang out and the bell of the parish church began to toll.

This was the signal to herd the Protestant courtiers, including some of the king's most courageous knights, into the garden I saw below, and have them poniarded to death by the king's Swiss Guards.

"Across France more than 30,000 men, women, and children were killed in this massacre that started on St. Bartholomew's Day," said the guide. The king himself is supposed to have sat at the window here and shot his suspected enemies below as if they had been quail—but this is legendary embroidery on a deed already infamous enough.

OF THE OTHER RULERS who knew the Louvre as home, the most famous is Louis XIV, the Sun King, a key figure in the story of the Louvre's treasury of paintings as well as the most powerful European of his day (page 812). When Louis became king at 5 in 1643, the crown owned only 200 paintings. In 1710, near the end of his reign, the inventories listed 2,376. Realizing that a great art collection was a sure index of personal prestige, he let it be known that the shortest way to royal favor was to offer a valuable work of art. Many of his acquisitions now grace the Louvre.

The Sun King also decided to rebuild parts of the royal residence; with a sweep of his lace-frilled hand he decreed that the palace be extended to surround the Cour Carrée. To design the new façades, he appointed Claude Perrault, a physician, which outraged professional architects. However, Perrault's Colonnade, more than 550 feet long and

Ancient mysteries of early Nile civilizations spark the interest of scientists and tourists alike in the Louvre's Department of Egyptian Antiquities.

X-raying the weeping Isis, goddess of fertility and protectress of the dead (above), a laboratory technician discovered papyrus writings hidden in the base of the wooden statuette, dating from 525-333 B.C. Louvre scientists probably will not finish their studies of the writings until next year. X-rays of other Egyptian artifacts have disclosed skeletons of fish, cats, snakes, and—in one case—a human fetus hidden within.

Two seated priests (right), carved from limestone between 1320 and 1230 B.C., stare with unseeing eyes past a visitor examining a sarcophagus, identified by inscriptions as that of another priest.

ingeniously held together by iron bands in the manner of surgical clamps, still stands sound today. It also glows as brightly as when it was new, and that in itself is a new thing.

Over the centuries, the smog of Paris had shrouded the Louvre in grime. Recently, modern technology has been enlisted to restore the palace's pristine beauty. I watched as swabbers in oilskins washed away the dirt of the years with the aid of a noisy pump.

Previously the cleaners had tried everything: steam, abrasives, chemicals, and water under pressure. But the Louvre is made of many different kinds of stone—some quite soft and porous—and they did not dare use force. Finally they found that simply allowing water to flow gently over a section for 24 hours loosened the grime. Trained workmen then took over the gigantic task of actually scrubbing the two-and-a-half miles of Louvre walls. I watched them performing their miracle under cascades of water, with what looked like giant toothbrushes (page 815).

The transformation has been Cinderella-like. From the old familiar cocoon of rain-streaked soot, a honey-colored fantasy of delicate stonework has emerged to sparkle once more in the soft Parisian sunlight.

WE ARE FORTUNATE that so much of the Louvre has survived to be washed. For while Louis XIV was building at one end, the other end nearly burned down.

To celebrate the announcement of the queen's pregnancy, an extravaganza entitled

EXCLAMATIONS (ABOVE) BY BRUCE DALE; BOOMERANG BY ADAM WOOLFITT © N.G.S.

HENRY BEVILLE © N.G.S.

"One paints with the heart," said Jean-Baptiste Chardin, the Parisian noted for domestic scenes such as "The Grace," first exhibited in 1740. In contrast to the opulent allegories of court artists, he portrayed the interests of the middle class—family, religion, good manners, and good food. His emphasis on the commonplace recalls Dutch masters, such as Metsu (right). Chardin's brushwork is so subtle, the author notes, that some believe he applied the pigment with his thumbs.

Spirited city life of the 17th-century Dutch unfolds in the paintings of Gabriel Metsu. His "Vegetable Market at Amsterdam" portrays a wide range of subjects—a farmwoman with her wares, a modest housewife, and a fawning dandy. Metsu and his fellow painters catered to new patrons, the bourgeois, whose less-than-palatial houses demanded smaller canvases. Thus the artists earned the title the "little Dutch masters."

The Ballet of Impatience was planned in the royal apartments. A workman in charge of the stage settings fell asleep on the job, and his torch set fire to the hangings.

The flames spread rapidly, fanned by a high wind. Royal servants and a crowd formed a bucket brigade to the Seine. Still the fire gained. The Louvre seemed doomed.

The court assembled in church to pray. Contemporary accounts relate that during Mass the wind died down, and so did the flames. But some great treasures had perished.

THE SPECTER OF FIRE haunts the Louvre to this day. I could see why as I prowled the attics over the galleries. From the outside the roof appears a solid mass of slate and masonry, but the view from the catwalk and the perilous ladders on the inside tell a different story. Huge oak beams criss-cross the cobwebby clerestories, dry as kindling. They are now being replaced by steel and concrete—but the old oak will not be wasted; it will be made into picture frames.

To replace the gutted ruins, a new and splendid hall was built, named after the god Apollo and now the depository of the coronation regalia of the kings of France. Even the smallest detail of the gilded woodwork was designed by the favorite court painter of Louis XIV, Charles Le Brun.

Here I marveled at Charlemagne's sword and at the Regent Diamond, one of the world's storied gems. It weighs 140.5 carats, more than three times as much as the Hope Diamond. It is as big as a half dollar.

Louis XIV, who spent a king's ransom to make the Louvre a wonder of the world, nearly signed its death warrant when he decided to build another palace in the marshlands near Versailles. The king moved his court there in 1678, taking his art collections and leaving a vacuum at the Louvre. It was quickly filled.

The space below the Grande Galerie had long served as studios and workshops for sculptors, painters, engravers, goldsmiths, clockmakers, and gem cutters. (On a recent tour there I saw plumbers, electricians, masons, carpenters, and smiths—all busy with unending chores of maintenance.) From these stony bowels of the Louvre, the artists and craftsmen of Louis XIV spread like creeping vines through the galleries and apartments upstairs.

They moved in their families and their models as well, and set up housekeeping. A painter nostalgic for Italy carried earth to the top of a colonnade and planted a grove of shade trees.

Thus the Louvre lost its dignity. But it was a pleasant place to live and work—despite falling masonry, rotting beams, and hordes of rats—and here many of the great

Friends posed patiently for "The Card Players," one of five versions of the subject painted by Paul Cézanne in the 1890's. Unconcerned with details, he concentrated on portraying solidity with tones of color. His stress on structure made him a forerunner of the Cubists.

Rogues of the stage, "Crispin and Scapin" conspire before the footlights in a painting by Honoré Daumier. Best known for bitter political cartoons—he was once imprisoned for ridiculing King Louis-Philippe—the Parisian also painted a number of oils in the 1850's and '60's. To express his satirical view of humanity, he focused on types rather than individuals.

figures in French 18th-century art found shelter for their genius, among them Boucher, Fragonard, and Chardin (page 824).

This charming reverie could not last. The late 18th century brought the French Revolution, and a revolution to the Louvre as well.

When the Revolution broke out in 1789, the Louvre had virtually no works of art in its halls. But the revolutionaries decreed that it should become the repository of the art confiscated throughout the country as symbols of the old order. These treasures seized from castles and monasteries of France—a national patrimony, as the revolutionaries thought of them—went on display in the Grande Galerie in 1793. This was a milestone in the history of art museums. Masterpieces formerly only for the eyes of the few could now be enjoyed by all who cared to come.

Shortly afterward, with Europe prostrate at Napoleon's feet, art treasures looted across the Continent flowed to Paris, and the Louvre was renamed the Musée Napoléon. But the artists had to go. Although the emperor was a staunch patron of art and artists, he also was a realist. "Get them out," he is reported to have said when he saw their picturesque shacks clinging to the walls, "or they'll end by burning my conquests."

The glory of the Musée Napoléon lasted only as long as that of its creator. In 1816, with the emperor exiled to St. Helena, the victorious British, Russians, Prussians, and Austrians directed that the Louvre's recent acquisitions be returned. Some 5,200 art objects were taken away. But a nucleus remained, mostly paintings from Italy.

After Napoleon passed from the scene, rioting mobs and the passions of politics continued to endanger the Louvre. In 1848, rebellious soldiery invaded the palace and bivouacked in the Grande Galerie (pages 801-803), where the reigning monarch, King Louis-Philippe, used to chug back and forth aboard his model railroad. The troops lighted camp stoves in front of the masterpieces, and the alarmed curators, following a time-honored Parisian custom, chalked slogans on the walls: "*Respect aux Arts.*" The soldiers, some of them bedded down in the collection of ancient Roman tombs, agreed to move, and once again history breathed a sigh of relief.

The June insurrection of 1848 brought to power Napoleon III, first as president, later as emperor. He regarded the Louvre as a gigantic billboard for advertising the prosperity of his empire, the magnificence of his reign, and had most of the Louvre redone.

The style he and his architect, Hector-Martin Lefuel, chose is *pâtisserie*, or "wedding cake," characterized by profuse ornamentation. What the visitor sees today dates chiefly from this vast rebuilding by 3,600 workmen and 150 sculptors. The Louvre was declared

HENRY BEVILLE © N.G.S.

PHOTOGRAPHS BY KAY LARSEN; HENRY BEVILLE (RIGHT) © N.G.S.

Art for the sake of power: Napoleon Bonaparte commissioned Jacques-Louis David to memorialize his coronation on December 2, 1804.

Assuming the imperial aura of the Caesars, Napoleon accepted the title of emperor. He brought the Pope to Paris to crown him in Notre Dame Cathedral. But rather than pledge obedience to the religious prince, the former soldier of the Revolution unexpectedly seized the golden laurel wreath and crowned himself. Then, before assembled cardinals and notables, he presented the crown of empress to his kneeling wife Josephine.

At the ceremony David recorded expressions and dress in sketches now in the Louvre's Department of Drawings. Later he arranged and rearranged costumed dolls representing some one hundred dignitaries; he judiciously chose not to show Napoleon's disrespectful self-crowning. The artist placed Napoleon's mother on the central dais at the emperor's request, although she was not present. Napoleon's small nephew and other relatives also appear in the 30-foot-wide spectacular (above).

In 1808, after David completed the canvas, Napoleon congratulated him, "This is not a painting. It is alive."

ENGRAVING BY BRULÉ DALE © N.G.S.

"**Gems" of colored glass** simulate the precious stones that originally encrusted Louis XV's coronation crown, France's only extant diadem; here it glitters in the Galerie d'Apollon. The real jewels, in keeping with tradition, were removed after the ceremony and placed in the royal treasury. During the Revolution, many of them vanished—including the 55-carat Sancy diamond that surmounted the crown's central fleur-de-lis and the 140.5-carat Regent diamond that adorned its headband. France recovered the Regent, also displayed in the Galerie d'Apollon.

Human broom of uniformed guards performing *le balai*, "the sweep," sends visitors scurrying down the Daru staircase at the closing hour. Departing guests carry with them memories of the grand museum that enshrines 8,000 years of mankind's creative triumphs.

completed in 1857, and at the inaugural ceremonies a stonemason and a building contractor sat by the emperor.

While Napoleon III was straining the treasury to beautify the Louvre, he failed to heed the rumble of a distant drum. In 1870 Prussian armies laid siege to Paris. Faced with starvation, the people of Paris rebelled, and in 1871 set fire to the Tuileries Palace that then connected the two long arms of the Louvre. The flames spread to the museum. It was saved by the courage of the Marquis de Bernardy de Sigoyer. Leading a detachment of infantry, he climbed to the roof, and, despite flames on one side and sniper bullets on the other, quenched the fire.

The palace, however, was reduced to a gutted shell. Many of its blackened stones were purchased in 1884 by a Corsican, Duke Pozzo di Borgo, who transported them to a village near Ajaccio, Napoleon I's birthplace, to build a villa. For generations the owner's family had had a vendetta with the Bonapartes, and what sweeter revenge than to have a home built from the ruins of the palace of the last Napoleon.

The luck of the Louvre in the Franco-Prussian War held through the German occupation in World War II. At the start of hostilities the most valuable exhibits were hidden in 70 places in the countryside, mostly in Loire chateaus. There, in obscure cellars, they remained safe from Nazi greed and the destruction of battle.

Though Louvre authorities have carefully cherished and protected the art of the past, they hold aloof from the bitter battleground of contemporary art. No work may enter the permanent collection until the artist has been dead a number of years. Despite this restriction, however, Louvre officials keep close tabs on modern art and have ways of letting their opinions be known.

Thus in 1871 an eccentric American living in Europe painted a picture he called "An Arrangement in Grey and Black." Exhibited in London and Paris, the painting was ignored by critics and public. French museum authorities, however, recognized it as a masterpiece and purchased it. Twenty-three years after the painter died in 1903, the picture went on display in the Louvre. Its popular name: "Whistler's Mother."

"I WISH I had enough time." This is the tribute countless visitors pay to the Louvre, as the guards rattle their keys and intone their dirge, "*Le musée est fermé.*"

The wish can never be granted. Neither the tourist nor the scholar with a lifetime to spend can ever have time to absorb the Louvre's 8,000 years of art.

Regretfully leaving after my most recent visit, I reflected that I, and all my colleagues in the world's museums, had in a sense been trained in this building—for the Louvre has shown what a great museum should be. Neither a mausoleum for dead objects where historical appreciation turns into a yawn, nor a place for leisure-hours entertainment, but a vital force in the life of a country, a place where the people, exposed only to the best, can learn to tell pearls from fishes' eyes. □

Traveler's Companion: a New Map of France

GEOGRAPHIC'S FACT-FILLED SUPPLEMENT SALUTES THE LAND OF THE LOUVRE, THE LOIRE, LIMOGES, AND LE MANS

EXTACHROME BY THOMAS NEBBIA © N.G.S.

Torrent of fruit pours from a harvester's basket in a Burgundy vineyard. The map of France sparkles with place names—Bordeaux, Champagne, Chablis, Cognac—made famous by the grape.

WHETHER YOU'RE going to the Alps or the Riviera, to the granitic coast of Brittany or the gentle valley of the Loire, you'll welcome the National Geographic Society's newest supplement, **A Traveler's Map of France**, distributed with this issue of the magazine.

As a matter of fact, even if you aren't planning a journey at the moment, you'll enjoy this decorative and instructive map. To those who know France, it will bring pleasant remembrance of things past. For those who don't, it will come as an exciting invitation to get acquainted.

The new map traces the lacework of rivers and canals, highways and railways that so efficiently serve all the provinces and link them with Paris. You can speed along the *routes nationales*, or principal roads, that reach from the fertile plains of Picardy in the north to the Pyrenees and the land of the Basques in the southwest, from Brest on the Atlantic to Strasbourg by the Rhine.

On the other hand, you can put your car and yourself aboard a train for a long night's haul between, say, Paris and the Riviera.

Streaking out from Marseille and Nice, broken red lines on the map indicate steamer routes to the Mediterranean island of Corsica, one of France's 95 departments, or states. Similar lines mark ferry crossings of the English Channel.

Inset vignettes by staff artist Lisa Biganzoli include glimpses of the Riviera and the Alps, an elegant chateau of the Loire region, and a classic view of Chartres Cathedral rising from the wheatlands of La Beauce.

On the back of the map you will find essential facts for planning a French vacation. To help you decide where to go, there are succinct descriptions of France's eight diverse regions. Inset maps show the environs of Paris and the resort-happy eastern reach of the Riviera. An alphabetical index, with key numbers, lets you quickly pinpoint any of the French place names on the map.

The reverse side also provides

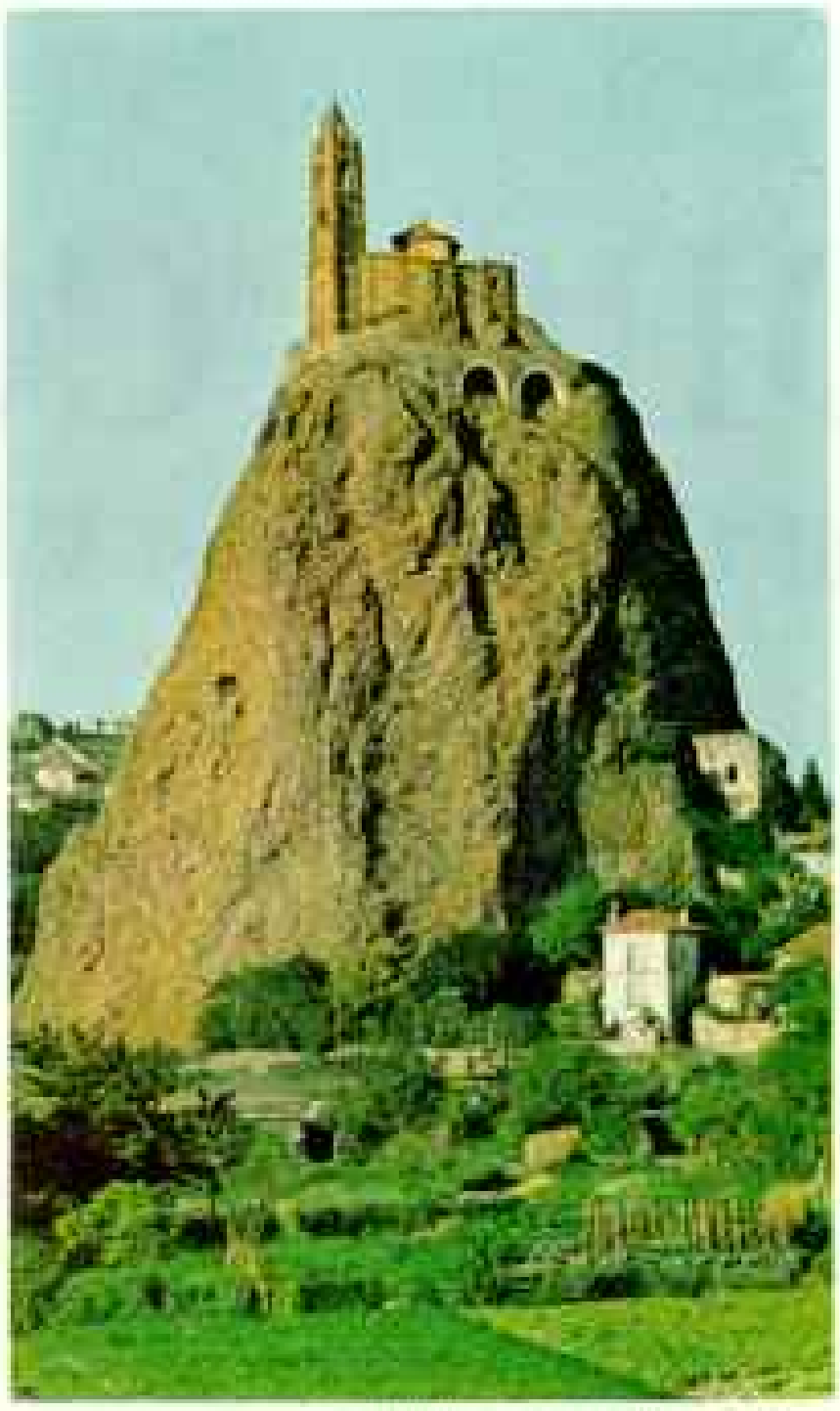
information about necessary documents, inoculations, transportation, postage and currency, hotels and restaurants, shops, museums, camping sites and youth hostels. A large panel lists the principal festivals of France, with dates. And there are hints on how to get about in Paris.

Paris in the springtime—or any time. Paris with its gracious avenues and magnificent monuments, tempting shops, unparalleled restaurants, animated sidewalk cafes. The Seine with its bridges and barges and sightseeing bateaus. Notre Dame Cathedral. The Louvre—"France's Palace of the Arts" (page 796). And the Eiffel Tower, the very symbol of earth's most enchanting city.

A thousand years ago Paris, capital and cultural center, served as an example to all the other cities in the kingdom that was France. Today Paris is still setting styles and standards for the rest of the nation—and indeed for much of the world.

But of course Paris isn't France; it's surrounded by France. It is, in effect, *the* market city to which all roads lead from the provinces.

When you unfold the new supplement, you also unfold the story of France's role in Western civilization. Here spreads before you a land of glory, solemnity, gaiety, beauty; a land to which so many others owe so much; a land that inspired the saying, "Everyone has two countries—his own, and France." □



Crowning a volcanic pinnacle, the chapel of St. Michel d'Aiguilhe overlooks Le Puy, a town in central France. The map locates scores of churches and cathedrals, chateaus and Roman ruins.

Full spectrum of France unfolds in this map, inviting you to explore picturesque towns and varied regions. Enlightening notes range from prehistoric cave paintings to the country's first atomic power plant.

MOROCCO

Land of the Farthest West

ARTICLE AND PHOTOGRAPHS BY
THOMAS J. ABERCROMBIE
NATIONAL GEOGRAPHIC FOREIGN EDITORIAL STAFF

A DOZEN TURBANED RIDERS, twirling and firing their muzzle-loaders, screamed across the plain full-bore toward us. I looked for a place to jump.

But, reined in hard, the foaming horses thundered to a stop—seemingly inches away—splashing us with dust and gunpowder. Before the cloud settled, they galloped off to make room for the next wave hard on their heels.

The crowd around me—blue-veiled women, barefoot youngsters, hardy men in long, hooded *jellabas*—smiled at my discomfiture. It was my first *fantasia*, the traditional riding-and-shooting fest with which Moroccans observe weddings and circumcisions, or salute visiting dignitaries (foldout, following pages). Today the whole town of Rommani had turned out.

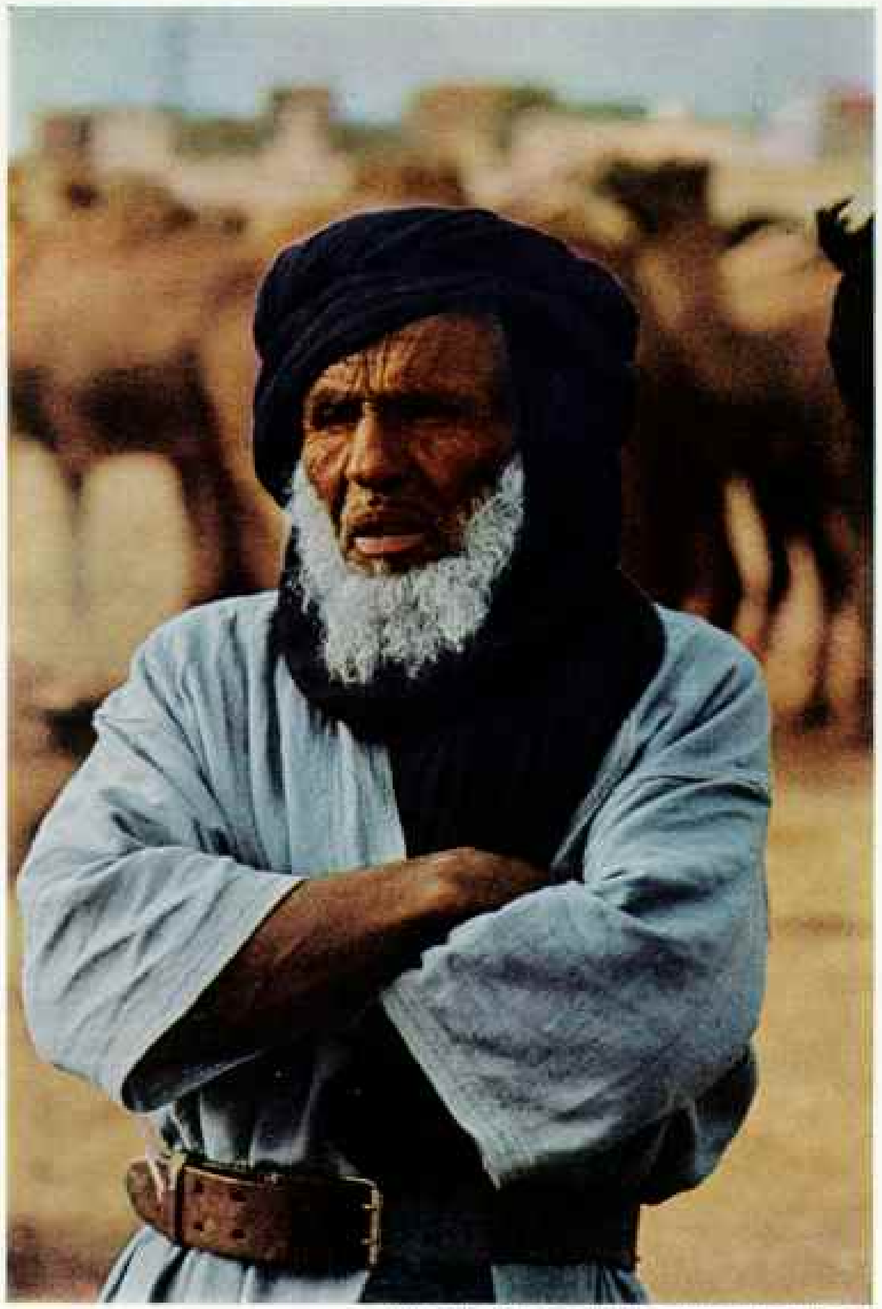
"It is the grand opening," a bearded bystander explained in French. "The new hospital! Think of it —80 beds, operating room, X-ray, laboratories . . ."

They might need it, too, I thought, as another volley punctured the sky. But such is Morocco—an ancient land striving for a modern identity, the Middle Ages galloping wildly through the 20th century, an Arabian Nights with a heavy French accent.*

For three months I explored this delightful monarchy. El Maghreb al Aqsa, the Arabs call Morocco—the Farthest West. Roughly the size of California, it nourishes a somewhat smaller but growing population, approaching 16,000,000. I bargained with Bedouin in the blazing Sahara, battled a blizzard with Berber friends high in the Atlas Mountains—and loafed along Morocco's golden Atlantic beaches. I visited factories in booming Casablanca, the vineyards of Meknès, the mysterious casbah of Tangier. But never did I feel closer to the country's soul than in Fez, Morocco's cultural capital.

In Fez's French-flavored "new city," I joined noon crowds filling the sidewalk tables at the Tour d'Argent.

*Franc and Jean Shor's "From Sea to Sahara in French Morocco" appeared in the February 1955 NATIONAL GEOGRAPHIC.



"Blue Man" of Morocco looks for bargains at the weekly camel market in Goulimine, on the edge of the Sahara. The desert dweller's nickname derives from indigo-dyed robes, whose color rubs off on hands, face, and grizzled beard.

Rattle of gunfire from long-barreled muskets (preceding pages) climaxes a *fantasia*. In Morocco, traditional ways often march hand in hand with progress; this celebration marked the opening of a new hospital in the little town of Rommani, south of Rabat.

THIS PAGE FOLDS OUT

Morocco

AFRICA'S closest approach to Europe, Morocco almost rubs noses with Spain across the nine-mile-wide Strait of Gibraltar. From here Arab armies first crossed to Europe in A.D. 711 and dominated much of Spain for nearly eight centuries.

The Rif Mountains rise abruptly from the sunny Mediterranean. Inland lie three ranges of the cedar-clad, snow-capped Atlas Mountains, separating the fertile Atlantic plain from the pre-Saharan wastes farther east. Divided between France and Spain for 44 years, Morocco became independent in 1956.

AREA: 171,834 sq. mi. **POPULATION:** 15,700,000; Berber and Arab. **GOVERNMENT:** Constitutional monarchy. **LANGUAGE:** Arabic, French and Spanish widely understood. **RELIGION:** Moslem. **ECONOMY:** Agricultural and pastoral. Chief products: grains, vegetables, citrus, cork, almonds, and olive oil. Minerals include phosphates, lead, and zinc. Fish and fish products increasingly important as exports. **MAJOR CITIES:** Rabat (capital), Casablanca, Marrakech, Fez, Tangier.

The noise of rush-hour traffic mingled with strains from the jukebox inside. "*Bleu, bleu, l'amour est bleu. . . .*" Office girls giggled gossip, old men argued the election news in *L'Opinion*, French tourists, sipping cups of espresso, reviewed the passing parade of minis and bell-bottoms. Young couples smiled at each other, oblivious of it all. Waiters balancing brass trays made their way through the Gallic scene.

After lunch I strolled along the broad, flowered boulevards to the Place de la Résistance and hailed a taxi. Minutes later at the Bab al-Mahrouk, one of the massive gates in the city's walls, I turned my back on the familiar world and stepped—as if through the looking glass—into another Fez.

Here the lanes were cool, darkened, nearly deserted. In the medina, the old quarter, wheeled vehicles—even bicycles—are prohibited. Now and then I passed women, anonymous under their burnooses, hurrying masses of dough to the *farran*, the public ovens, or tattered porters driving donkeys straining under bundles of pungent green mint or skeins of scarlet wool.

"*Balek! Balek!*" they shouted. "Make way!"

I flattened against a doorway to let them pass. The narrow cobbled streets often became tunnels between overhanging houses. In the heart of the twisting labyrinth, around the green-tiled tomb of Idriss II, the city's patron saint, old Fez comes into focus.

Craftsmen of Old Won Fame for Fez

Embroidered caftans splashed by shafts of sunlight, bolts of brilliant silk, spangled saddles, and fine carpets dazzle the eye. Racks of blue pottery, silver jewelry, and bright-colored slippers overflow into the streets (following page). The aromas of saffron and sandalwood mingle with earthier smells of leather, potter's clay, and red-hot iron. Above the cacophony of the crowd I can hear the coppersmith's hammer, the pitchman's shouts, the water peddler's jingling bells. Suddenly all is cut short by the afternoon call to prayer.

Though the history of Fez tells of mosques and palaces, of sultans and conquests, it was the superb craftsmen of Fez who shaped the city's character. Enriched by several thousand families of artisans—immigrants from Córdoba in Spain and Qairouan in Tunisia—Fez began to prosper soon after its founding, late in the eighth century. Its weavers, potters, and coppersmiths found eager markets overseas. The skill of its tanners and bookbinders helped make the word "morocco" synonymous with fine leather.

In the clangor of Suq as-Saffarine, the smiths' quarter, I watched Abdel Azziz Benjelloun tap designs into a disk of brass. "*La bes!*—Hello!" he greeted me in the Moroccan-Arab dialect. Hanging from the walls of his tiny workshop sparkled the intricate arabesque tracery of his finished trays.

Under his hammer and stylus, designs grew in perfect symmetry, and the disk slowly deepened into a bowl. I was amazed to see that he worked without sketches or patterns.

"My ancestors worked metal for ten centuries; I started with my father when I was 7," Abdel Azziz said. "The patterns are part of us. But each piece is done freehand—no two are exactly the same. That is the difference between manufacturing and art."

Drab Streets Hide Opulent Homes

Few have mastered the art of living more thoroughly than the people of Fez. Deceiving are the windowless houses that line their Spartan streets. I learned this the day I visited the house of Mohammed Mernissi. I had to stoop to enter the creaking wooden door that opened through a gray, nondescript wall. Once inside, I could hardly believe my eyes. A miniature Alhambra!

Mohammed led me across a tiled central court flanked with marble columns to the *beit al diafa*, or guest parlor, and motioned me to a seat on a 30-foot-long blue-plush divan. While mint tea was poured from a silver service, I admired the intricately carved plaster of the walls and capitals. The ceiling, 20 feet above us, was inlaid cedar painted red and gold. A television set provided the only modern touch.

"Such a house is not unusual," Mohammed insisted, turning aside my compliments. "We are a city of middle-class merchants doing well—though an outsider might never realize it. We abhor ostentation. We are all equal in the eyes of Allah. Why not in the eyes of the tax collector as well?"

The faith of Fez showed in the faces of the crowd that poured quietly out of Al Qarawiyyin Mosque after Friday prayers. Humble men, they seemed, dressed in simple white jellabas. Many led young sons by the hand. Almost every one, I noticed, bore a round spot—like a faintly visible birthmark—in the center of his forehead.

"*Nehna abid Allah*," explained one quietly. "We are all servants of Allah."

Sights, smells, and sounds assault the senses in Morocco's *suqs*, or bazaars, where visitors step from the modern world into a centuries-old way of life. Above the noise of the crowd and the braying donkeys rings the cry "*balek, balek!*—make way, make way!" A heady mixture of orange and thyme, bay leaf and mint scents the air. Amid a labyrinth of twisting streets, pigeonhole shops sell everything from ribbons to birdcages, from almonds to leather goods.

A shop in the medina, the old city, of Fez features women's *babouches*, slippers of hand-embroidered leather. Berber-style jewelry sparkles in the window of a shop in Tiznit: pendants on the silver necklace, inlaid with semiprecious stones, symbolize hands, traditional protection against evil. Spice shop in the Fez suq offers freshly ground red and black pepper, cumin, paprika, ginger, and mustard seed.

Classics in copperware—teakettles, pots, and charcoal braziers—entice buyers in the Marrakech market. In a nearby open-air shop (right), a vendor patiently awaits customers for stringed instruments used by many professional entertainers.

Five times every day they turn toward distant Mecca, and many times during each prayer their brows touch the ground. Their devotions have stamped them with a mark as indelible as their faith.

From its very beginning Fez followed its religion fervently. In A.D. 859 a pious lady named Fatima pledged 60 ounces of silver to start construction of Al Qarawiyyin, a mosque that would become a center for higher learning as well as for prayer. Wealthy sultans built schools around it and patronized such scholars as Ibn Khaldun and Leo Africanus. Its vast library served astronomers and mathematicians.

"When I was a student, classes were still held under the arches in the mosque itself," said Professor Abdel Rahman Harishi, inspector of curriculum at Al Qarawiyyin's new campus just outside the city wall. "We sat on mats around the master; instruction was in the form of running discussions. After a student memorized the Koran, he was allowed to choose his own teacher.

"The only subject offered was religion," Professor Harishi continued, "but the religion of Islam embraces not only theology but also law and history, as well as the classical Arabic language."

Capital Wandered as Dynasties Changed

It was the Arab conquest, early in the eighth century, that crystallized Moroccan character. The original Berber inhabitants had held the Phoenicians and Romans to coastal areas. Yet the Berbers submitted to the armies of Islam, subdued not by the sword but by the word.

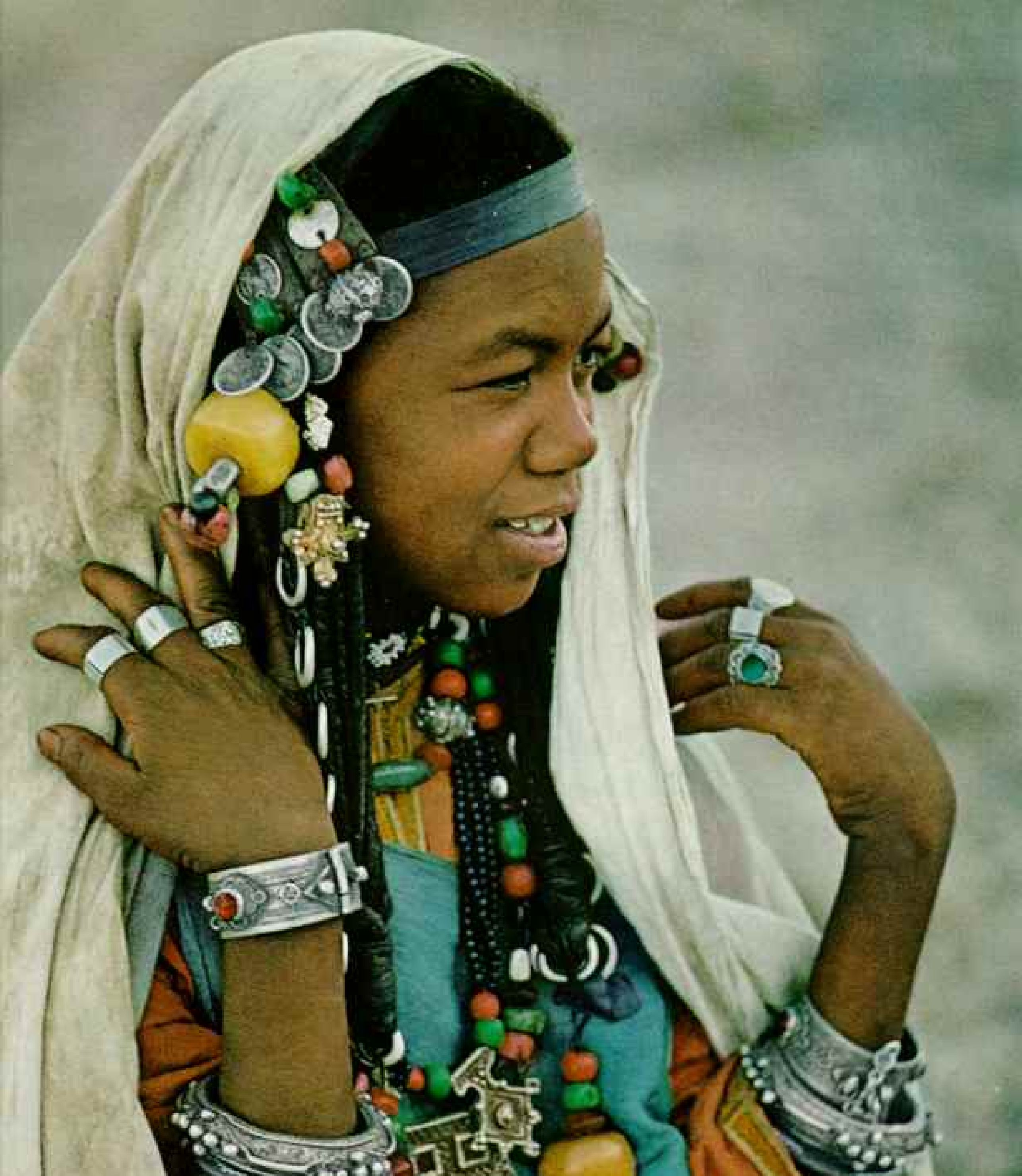
From then on, waves of reform dynasties marched through Morocco's history. The capital moved from Fez to Marrakech, back again to Fez, then to Meknès. Morocco's present king, Hassan II, rules from Rabat, on the Atlantic coast (map, page 838).

"Rabat was little more than a small fortress guarding the mouth of the Bou Regreg River when France's first resident-general, Marshal Louis Lyautey, established headquarters for the Protectorate here in 1912," a long-time resident told me. "A year later, Moroccan Sultan Moulay Youssef moved his royal court to Rabat."

With Salé, its neighbor across the river, Rabat rose to brief infamy in 1627. Together they proclaimed the Republic of the Bou Regreg. Its pirate corsairs became the scourge of Christian fleets. The main preoccupation

Walled old quarter of Fez cloaks the foothills of the Rif and Middle Atlas

Mountains with a pattern of mud-brick houses and minarets. The city venerates the tomb (green pyramidal roof at center) of Idriss II, the sultan who fortified it about A.D. 809.



of the towns was booty and captives—the wealthy held for ransom, the poor sold as slaves. Daniel Defoe wrote that Robinson Crusoe's adventures began after he was captured by a privateer and kept at Salé for about two years. Internal strife, aggravated by British bombardments, put an end to the republic in 1641.

Rabat's castle, hemmed in by rust-colored walls, still looks out to sea beyond the medina, but the city's harbor has silted up. Where pirate fleets once anchored, penny ferryboats ply the Bou Regreg.

The royal palace and its ministries, the embassies, and splendid villas line broad green parks and palm-shaded avenues of the contemporary administrative city. Along Avenue Mohammed V, named for the father of the present king, fine shops offer the latest French fashions, books, cuisine, television sets, and automobiles. Yet traffic is light; the pace of the city relaxed.

King's Schedule Precludes Pomp

The nearest thing to excitement is the Friday-noon pageantry when King Hassan, in Arab dress and surrounded by his colorful court, parades solemnly from his palace across the Mechouar, or royal park, into El Faeh Mosque to lead the weekly prayers. Lately, even His Majesty's Friday appearances have been rare, his schedule committed to the day-to-day mechanics of nation building: dedicating dams, schools, and irrigation projects, patching tribal feuds, and introducing constitutional reforms. His energy and royal acumen—not just the scepter he inherited—have earned him the support of the Moroccan people.

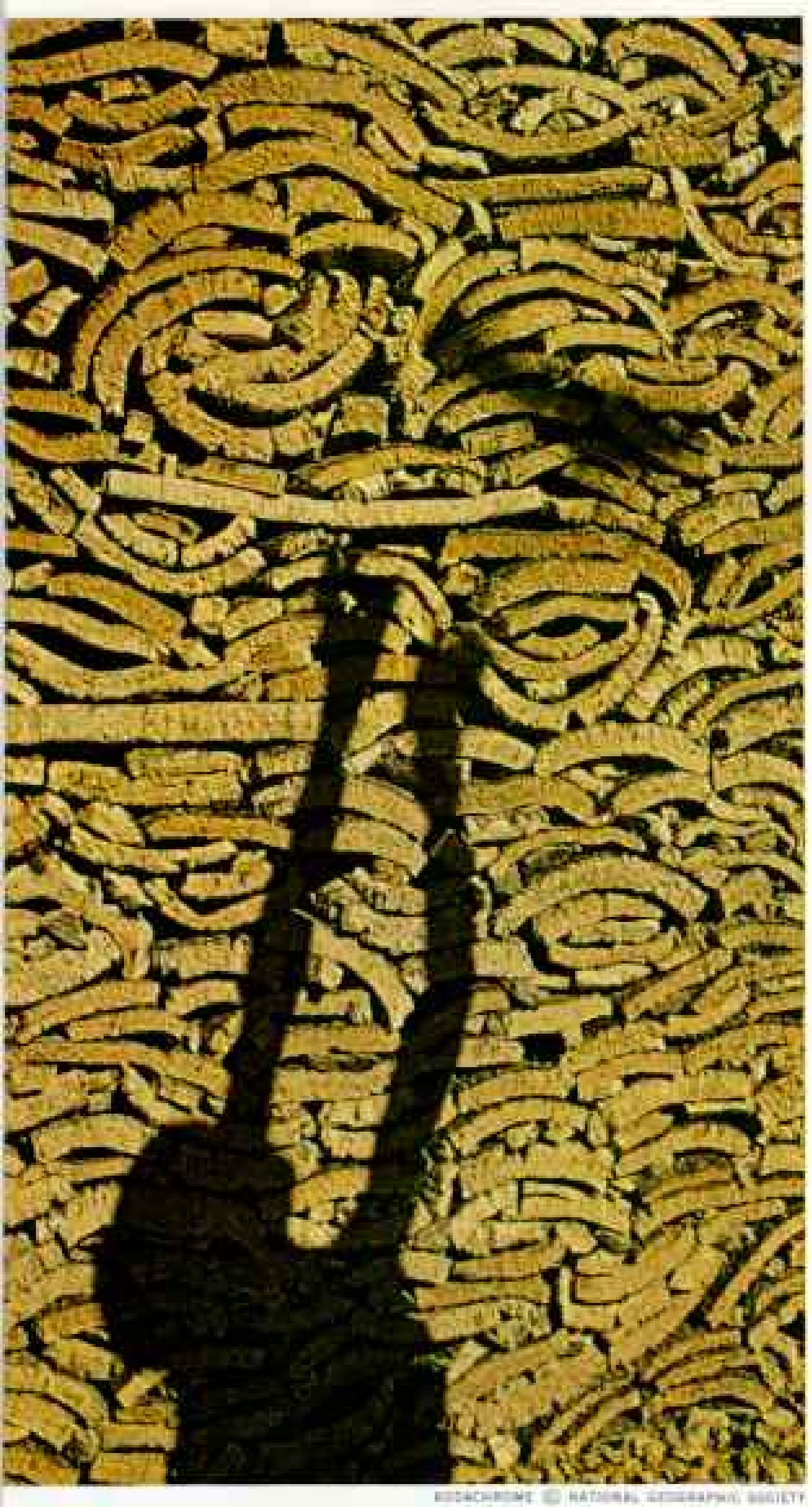
The first cries of protest rise from Morocco's students and labor unions. Despite a new constitution and a parliament elected by popular vote in 1970, many Moroccans speak out for more voice in their government. Last year student strikes closed the University of Rabat for several months. I talked with Dr. Mohammed Gessous, a young sociologist on the faculty. We met at his small apartment on Rue de Nice, where he lives with his Brooklyn-born wife Dyantha.

"Many of us feel the French influence is too strong in Morocco," Mohammed said. "French technicians and teachers are still favored over native Moroccans carrying the same credentials.

"I had to fight for my post at the university," he continued. "I finally won, but my

Flavor of France pervades Casablanca. Short-skirted shoppers—both French and Moroccan—discuss the latest fashions at a chic boutique. Cloistered for centuries, Moroccan women increasingly demand freedom from tradition's grip.

Desert custom survives in the oasis village of Akka at the foot of the Anti Atlas range. This Berber woman wears prized silver jewelry, coins, and amber beads at a friend's wedding.



KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Mosaic mound of cork, enough to cap countless magnums, piles nine feet high at a storage depot in the Rif range near Ketama. Waning sun casts the shadow of a worker who tosses slabs to another man atop the heap. In this region cork trees are stripped of bark once every 12 years. Most of the harvest goes to customers in Europe; Morocco ranks third in world cork production, after Portugal and Spain.

salary—about $240 a month—is half what they would have paid a professor from France.

"Another pressing problem is the crowding in our cities—especially Rabat and Casablanca. They are drawing the rural population faster than they can absorb it. Much-needed city property is tied up by speculators; housing is scarce and expensive."

Earlier I had trudged through the rickety *bidonvilles* in Rabat's third ward, a depressing quarter of packing-crate architecture surrounded by a new white wall that hides it from the more prosperous Rabatis who drive south along the sea to their weekend villas. In the center of the vast slum stands its only modern facility, a police station.

"Areas such as the third ward are potentially explosive, but with Allah's wisdom and strength we will resolve our problems without violence or revolution," Dr. Gessous added. How? When? He was more cautious.

"It is still too early to tell," he replied. "My name is Mohammed, but I'm no prophet."

Busiest Port Will Double Its Capacity

Only 55 miles southwest of Rabat on the Atlantic coast beats the heart of modern Morocco, the port of Casablanca. Scarcely more than a fishing village in the 1900's, it grew during the French Protectorate into the nation's largest city. Today a million and a quarter citizens share its joys and sorrows. Skyscrapers, a cathedral, factories, boutiques, and traffic jams give it a marked European character.

Aboard his official launch, Port Director Mohammed Bouayad gave me a brisk tour of Casablanca's busy harbor. Dodging small sailboats, we eased past the yacht club to skirt the crowded quays.

Giant ships off-loaded locomotives, wheat, newsprint, farm machinery—and tourists. Others took on fresh oranges, olive oil, sardines, cork, and manganese. White dust billowed from quarter-mile-long bins, where conveyors gorged French and British freighters with phosphates for fertilizers—Morocco's most important export.

"Casablanca handles 70 percent of the country's shipping," said Mr. Bouayad. "We can dock 10,000 vessels a year—40 at a time. And we plan to double our size."

Half the country's industrial labor force works in Casablanca. Its many firms turn out glass, soap, textiles, trucks, and Moroccan wines. On the outskirts of town, I visited one of Morocco's most modern plants, a spotless

complex set off by well-watered gardens. It reminded me a little of a Swiss watch factory. Giant letters on the roof spelled out SOMACA —Société Marocaine de Constructions Automobiles. My host was Khalifa Terraf, a time-and-motion man from the front office.

"Ours is a small operation by your Detroit standards," Khalifa shouted over the clatter of the assembly line. "Only 90 cars a day. In fact fewer than that right now; we are in the midst of model changes."

As I watched the vehicles roll off the end of the line, I did a double take. An Italian Fiat followed a German Opel, an English Austin, and a French Renault. Nearby, workers were getting ready to paint a Dodge truck.

"We assemble half a dozen different makes," Khalifa explained. "Not as efficient as real mass production, but we can give our customer a better choice. Because the tariff on imported cars is high—120 percent—ours sell for much less."

Playful and Pious Share Sunny Beach

If the east side of Casablanca is for work, its western suburbs are dedicated to play. Especially on weekends the city's sun-and-fun set crams the beaches for miles. I spent a delightful Sunday afternoon barefoot in the Atlantic surf, butting in now and then on one of the wildcat soccer games boys play along the sands—or just enjoying the scenery. Under colored umbrellas at chic beach clubs like the Miami, the Acapulco, and the Tahiti blossom some of the boldest bikinis to be seen anywhere in the world.

Farther along the beach the mood changed as I reached the tomb of Sidi Abd er Rahman, one of Casablanca's patron saints. His white-domed mausoleum stands on a tiny peninsula of rock amid the crashing breakers.

Families camp, often for days, in rented tents and shelters clustered around the tomb, in hope of blessings and cures for which the holy site is known. I watched one veiled lady light a three-foot candle and offer it at the tomb with prayers. Then, lifting her long robes above her knees, she went wading with her children in the nearby surf.

After dark, Casablanca seems more the international city. During my stay I dined out every evening in a different language, often to the tune of flamenco guitars, gypsy violins, or the Arab *oud*, a kind of lute. At the Rissani the couscous is served while belly dancers undulate behind swirling veils.

When I walked back to my hotel, the

SKYSCRAPERS (ABOVE) AND FURNISHINGS (FOLLOWING PAGES) BY THOMAS J. ABERCROMBIE (C) N.G.S.

Gleaming new buildings on Avenue Hassan II, named for Morocco's king, underline the meaning of Casablanca—Spanish for "white house." One of the world's busiest ports, the city exports more than ten million tons of freight annually, mostly phosphates and citrus. During World War II Casablanca played host to a historic conference of Allied leaders.

Calf-deep in dye, tanners of Fez (following pages) soak cowhides, goatskins, and camelskins for the slippers, handbags, belts, bookbindings, and saddles that have made the word "morocco" come to mean fine leather. Boiling dye steams in foreground. White vats at rear contain tanning chemicals.

streets were nearly deserted. Casablanca is hardly the wild, wicked city Hollywood would have us believe. Buses stop running at 9 p.m.; lights flicker out soon afterward. After all, tomorrow is a working day.

Unlike upstart Casablanca, exotic Marrakech, 150 miles to the south, has been a power since the 11th century (map, page 838). Veiled men from the Sahara, the Almoravids, set up their black-wool tents here just north of the High Atlas mountains in 1062. Their leader, Youssef bin Tachfine, built a stone fort and a mosque before he and his armies marched northward to capture rival Fez. By the beginning of the 12th century, the Almoravid Empire stretched from the Sahara almost to the Pyrenees. As its capital, Marrakech flourished. To Europeans its very name, corrupted to "Morocco" (Maroc in French), soon stood for the country as a whole.

Marrakech Draws Potpourri of Visitors

From its beginnings Marrakech was a cultural crossroads. Behind its crenelated walls city Arabs and mountain Berbers mixed with nomads from the Sahara and dark-skinned Senegalese from beyond. Today, as Morocco's leading tourist attraction, Marrakech still draws a mixed bag that arrives by bus, camel caravan, or Rolls-Royce.

At her splendid pink villa in the center of town, the Countess of Breteuil welcomed me. This charming lady looked regal even in her simple, locally made caftan.

"Winston Churchill used to come to Marrakech to paint—something about the marvelously clean air," the countess said as she led me through gardens and orange groves to her swimming pool, sheltered by rows of tall cypresses. Charlie Chaplin, Truman Capote, and the Rolling Stones, too, had sampled the mysteries of Marrakech, I learned. "We get plenty of other tourists—a quarter of a million every year," she added.

I hailed a rickety horse-drawn caleche and clip-clopped toward Jemaa el Fna square, which is also called the "Assembly of the Dead." Once recalcitrants were put to the sword here, and their heads were displayed as a lesson to others who might oppose the sultan. But the executioners have vanished, long since replaced by a 30-ring circus.

Find a Cure or Write a Will

Every afternoon they gather—dancers, fortunetellers (opposite and below), acrobats, snake charmers, buffoons, storytellers—each making his animated pitch to a tight circle of fans. Stalls lining the square sell shish kebab, three skewers a dirham—about 20 cents. I nibbled a snack while I took in the show.

Amid the music and laughter men had set up shop. One bearded ancient made *hejabs*—amulets—guaranteed to ward off headaches. A pharmacist proclaimed a stronger cure: powdered lizard skin. A sidewalk dentist advertised his trade by spreading human teeth on his ground cloth. Nearby a two-penny lawyer helped a man draw up his will.

Away from the din of the square I passed a peaceful hour in the 12th-century Koutoubia Mosque. The keeper led me along a series of vaulted rampways that wound upward inside six-foot-thick stone walls. One could even ride a horse to the top of the square minaret, 23 stories above the city. The climb—and the view—left me breathless.

Below me, framed by thousands of acres of palm groves, timeless Marrakech glowed in the late-afternoon sunlight. Beyond beckoned the snowy ramparts of the High Atlas.

It was April before I got around to the

Intent on his future, a man in Jemaa el Fna square, the Marrakech marketplace, hears a prediction from a card-reading fortuneteller. Another seer paints her palms with henna (right).

The square seethes with life, like a huge circus. It swarms each afternoon with dancers, musicians, storytellers, fire-eaters, snake charmers, and acrobats. Long ago the square acquired the macabre name of "Assembly of the Dead"; here the heads of executed rebels were once displayed as a warning to anyone tempted to disloyalty.

mountains, hiking upward from the Berber village of Imlil at the foot of 13,665-foot Mount Toubkal, North Africa's highest peak. Swelling streams flashed like silver ribbons through the valleys around terraces green with the first barley and shaded by rows of almond trees lush with pink spring plumage.

My guide for the climb was Ibrahim bin Abdel Rahman, a handsome young man in his thirties; from under his black turban shone a perpetual smile. While a porter loaded my cameras onto a donkey, Ibrahim told me of the language problems of Morocco's Berber people.

"The language of Imlil is Tachelhit, a spoken dialect only, used by the Chleuh tribes of Berbers," he said.

"But I learned my lessons in classical Arabic, the language of the Koran," he continued. "In the larger city markets we must deal with Moroccan Arabic—something quite different. And to get ahead these days a man must know French too."

Slowly we climbed through high cedar forests and above robed shepherds driving flocks to summer pastures. By late morning, at 7,500 feet, we hobbled the donkey in a small pasture below a high waterfall and started scaling the steep rocks to the Lépiney hut, a stone cabin built years ago by the

Freed from the crust of centuries, the ruins of Roman Volubilis stretch across a plain north of Meknès. Nearly 2,000 years ago it flourished as a trade center for the region. As in other North African provincial outposts, the population probably included Berbers, Syrians, and Jews, as well as Roman officials, soldiers, and merchants. Major excavations,

French Alpine Club. Before sunset we crossed the last small snow patch near the refuge, two miles up. Next day we planned to make a dash for Tazarharbt, a plateau now looming 3,000 feet above us (pages 856-7).

But it was not to be. Before we slept, swift clouds blackened the stars, and a howling wind rattled the rafters of our lonely cabin. By early morning unseasonable snows were whitening the world around us.

"I know these storms," Ibrahim shouted above the wind. "They can go on for days. Let's start down—right away."

In this blizzard! We weren't equipped for snow climbing. But Ibrahim was right; it was getting worse. Yesterday's trail was already buried. Soon we would be snowbound.

We made makeshift mittens out of the plastic bags I carried for the cameras. The wrought-iron hatchet Ibrahim used to chop firewood would serve as an ice ax. I led the way slowly down the howling mountainside, cutting steps in the old snow, and sometimes handholds, as the three of us strained for balance against 70-mile-an-hour gusts. One slip and we would toboggan off into oblivion.

Back on bare rock and safely below the storm, I looked at a long smear that marred the trail behind us. A small avalanche had passed right through the path we had taken.

begun in 1915, are still unfinished. This view through the Tangier Gate looks along the main street to an arch dedicated to the Emperor Caracalla in A.D. 217.

Seeking a blessing, a woman of Tikirt in the High Atlas tied an offering of cloth strips to the door of this local saint's tomb; villagers still revere him though his name has long been forgotten.

We retreated toward the village in a chilly rain.

Without these rugged mountains, I reflected, Morocco would have never been. Their lower folds and crevices cradled the villages of the country's first inhabitants, tough, independent Berbers like Ibrahim. The same high ramparts had locked in precious rains and kept enemies out.

Cordial Welcome From Chief's Son

South and east of the Atlas the desert begins abruptly. Less than an hour by car from the pine forests of Tizi n' Tichka Pass, I wound through the bare brown foothills past the first casbahs, the towering fortress oases that clustered on rock outcroppings above small date-palm groves. North of Ouarzazate I pulled into one to cool my Land-Rover's boiling radiator.

The flood of curious villagers that poured around my vehicle parted as a young man approached. He was Al Hussein Choutine, he told me, son of the village chief.

"Welcome to Tikirt," he said. "My father will be back by sundown. Meanwhile if you would like to see the casbah. . . ."

In times past these elaborate mud forts were used as silos for the village's precious grain and as redoubts during intertribal wars. The tall turrets also served as lookout posts.

From the narrow window in Al Hussein's own room high in the north tower, I could see most of the village and its meager fields. Through it ran a small stream where women in gaily colored dress beat laundry and laid it out on the hot gravel to dry. The youth's room itself was sparsely furnished, with only a mattress and a few books.

"My dream is to travel to Casablanca or Rabat someday to study," Al Hussein said. A commotion at the gate below interrupted us. Children were shouting. His father was back. I peered down to see a servant leading the sheik's horse away. Storks nesting on nearby battlements paid it all no mind.

"Half the good men of our village have moved to the cities—some even to France—to work," said Sheik Mohammed as we washed for dinner. His son poured water over our hands from a copper pitcher as we sat on the floor around a low table.

"But what can we do? The village is poor. It can barely support those of us who stay," he added. Nevertheless, the feast that followed was generous. Such are the obligations of Moroccan hospitality.

A traditional *tajine* of chicken cooked in oil and garnished with olives, apples, and carrots was followed by bowls of yogurt. Then came the main course, a robust mutton couscous. We finished with pastries filled with almonds and honey, glasses of hot milk laced with a dash of coffee, and mint tea.

Loaded up with extra jerry cans of water and gasoline, I bore south through Tazenakht and Foum Zguid along a dusty, bone-jarring track into the Moroccan Sahara.

At Mrimina and near the oasis of Tata, I saw rock drawings of graceful gazelles, ostriches, giraffes, and elephants scratched into the sandstone. Archeologists believe they mark ancient hunting camps or places of worship of a people who lived here in better times, some eight thousand years ago. The drawings lend weight to current climatological theory that through the millenniums the Sahara has become progressively drier. Life for today's desert dwellers is unbelievably harsh, and a drought was making it worse.

Brotherly Pact Eases Misery of Drought

Looking for nomads, I drove west through the brittle teeth of the Anti Atlas range. A few miles from the walls of Taroudant, I found an encampment of Requibat Bedouin, half a dozen goat-hair tents hidden in a scrub forest of argan trees. Sheik Moussa Bouzid, head of the clan, came out to greet me.

He wore the blue robes and matching turban of the Sahara people. Rubbing off, the indigo dye colors their faces and hands. Outsiders call them the "Blue Men." * We ducked out of the sun, leaving our sandals at the edge of the carpet, where Ahmad, the sheik's son-in-law, was stirring embers under the teapot.

*Victor Englebert wrote of these tribesmen in "Trek by Mule Among Morocco's Berbers," in the June 1968 NATIONAL GEOGRAPHIC.

Brass cups proclaiming his trade, a water vendor roams the camel market on the outskirts of Marrakech. From a goatskin bag gurgling with spring water, he sells a drink for five centimes—about a penny—but today, as on most days, he may earn more money posing for tourists. Though such vendors still wander the markets, competition from soft-drink sellers threatens to run them out of business.

KODACHROME BY THOMAS J. ABERCROMBIE © N.G.S.

KODACHROMES © N.G.S.

Writing on wooden tablets, students in a Koranic school learn Islamic scripture. They dwell in Aremd, 6,000 feet high in the Atlas Mountains. In his travels around Morocco the author saw new schools rising in almost every village. But the basic curriculum continues to emphasize religion, the Arabic language, and arithmetic.

On a snowy ascent in the High Atlas range, the author's guide and porter head for the Refuge de Lépiney, a stone shelter on the flanks of 13,000-foot Tazarharht, whose craggy face rises half a mile above the climbers. The party never reached the summit; a freak April blizzard forced them to make a swift and perilous return.

Sober countenance of a sheik's wife reflects the harsh life of the Sahara's people. A three-year drought in the Oued Drâa region forced this woman and her clan to march 150 miles across the mountains to the fertile Sous Valley.

Keyhole arch frames the massive minaret of Al Berdain Mosque in Meknès in a time exposure that captures the stars in flight. Red cast results from the film's reaction to sodium-vapor lamps. Capital of Morocco under Moulay Ismail, who ruled from 1672 to 1727, Meknès today serves as commercial center for the vineyards and olive plantations that cloak the surrounding hills.

"The oldest among us cannot remember such a curse," said the sheik. "Not a drop of rain for three years in all of the Oued Drâa region. More than 70 of our camels and many goats died on the month-long march over the mountains," he continued, "but the people of Taroudant have welcomed us as brothers." Sheik Bouzid showed me the treaty he had signed with them, granting asylum "until Allah might be merciful once more."

Behind him the tea ceremony had begun. Ahmad cracked a tall cone of hard sugar and popped a fist-size chunk into the hot tea along with handfuls of mint leaves. He poured himself a sip, sampling it with all the concern of a French winetaster. Another chunk of sugar and it was perfect. He filled our glasses

KODACHROMES BY THOMAS J. ABERCROMBIE © N.G.S.

with the brew, thick and sweet as syrup.

"*Bismillah,*" the sheik intoned before we drank. "In Allah's name."

Refreshed, we turned our talk to other subjects. Outside, women drove sheep and goats from the argan forests into thorn-branch corrals for the night. The argan trees —unique to southern Morocco—reminded me of olives. People don't eat the coarse argan fruits, but camels and goats thrive on them, and on the leaves as well. Often I had seen nimble goats climb the gnarled trunks to the topmost branches, 20 or 30 feet above the ground.

"Our flocks are growing, Allah be praised; soon we will count more than 500 again."

Concerning his camel herds, the sheik was more reserved. With camels a man buys a bride and pays his taxes—the herd is his bank account, hence a private matter.

A main center of Morocco's camel commerce is drowsy Goulimine, an administrative outpost of 5,000 sun-baked souls that sits on the edge of southern Morocco's Sahara. I arrived in summer with the temperature nudging 120 degrees. The whole town was a scene in slow motion.

But each Friday night, in the cool of darkness, caravans begin to file into the streets from the surrounding desert, some from as far away as Mauritania. By first light Saturday, the walled market is jammed with braying camels. The fun begins. For a few hours the town comes to life.

Amid almond trees newly burst into flower, a Moroccan farmer plows his patch of land near the village of Asni.

The varied geography of Morocco impresses visitors, many of whom expect to see only the barren, monotonous wasteland of the Sahara. Three ranges of the snow-capped Atlas crown the nation, and the plains bordering the Atlantic and the Mediterranean blossom like gardens.

Long a magnet for painters, Morocco appealed more to the artist in Sir Winston Churchill than any other country he knew. On dozens of canvases he captured the deep-blue sky, the white Atlas Mountains, and the red earth.

A slice of landscape between Rabat and Fez puts on contrasting faces for different seasons. When hot, dry winds of August parch the hills (lower right), irrigation ditches nourish the rows of fruit trees. In the wetness of late winter (below), young wheat greens the same slopes.

FOTOCOMUNES

The buyers, down from city stockyards in the north, seem hardly a match for the hard-haggling desert men (page 837). Folds of their turbans wrapped around their chins muffle their lean faces and their words. Bargains are often struck in sign language alone. Frisky stallions break away and gallop through the startled crowds, chased by herdsmen brandishing curses and long sticks. Wiry young men called *gabbadh*, more or less camel cowboys, hire out to tame the more spirited animals.

"Despite their reputation, camels are not vicious," confided one gabbadh, a tall Senegalese dressed in dusty shorts and T-shirt. His name was Suwaylim. He spread out a straw-rope lasso on the ground. A helper drove a frightened camel toward the loop. With a sharp tug Suwaylim snared the beast's hind leg while the helper leaped high on its neck with a stranglehold. Groaning, the camel went down in a cloud of dust. In seconds Suwaylim bent and bound one of its front legs. Helpless on three, the animal was led off peacefully.

By noon the sun, high above the minaret, had driven away the last of the shadows—and the crowds. Goulimine settled down to endure another sizzling week.

Verdant Scene Ends Desert's Monotony

The lush Atlantic plains came as a welcome change from the monotony of the blistering deserts. I drove north and east from Rabat, through the cork forests of Mamora, past olive plantations and velvet hills of wheat (preceding pages), rolling vineyards, and orange groves hemmed with tall cypresses. I often stopped to pick wild flowers from calico fields or bargain with Morocco's many roadside entrepreneurs. Melons, figs, straw hats, amethysts, fresh eggs, pottery, pet squirrels, baskets, Berber jewelry, asparagus, snails—each district had its specialty. In the Rif Mountains, near Ketama, I encountered the boldest breed of salesman.

"Hashish! *Bonne qualité!*" the hawkers shouted, waving aloft plastic bags of chartreuse dust.

Curious, I stopped at the fourth or fifth salesman, a boy in his teens. He gave me a tour of his roadside plantation, pointing out the better *Cannabis* plants and the choicest leaves. Though I deplored such commerce, I had to admire his bravado. Marijuana and hashish are illegal in Morocco. Wasn't he worried about the government agents?

"*Non, monsieur,* they are some of our best customers."

Later an official explained.

"Authorities buy up crops to destroy them. This helps cut down drug traffic without completely crippling the farmers, already among the poorest in the land. For many, the drug is the only cash crop.

"The Rif is rugged country," he shrugged. "Most of it is not reachable by motor road; to enforce prohibition, we would need an army."

The Rifians have a reputation as tough and independent people. Spain assumed suzerainty over this northern zone of Morocco in 1912—but it took another 14 years, climaxed by bitter fighting, to subdue the Rif.

Spanish Flavor Lingers Over Chechaouene

Outraged by Spanish rule and exploitation, a fiery Berber chieftain named Abd el Krim el Khattabi and his brother organized a band of mountain guerrillas and declared a *jihad*, a holy war, against the invaders. Armed only with rifles, his men routed a Spanish force at Annoual, butchering some 16,000. Flushed with victory and fat with captured weapons, Abd el Krim drove the Spanish army of 40,000 out of Chechaouene, their main mountain stronghold.

Perched on the flank of Mount Tisouka like an eagle's nest, Chechaouene today is one of Morocco's most charming towns. Its low whitewashed houses, the wrought-iron tracery of their windows, the red-tile roofs in the morning sun reminded me of Spain. I sought out the house of Mhamed, brother of the famous rebel leader.

I was greeted by a striking young woman in her early twenties. She was Rhima el Khattabi, Mhamed's granddaughter, home for the summer from her teaching job near Casablanca. We spoke in Spanish.

"With Allah and our mountains protecting them, they held off the Spanish, though overwhelmingly outnumbered," Rhima said. "The Spanish even bombed Chechaouene with airplanes. Finally, in 1926, Abd el Krim was forced to surrender. But it took more than 300,000 French and Spanish soldiers. They took him away to exile."

Abd el Krim died in Cairo in 1963, but his memory survives as a symbol of the Moroccan fighting spirit. For the 30 years following his

defeat, northern Morocco settled down under Spain. Rhima's father became *caïd* of Chechaouene and later served with Franco's army in Spain.

"For 44 years the Spanish and the French kept my country divided," Rhima said. "I am learning French now—Spanish is no help in Casablanca—but the language problem is not severe. All Moroccans speak Arabic.

"On the streets of Chechaouene, I go back to the veil. Otherwise people would talk. In 'Casa' it's a skirt and sweater or pants suit—for the same reason."

Quite a family, I thought. Three generations of Khattabis spanned a vital period of Moroccan history. They not only lived it, they helped make it.

Few cities anywhere look back on a more colorful history than Tangier, Morocco's northernmost city, on the strategic Strait of Gibraltar. Phoenician sea traders had established a port at Tangier by the 12th century B.C. The Carthaginians captured it from the Phoenicians. Then came the Romans, followed by the Vandals and the Arabs. For brief periods the Portuguese, the Spanish, and the British occupied it in turn. After France and Spain divided Morocco in 1912, Tangier became an international zone.

"It was a wild place then, a paradise for shady dealers, writers of spy novels—and, of course, real spies," recalled long-time resident Freddy Janowitz. A Czech, Janowitz came to Africa in 1928 as a mess officer with the French Foreign Legion and settled in Tangier after his hitch was up.

PHOTOCHROME BY THOMAS J. ABERCROMBIE © N.G.S.

"Bonjour, bonjour!—Good morning, good morning!" In joyous French, children welcome the author to Zemmour. Their families still till the soil, but increasing numbers of countryfolk flock to the cities in search of jobs. The result: overcrowded urban areas with inadequate housing.


JUGOLINIJA

"During World War II, I managed the Minzah Hotel, unofficial headquarters for the Allies; the Germans stayed at the Rif Hotel down near the beach. I'm writing a book about my experiences.

"After Morocco became independent, Tangier lost its free-city status. Duty-free shops closed by the hundreds. For a while things looked bleak.

"But I knew it was only a matter of time before the next invasion. Europe is only a ferryboat ride away—an hour by hydrofoil. I went ahead and built a night club. Now every evening I have a full house—and tourists spend more money than spies."

Nowadays tourist boats arrive daily from Spain and Gibraltar, disgorging hundreds. Most spend only a few hours on a "quick tour of Africa." It's time enough to visit Tangier's casbah and bargain for carpets, brassware, or antique muskets, or to mix—as I often did—with the crowd of turbaned merchants, veiled women, and Berber farmers during the late-afternoon *paseo* along crowded Boulevard Pasteur.

Across from the Place de France, I paused at the small park that looks out over the minarets of the old city and the row of ultramodern hotels that line Tangier Bay. A camel caravan plodded along the sandy shore carrying a tribe of tourists back to their villas. In the haze beyond the ships in the strait—I counted seven—I could make out the tip of Spain, only 19 miles away.

Culture Triumphs Where Politics Failed

For nearly eight centuries much of Spain had been Arab too. Slowly the cross had driven back the crescent until, the same year Columbus sailed from Palos, the Moors met their final defeat at Granada. But Europe would never be the same. Arabs had left their indelible stamp on Spain's language, its architecture, its music—and its temperament. Then, after 400 years, a new tide rose, and for half a century Europe flowed into Morocco.

A Moroccan friend back in Rabat summed it up: "From 1912 until 1956 we resisted French rule—only to be seduced by its culture. Europeanization is inevitable, we are such close neighbors. The problem is to sort out its curses from its blessings. Then we can construct our future."

With their cultural footings set deeply in a rich and pertinent past, and supplied with the building blocks of modern technology, Moroccans are bending to the task. □

Ships of the sea and the desert follow the northern coastline. Passengers on the Yugoslavian freighter and camel-riding tourists from a nearby resort are bound for the same goal—Tangier, fabled city of intrigue on Morocco's northern tip, four miles away.

SAN FRANCISCO'S TRAGIC OILSPILL TRIGGERS SPONTANEOUS COOPERATION BETWEEN INDUSTRY AND CONCERNED CITIZENS: HERE IS THEIR STORY

Barehanded Battle to Cleanse the Bay

By PETER T. WHITE Photographs by JONATHAN S. BLAIR
NATIONAL GEOGRAPHIC STAFF

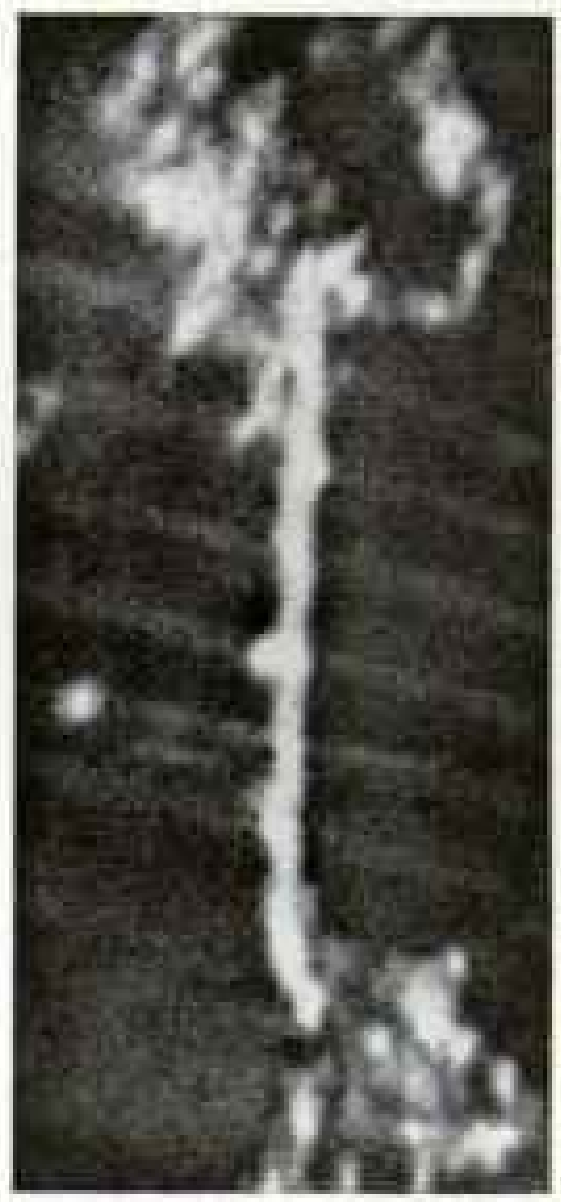
EKTACHROME © NATIONAL GEOGRAPHIC SOCIETY

SHE COULD HARDLY WAIT to get her hands on the oil. Sloshing in on the tide, it looked and smelled like tar, and stuck more persistently than molasses. But the high-school girl with the long blond hair didn't stop to worry about that. "How could we just sit there while the beaches got polluted, and the birds were dying? We wanted to *do* something. We wanted to get *involved!*"

She typifies a whole army of volunteers from the San Francisco area, aching for action after the alarm burst forth on the air and in the headlines: TWO TANKERS COLLIDE—GIANT BAY OIL SLICK.

One of the oil fighters' main weapons was straw. Put it on oil and it will absorb five to forty times its weight; the messy mixture can then be carried away. The Standard Oil Company of California, whose tankers spilled the oil, had 1,000 bales of straw ready and quickly corralled 39,000 more, under expertly prepared contingency plans.

But neither company nor government experts had foreseen the phenomenal response of the public: That such vast volunteer forces —uniting all ages and walks of life—would spontaneously organize themselves, work tens of thousands of man-hours, and put their stamp of unstinting enthusiasm on the great cleanup.



U. S. COAST GUARD

EIGHT HUNDRED and forty thousand gallons of oil! The crash that spilled it came in the dark, on one of San Francisco's foggiest nights. But radar enabled the U. S. Coast Guard to record the way it happened near the Golden Gate Bridge—the thick vertical line in the two radar pictures (**above**). At top, the dot left of the bridge is the *Arizona Standard*, inbound for the refinery on the bay; the second dot, to the right of the first one, seemingly stuck to the bridge, is the

Oregon Standard, outbound for Vancouver. Time: 1:39 a.m., January 18, 1971. Three minutes later (**lower**) the two dots have come together. Coast Guard radio alerted *Arizona* but could not raise *Oregon*.

No one was injured, but *Arizona*'s bow was crushed (**left**) and oil pouring out of *Oregon* posed danger. Would it reach the Richardson Bay Wildlife Sanctuary, a stopover for migrant ducks on the Pacific flyway? Would oil ruin the wintering grounds of tens of thousands of shore birds in San Francisco Bay? Luckily the tidal range was narrow that day; half the tidal flow was over at that hour, and so the oil flooded only 4½ miles into the bay. But after ebbing 7 miles out to sea, it flooded back onto the coastline, north beyond Duxbury Reef and nearly as far south as Pescadero Point—trapping thousands of sea birds. Oil had blackened the Golden Gate (**above**) 12 hours after the collision. By then the cleanup was in full swing.

STRAW BY THE TON dropped onto the oil from a U. S. Army helicopter (**above**) and from scores of boats and barges. Soaked with oil, the straw was picked up by barge-borne cranes, by men with pitchforks in dozens of small boats, by eager volunteers on the beaches. Bulldozers piled it into great gooey masses. Mechanical loaders hoisted these piles onto dump trucks that drove them away, to decompose in pits and garbage dumps. On the water, vacuum hoses sucked globs of oil into tank trucks afloat on barges or parked along the shores.

Most of the equipment was mobilized by Standard Oil, whose board chairman, expressing regret for the collision that caused the spill, had pledged "all possible resources, everything necessary to restore the bay and the beaches to their normal condition." The company rented nine helicopters, fielded 155 two-way radios to coordinate the work, and assigned seven telephone operators to take claims for damages. Many pleasure boats had to be repainted; on some, the removing of oil stains stripped off the paint as well.

The oil spilled was the heavy type called Bunker-C, used as ship fuel, which must be kept above 130° F. if it is to flow freely. In

PHOTOGRAPHED BY JONATHAN S. BLAIR (ABOVE) AND AL GIDDINGS © N.G.S.

the cold water it congealed, but some volatile components mixed with water; the full effect on shellfish and other delicate links in the marine food chain may not become apparent for years.

Reported a scuba diver (**right**): "Even where there were no heavy oil patches, I found an iridescent film—lighter parts of the oil. Soft black globules, some no larger than golf balls, floated a foot or so below the surface." When he got home and washed his neoprene diving suit, it fell apart; the glue that held the stitching in place had been dissolved by the oil.

CLEANUP VOLUNTEERS worked into the dusk near the San Francisco Marina with pitchforks and rakes, latching onto the oily straw as soon as it hit the beach. Aboard the tug a Standard Oil employee pushed straw shoreward with a pole; on the fantail a company supervisor with a two-way radio watched to see what materials the volunteers might need. More pitchforks? The total provided

EXTRACTED © NATIONAL GEOGRAPHIC SOCIETY

was 2,100. Recalls a man who helped coordinate the outpouring of volunteers: "That first day, on Monday, they were mostly long-hairs, the hip, the 'street people,' as they sometimes call themselves. They had time on their hands, they responded right away. By Wednesday the 'straight people' had fully joined in—businessmen, bus drivers, they'd arranged to take time off. Schools let youngsters out of class to help. Some retired people out there were so old they had trouble walking on the sand. The company hired a lot of construction workers, so you saw hard-hats too. It sure was a real American cross section."

Work continued through the nights, under portable mercury-vapor lamps from the Army. Food was contributed by housewives and public-spirited hamburger stands.

SOME WADED into the chilly water to spread more straw and to bring out oily armloads. "The quicker you get it the better," said a girl wet up to her neck. "Once it hits the rocks on the shore it's so much harder to get off." Globs three feet long and a foot wide came floating in, many so weighty that they had to be wrenched into manageable pieces by hand. Said another girl, "You sure use all your muscles."

The oil company employee supervising cleanup operations beamed with admiration. "You couldn't pay a person to do this job, to go into the water the way those kids did. None complained of being cold. The only time I found one unhappy was when we couldn't get them straw fast enough."

On Agate Beach (**right**), volunteers picked up oil-saturated straw and carried it in cardboard boxes to waiting trucks. Here gummy tides coated and choked the mollusks that cling to the rocks.

Nearby at Bolinas (**below**), hundreds on the beach sawed and hammered day and night, building a many-sectioned boom to protect the entrance to Bolinas Lagoon, a sanctuary for egrets and blue herons.

The first section was ready for floating, and the bearded young man in charge shouted, "You want a bulldozer to do it?" From the dark a voice shot back: "Let's pick it up!" Quiet settled, everyone breathed in unison. One. Two. Three. Everyone lifted. "Beautiful," said another bearded participant. "Man, it was a good trip."

TO HELP the oil-crippled birds became the emotional commitment of many volunteers —society matrons, professors, students by the hundreds. And no wonder, for what had befallen the birds was shocking.

Half were western grebes, a fifth were scoters, and the rest included 27 species—loons, scaups, and common murres. They all sit on the sea and dive for their food. Diving into clean water, they came up into black oil. Unable to fly with oil-heavy wings, hopelessly trying to preen, many drowned. Others, pounded by surf, wound up as shapeless blobs washed onto a beach, their bodies growing cold, their insides ravaged by swallowed oil. Some men, hearing the choked cries of distress, sat down and wept.

Beached birds with life still in them were wrapped in rags and driven to dozens of

DETACHROME © NATIONAL GEOGRAPHIC SOCIETY

cleaning stations, including Fort Baker's gymnasium (where a loon arrives to be bathed, **above left**). Standard Oil supplied 22,500 gallons of one widely used cleaner: warmed, crystal-clear mineral oil—highly refined petroleum, commonly found in nurseries as a balm for babies' skin.

Birds such as the scoter (**right**) received several mineral-oil baths and were dried in a mixture of flour and corn meal. Then off they went to collection points, such as the warm basement of the lion house at the San Francisco Zoo (**above right**). To fight dehydration, starvation, and infections, a syringe force-fed a mixture of water, bits of fish, antibiotics, and vitamin B_1.

But many birds soon died. Experts predicted survival for no more than three to five out of a hundred.

UNDETERRED by unfavorable prognoses, volunteers created a unique treatment center for hundreds of birds in a University of California warehouse in Richmond. There, in a plastic pool embedded in a makeshift plywood enclosure (**below**), a grebe could swim again after three weeks of intensive care. A student in the corner makes notes on the bird's behavior; under a sun lamp, loons, gulls, and murres preen after their swim.

But how long until a grebe could return to the sea? A few weeks? Several months? Not even zoologists could tell for sure. He must overcome not only the toxic effects of the oil and the shock of being handled by people. His feathers must regain their ability to shed water lest he become waterlogged and drown; the down beneath those feathers must once again be able to keep him warm, or he might die of exposure. Would the bird have to await new feathers, after molting?

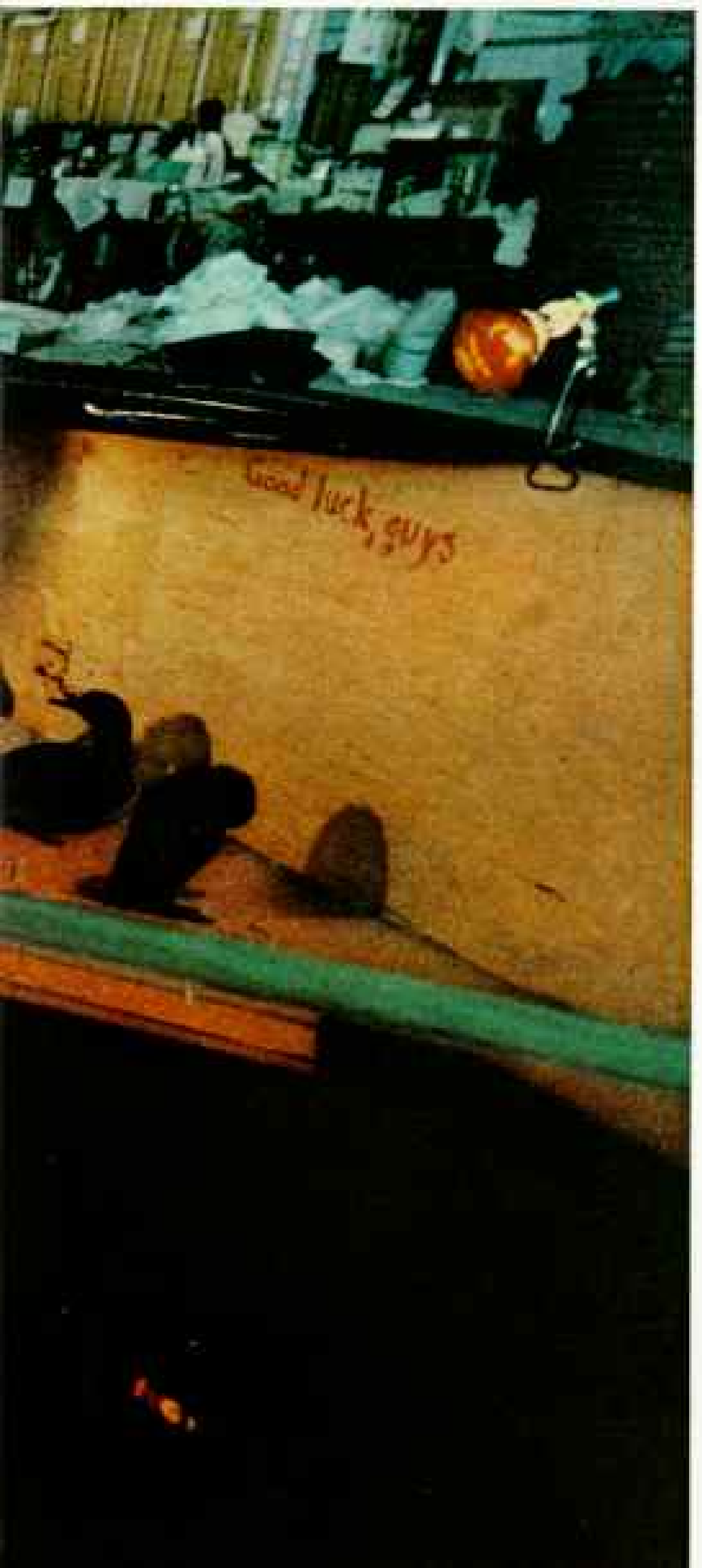
Simply keeping grebes alive in captivity posed a challenge. "So little is known about them," said a supervising veterinarian at the Richmond Center. "The kids try everything they can think of." Example: playing stereo recordings of surging surf; it seemed to calm the grebes. Standard Oil paid $900 a day for medicines and food, mostly live shrimp and minnows. Grebes at the San Francisco Zoo also soon switched to live fish, served in pans (**right**).

Penned in small groups, the Richmond Center's birds received individual attention. "You get attached to one," a girl said, "and

then you want to come back and see how he is." A college student, asked how he could serve daily and yet keep up his academic work, replied, "I can't. But this is more important." Like other young volunteers, he kept detailed records of the progress of many individual birds—valuable material for the continuing research into the care of oiled birds.

Officials of California's Fish and Game Department pointed out that the birds are a self-renewable resource. Barely half the grebes hatched in one year are likely to survive into the next; thus the more that are saved now, the fewer will probably survive out of next year's hatch, because their environment can support only a limited number. Wouldn't it be best to kill the seriously contaminated birds humanely?

Richmond Center volunteers bristled at such talk. Proud of the unexpectedly high survival rate chalked up on their scoreboard (**below**), they cheered when the first grebe to be released flew off to the sea, only a month after that initial swim in the pool. To them, their birds had become symbols. As a young housewife put it, "When we help them we are fighting for all of us, to save our environment."



TECHNOLOGY to foil the oil included plastic booms, shown protecting the rocky shore at Sausalito (**left**). A Standard Oil employee maneuvered the oil shoreward, through a gap between boom sections, toward a suction hose pumping it into a tank truck.

Inside San Francisco Bay (**below**), a chartered cabin cruiser pulled the long line of booms to encircle clumps of oil-soaked straw. It would be picked up with pitchforks by the crew of the barge in the distance.

Moving slowly through a patch of oil (**below right**), a self-propelled barge towed a "skimmer" fastened to its side. This is a raft with suction hoses. The oil it sucked up, mixed with water, flowed into the barge to be separated later at the refinery.

Some techniques fizzled. Shredded Styrofoam, sprinkled on oil, proved harder to pick up than the oil itself. But federal officials agreed that a good job was done, considering the present state of technology. Had it not been so, federal law would have held Standard Oil liable for cleanup costs. As it was, the company spent more than $4,000,000, part of which would be recoverable through insurance.

Noted the Federal Environmental Protection Agency: "When a passenger liner rammed a tanker in the Golden Gate in 1937, cleaning up was left largely to nature. At Santa Barbara in 1969 the work was done with the help of inmates from a correctional institution. This time so many volunteers showed up that nobody knew how to use them all efficiently. In fighting oil spills in the future, concerned citizens will have to be assigned a major role."

Looking beyond San Francisco, volunteers are already compiling a manual based on their experience. The idea is to help concerned citizens anywhere go into action efficiently and quickly, should some similar catastrophe threaten their community. □

Mississippi odyssey begins 1971-72 series of Special Publications

Meandering through Minnesota marshes, the Mississippi starts its journey to the gulf. *The Mighty Mississippi*, first of four new volumes, follows the great river 2,348 miles from source to mouth, recounting rampages of the past and man's success in harnessing its waters.

KODACHROME BY JAMES L. STANFIELD © N.G.S.

By MELVIN M. PAYNE, Sc.D.

PRESIDENT, NATIONAL GEOGRAPHIC SOCIETY

ONE WINTRY SATURDAY MORNING when I was a small boy, some of my friends and I decided to go exploring. Inspired by the river adventures of Huckleberry Finn, we combed a construction site near my home in Washington, D. C., for scrap lumber. With odds and ends of rope and wire, we tied the larger pieces into a raft and launched it in a water-filled excavation.

For a few seconds our vessel floated triumphantly. Then a key fastening came undone, leaving us standing hip-deep in icy water.

We splashed ashore shivering, lit a fire in a steel drum, and took off our wet shoes, socks, and pants to dry while we tried to keep warm beside the

Eye-smarting, throat-choking smog veils Los Angeles, California. Stifling air pollution now afflicts almost every major city in the world. In the second of the Society's new Special Publications, *As We Live and Breathe: The Challenge of Our Environment*, distinguished ecologists and technologists describe the danger to our planet. There is hope for the future, the authors point out, in man's growing awareness of his problems and the upsurge of efforts to solve them.

Tents pitched, Bedouin set up camp in Saudi Arabia's Empty Quarter. In *Nomads of the World*, the third Special Publication of the new series, you meet these wanderers who roam the desert in search of water and food for their camels. You will also encounter the Gaduliya Lohars, nomadic blacksmiths of India, who move from village to village in bullock carts. Pygmies trek the tropical rain forests of equatorial Africa, foraging for food. And in the Philippines, boat dwellers of the Sulu Sea sail from one fishing ground to another.

America's folk hero, the cowboy, commands vast audiences on television and in movies. Now comes a volume that surveys, sympathetically, this storied man of the West—*The American Cowboy in Life and Legend*, fourth in this series of Special Publications. Author Bart McDowell and photographer William Albert Allard join the cowboy on his trips to town, explore his country, and visit his ranches—including the 125,000-acre Diamond A in New Mexico (left).

fire. Like Huck's friend Tom Sawyer, I didn't mention the incident to my "Aunt Polly" for a long time afterward.

That ducking temporarily dampened any ideas I had about imitating Huck Finn. But I must confess that those feelings returned often through the years. I recalled them vividly a short time ago, while reviewing Bern Keating's manuscript and James L. Stanfield's photographs for the National Geographic Society's new book, *The Mighty Mississippi*. From its beginning as a tiny stream in Minnesota, I was swept along with the gathering might of the river's current. And I felt the adventure of discovery that had lured me as a child.

Indeed, that adventure lies within each of the Society's Special Publications for 1971-72. They, like previous volumes in the great series, are books the whole family will enjoy.

"Our sons, aged 7 and 4," writes a member from Oregon, "sit for hours looking at them."

Many members will recall *The Mighty Mississippi*'s author, Bern Keating, for his popular book *Alaska*—now being updated. He brings to his new book the same feeling of involvement that made his earlier one a best seller.

And what a subject the Mississippi is! Once this river formed the western boundary of our Nation; today it serves as a water highway through the Nation's heartland.

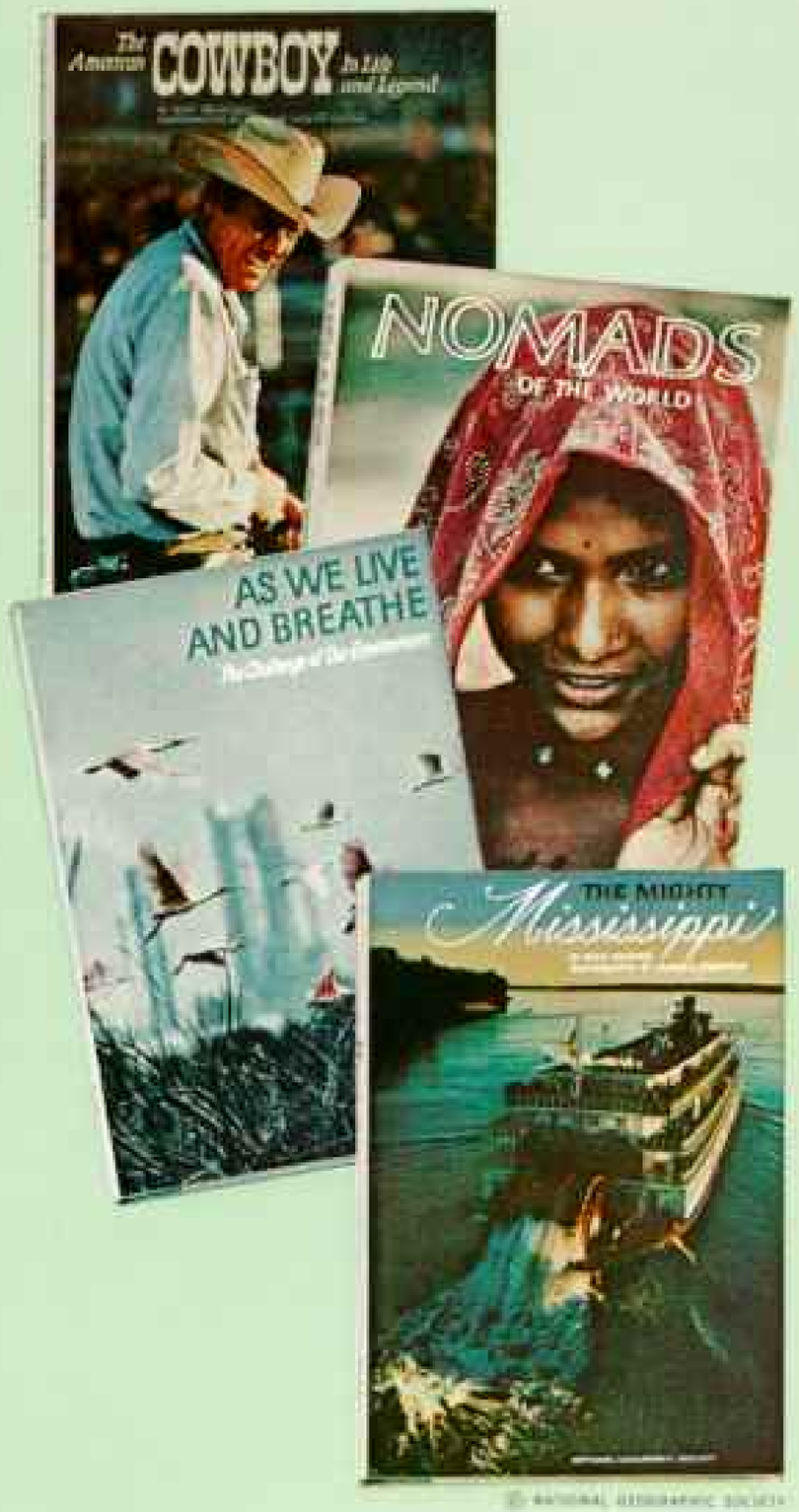
Its present provides as much excitement as its past, when Mark Twain knew it. The 31 states wholly or partly drained by the Mississippi and its tributaries account for 60 percent of the Nation's land area and produce almost three-quarters of our gross national product. This region is full of astonishingly diverse people—Indian wild-rice harvesters, tugboat captains, jazz musicians, cotton planters. You will meet them in the colorful pictures and vibrant text of this Special Publication.

Our second book of the series, *As We Live and Breathe: The Challenge of Our Environment*, comes in response to requests from thousands of members. "We have seen much of the beauty of the United States and the world through the pages of the *National Geographic* and its excellent books," writes a member from Iowa. "I would like to see . . . books showing what man is doing to destroy and pollute the natural beauty and the living things in his own environment. . . . Books that offer expert advice about the preservation of our 'National Geography.'"

Our members expect such a book because their Society has always supported conservation, ecological research, and other projects of basic importance to our understanding of the environment. On scientific expeditions—and as Secretary to the Advisory Board on the National Parks, Historic Sites, Buildings and Monuments—I have enjoyed a rare vantage point as the public has awakened and demanded positive answers to our ecological problems.

Your Society has published articles on the threatened extinction of many species. As early as 1897, we warned of pollution in the Potomac River. And in December 1970 two articles comprising "Our Ecological Crisis" appeared, together with a special map-and-painting supplement; all received unprecedented acclaim.

As We Live and Breathe begins by showing how easily careless man can upset nature's delicate balance. But it goes far beyond a grim catalogue of mishap, for the book also describes



Enjoyment, enlightenment, excitement

DON'T MISS these Special Publications for 1971-72. Travel the heart of the Nation on a journey down *The Mighty Mississippi*. Learn what you can do to help restore and preserve the balance of nature in *As We Live and Breathe*. Take what may be a last look at *Nomads of the World*. And put yourself in the boots and saddle of *The American Cowboy*.

Each hardbound volume, with 200 or more pages, is profusely illustrated in color. Send no money now. You will be billed $4.25 plus postage and handling for each book at time of shipment; pay only for the books you decide to keep.

886

efforts being made to restore life-renewing cycles. It stresses the need for a new attitude toward our planet.

Time is running out rapidly for the subjects of our third Special Publication in this series, *Nomads of the World*. I remember seeing a dramatic example of this when I visited Africa several years ago.

In the rain forest of Uganda's Ruwenzori Mountains, I came upon a small band of pygmies. They surrounded me excitedly, begging for food, clothing, anything I would part with. Much of their ancient self-sufficient way of life had already disappeared.

All over the world peoples once free to wander are rapidly becoming settled. But in a few isolated areas, there remain some who migrate as seasons change, game moves on, or grass for flocks becomes scarce.

In this book you will herd camels beside a Bedouin boy, spear a shark with a Bajau fisherman on the Sulu Sea, and accompany a Kashgai shepherd across the Zagros Mountains. With warmth and understanding, anthropologists bring you the nomads' joys and sorrows, their codes of honor, their restless spirit. Striking photographs capture ways of life soon to be abandoned.

The last in this series of Special Publications, *The American Cowboy in Life and Legend*, takes me back to my childhood as did the first, *The Mighty Mississippi*. I will never forget waiting for intermission in Washington's old Revere Theater. Then suddenly in walked Tom Mix—as advertised. Bigger than life, the movie-star cowboy swaggered down the aisle, twin six-shooters gleaming and spurs jingling. When he swaggered out again after his talk about the wholesome outdoor life, half the youthful audience followed him from the theater.

The cowboy book reveals the men behind the image of a great national folk hero. Author Bart McDowell of the Senior Editorial Staff has a special affection for life on the open range. "My grandfather, Judge Caswell K. McDowell, left his east Texas home in 1888 at the age of 18," he told me one day as we discussed this project. "He tried homesteading, but that life was too tame. So he decided to become a cowboy on the old Mill Iron ranch.

"Eventually he helped organize Motley County in northwest Texas, and later served as a lawman and county judge."

In this book, a remarkable collection of paintings, contemporary drawings, and magnificent color pictures by award-winning photographer William Albert Allard trace the development of a legend, and much more. For Bart returns to his native West to meet the real-life cowboy of today, to watch him, to share the excitement of his skills, and to visit the great ranches and cow towns.

Be sure to reserve your copies of the four books in this absorbing series. The first, *The Mighty Mississippi*, will be mailed immediately; the others will arrive at intervals of about three months.

To place your order now, print your name and address on the flap of this page, fold it, and drop it in the mailbox. ☐

Beauty queen, miner, Bedouin, cowboy—four faces from four absorbing new books: Patte Quinlen reigned over the 1970 Cotton Carnival in Memphis, bustling port city on *The Mighty Mississippi*. Coal dust masks West Virginian John Paulus, a victim of "black-lung" disease described in *As We Live and Breathe*. A bearded wanderer of Saudi Arabia's Empty Quarter epitomizes *Nomads of the World*. This wrangler, on Colorado's W \ J Ranch, and other hardy ranch hands present and past ride through the pages of *The American Cowboy in Life and Legend*.

There are only six $25 electric watches made in the free world.

TIMEX® makes them all.

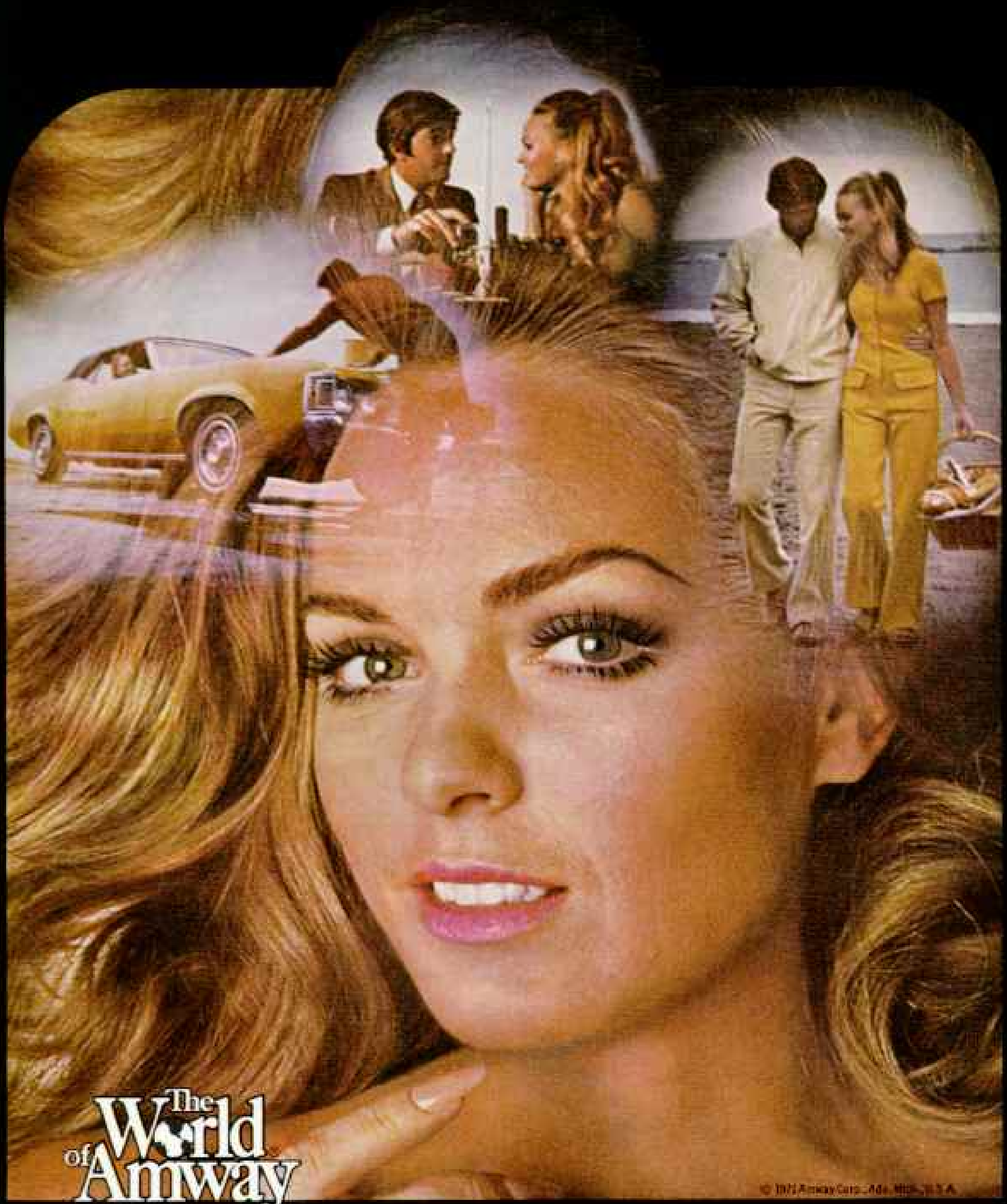
And all give you electric accuracy. All give you the convenience of a watch that never needs winding. All are water and dust resistant. All have a beautiful price. Just $25.

And you can have just about any of them with an automatic calendar for just $30.

You've been waiting for an electric watch at an affordable price? You've got it.

The Electric TIMEX.® It never needs winding.

Models illus. top to bottom: 760901, 761911, 760701, 761601, 762701, 761501.



A world of good things. Good things for you...for your family ...for better living. Over 150 Amway products...like cosmetics...toiletries...and Amway Home-Care Products, including laundry compounds...L.O.C. all-purpose cleaning concentrate... and all of Amway's other cleaners for floors, walls, cabinets, windows, dishes, silver...in fact, everything around your home. Products formulated to help protect our environment...products packaged in shapes and sizes most convenient for you...products which are concentrated for added economy and value. Products backed by Amway's guarantee of satisfaction or your money refunded. A whole world of good things brought right to your home by someone you know and trust...a friend or neighbor...your Independent Distributor of Amway products. Let him, or her, introduce you to this exciting World of Amway.

Amway Corp., Ada, Michigan 49301 | Amway of Canada Ltd., London, Ontario, Canada.

A Winnebago motor home is a kitchen for fishing trips. A bathhouse for the beach. A ski lodge for Aspen. A lounge for football parties. A dozen motels when you're on the road.

It carries everything. Double beds and bunks. Kitchen. Double sink. Oven-range. Refrigerator-freezer. Bathroom. Shower. Stool. Lavatory. Dinette. Lounge. Every convenience you could want, built in and ready to use, whether you're relaxing in a secluded forest or tooling down highway 101.

You can live in a Winnebago motor home. And have fun. No matter where you go. No matter what you do. Maybe that's why more people buy Winnebagos than any other motor home in America.

Winnebago Industries, Inc., P. O. Box 152, Forest City, Iowa 50436

Gentlemen: Please send me your free Winnebago brochures.

Name _____

Address _____

City _____

State _____ Zip _____

WINNEBAGO
Designed from the inside out

Camps

FARRAGUT NAVAL CAMPS

A summer to remember for boys 8–18! Trips on 65-foot flagship. 36-boat fleet incl. 23 sailboats. All sports. 2 pools, athletic fields. Golf, Apex, summer school. Opens July 3. Cat. **Farragut Naval Camps, Box LC, Toms River, N. J. 08753**

SHATTUCK Summer School-Camp Coed

School sports plus learning! 6 who, Golf, tennis, swimming, sailing, water-skiing, riflery, ice-skating. **Coed 13–18.** Ind. study; coll. prep. **Boys only 10–12.** Fundamentals, typing. **Dir. of Adm., A 715 Shumway Hall, Faribault, Minn. 55021**

VALLEY FORGE MILITARY ACADEMY SUMMER CAMPS

A summer of fun and learning adventure at America's finest Military Academy. Pioneers (8–11) Rangers (12–16) Bandsmen (13–17) Tutoring, Reading Clinic, Music lessons, Swimming, Indian lore and crafts, Scouting, Sports Clinics, SPORT KARTING, Riding, Leadership training.

Catalog, Box NC, Wayne, Pa. 19087

TED WILLIAMS BASEBALL CAMP

June-July-Aug. Great Food, instruction, competition, swimming. Everyone plays daily. Choose BASEBALL, or BASKETBALL, or TRACK & FIELD. Also, UMPIRE SCHOOL for men. **R. J. Cassidy, Dept. NG, Lakeville, Mass. 02346**

Junior College

GORDON

A unique Confessional Junior College. Assoc. Arts degree. Dormitories for boys and girls. Required, supervised study for all. Intercollegiate football and ROTC for boys. 45 miles from Atlanta (near enough, but far enough). Car advised. Write: **Dept. NG, Gordon Military College, Barnesville, Ga. 30204**

Coed Schools

ABBOTSHOLME

Founded 1886. Coed. 11–18. Full curriculum to university entrance. Open Country Pursuits. Centre for music & art. "One World" theme. 170 acre estate bounded by River Dove; near Peak National Park, Derbyshire. H. Inc. Brochures: **Abbotsholme, Rocester, Uttoxeter, Staffordshire, U.K.**

CULVER

Military Academy—1884
Academy for Girls—1971

Exciting college preparatory programs for boys, grades 8–12 and girls 9–12. Outstanding facilities on 1,500 acres beside Lake Maxinkuckee. Small classes. Commitment to excellence has marked Culver's success in developing responsible citizens and leaders. Riding program. Outstanding faculty. Accredited counselors. We invite comparison. Scholarships. Catalog.

69 Pershing Plaza, Culver, Indiana 46511

FENSTER SCHOOL-ARIZONA

Fully accredited for boys and girls, Grades 1–12. College preparatory. Small classes. Superior facilities and staff. Riding, swimming, other activities. Also summer school. Color Catalog. **Kenneth N. Fenster, P. O. Box 6238, Tucson, Ariz. 85716**

FLORIDA CENTRAL ACADEMY

In the Land of the Sun

Coeducational

Grades 7–12. Small classes. 20 mi. north of Orlando. Fully Accredited College Prep. 30 acre campus. Outdoor Pool. Golf. Athletics for all. Expert coaching. Air conditioned sleeping rooms. Colorado Summer School. Catalog. Dean, Box 38, Sarrento, Fla. 32776

JUDSON-ARIZONA

BOARDING - COLLEGE PREP. - COED

Fully accredited. Prep and General Courses. Healthful desert climate. Grades 5–12. Informal Western life. Small Classes. Remedial Reading. All sports. Riding. Art, music. Brochure. **Henry K. Wirk, Dir., Judson School, Box 1989, Scottsdale, Ariz. 85252**

INTERLOCHEN ARTS ACADEMY

Coed college prep boarding school for grades 9–13. Specialized education in Art, Dance, Drama, Music, Writing, plus full academic program. Curriculum stresses interaction, involvement. Catalog: **Adm. Dir., Box 2B, I. A. A., Interlochen, Mich. 49643**

Pine Crest School

Fort Lauderdale, Florida

Fully accredited, college prep. Boarding, grades 7-12. Honors, Adv. Placement courses. Major sports. Multimillion dollar campus; modern air-conditioned facilities. Coed. Summer School, new and review courses. Camp. Adm. Dir. Box N, Pine Crest School, Ft. Lauderdale, Fla. 33308.

Boys' Schools

Why Augusta?

A faculty adviser for each student. Individualized instruction in the basic educational pattern. Prepares for top colleges and universities. Gr. 8–12 and P.G. Lower School, gr. 5–7. Ideal environment for individual development. Summer School. Write Col. N. Harris Lynch, Box 100.

AUGUSTA MILITARY ACADEMY, FORT DEFIANCE, VA.

BERRY ACADEMY COLLEGE PREP for young men.

Spacious, beautiful campus. Small classes, emphasis on the individual. Grades 8–12, accredited. Financial aid. Founded 1902. Affiliated with Berry College. **Headmaster, Box 4004, Berry Academy, Mount Berry, Georgia 30149**

THE BOLLES SCHOOL of Florida Grades 7–12

Fully accred. Sound basic academic preparation. Developmental reading, study skills. College boards. Advanced placement courses. Guidance. Career, personal counseling. Varsity, intramural sports. **Dir. of Adm., 7484 San Jose Blvd., Jacksonville, Florida 32217**

CAMDEN MILITARY ACADEMY

A truly accredited college preparatory school, grades 8–12. In Carolina's winter resort section. Stresses academic achievement, character, leadership. Honor ROTC. Rate $1425.00 plus uniforms. Write **Col. L. P. Risher, Box N, Camden, S.C.**

CARLISLE MILITARY SCHOOL

"Developing Manly Men"—cultivates physical, mental, spiritual qualities. Gr. 8–12. Band, swimming pool, all sports. Honor ROTC. Rate $1400.00 plus uniforms. Col. James R. Risher, Pres. Write: **Col. Wm. N. Risher, Hdm., Bamberg, S.C.**

CASTLE HEIGHTS

The RIGHT School for Your Son!

Quality education in excellent school environment. 100% of 1970 graduates in 10 leading colleges (M.I.T., Ga. Tech, Vanderbilt, Auburn Univ. Tenn., N.C. St., etc.) Remedial program. Founded 1902. 10,000 alumni. Honor school. Junior school, emphasized in fifties available on separate campus, emphasizes personal attention. Ph: 615-444-6124 or write Box 0125N.

CASTLE HEIGHTS, Lebanon, Tennessee 37087

COLUMBIA MILITARY ACADEMY

Enhance your son's future at CMA. College prep.—gr. 8–12. Sep. Jr. School, gr. 4–8. Excellent academic standing, fully accredited. All sports.—indoor pool. ROTC. Summer School. Music program. **CMA, Dept. N, Columbia, Tenn. 38401**

FARRAGUT ACADEMIES

America's First Preparatory School with Naval Training. Fully accredited program for boys, grades 7–12. Separate Jr. School. Outstanding preparation for all colleges, careers. Sports, pools. $7 million in facilities. Two superb waterfront locations. Camps, approved summer school at Farragut North. Catalog:

FARRAGUT NORTH or FARRAGUT SOUTH

Box L, Toms River, N.J. 08753 Box L, St. Petersburg, Fla. 33733

Florida Air Academy

Accredited. Coll. Prep. AIR FORCE ROTC Grades 9-12 & PG Melbourne. Grades 1-9 Ft. Lauderdale. FOR CATALOG write **Melbourne, 3, Florida 32901**

Summer Session: June 27-Aug. 13
Fall Term commences Sept. 12

FORK UNION MILITARY ACADEMY

One ONE SUBJECT PLAN for grades 9-12 between home and Fully accred. Training toward commercial, mechanical and scientific careers. Separate Junior School gr. 5-8; homecoming, 17 modern buildings, 6 indoor pools, 2 fully equipped gyms. Bands, glee club. 73rd year.

Non-Mil Summer School, gr. 7-12

Catalog: **Dr. R. T. Whitescarver, Box 101, Fork Union, Virginia 23055**

GREENBRIER ★★★ 160th YEAR

"THE SCHOOL OF ACHIEVEMENT"

Achievement in class—achievement in life. Prepares for responsible leadership. Grades 7–12 and P. G. Fully accredited. Non-profit. Special How to Study classes. Indoor pool. Athletics for all. Special coaching in your favorite sport. Championship teams. Summer Camps. **Greenbrier Military School, Box M-6, Lewisburg, W.Va. 24901**

HOWE MILITARY SCHOOL

Jr. & Sr. Schools, grades 6–8 & 9–12. Thorough and exacting. Accredited gen. Developmental Reading. Jr. ROTC. Sports, dorm. Episcopal. Est. 1884. Summer Camp. Catalog. **Col. R. R. Kelly, Supt., 516 Academy Pl., Howe, Ind. 46746**

KEMPER MILITARY SCHOOL AND COLLEGE

Fully accred. Grades 7–12; 2-year college. Small classes. Fine faculty. Counseling. How-To-Study Program. Jr., Sr. ROTC. Sports. Social activities. FAA flying. Education for leadership. Scholarships. Catalog: **199 Third St., Boonville Mo. 65233**

Obtain Pilot's License

MARINE MILITARY ACADEMY

College Prep. 7–12. PG. Naval Honor School. Accredited. High academic standards. Marine Corps JROTC. Full sports program. Scholarships. Catalog. **320 Iwo Jima Blvd., Harlingen, Texas. Tele: 512/423-6006.**

MASSANUTTEN ACADEMY

Massanutten develops a boy's INTELLECTUAL, MORAL, SOCIAL, PHYSICAL and LEADERSHIP ability. Small classes—individual attention—select faculty. ROTC. Grades 6–12 & Postgraduate. Liberal home policy. Summer Camp and Co-ed Summer School. Ph. (703) 459-2161 or write **Col. L. N. Graham, Supt. Woodstock, Virginia 22664**

Seventy-first Year—Fully Accredited

MIAMI MILITARY ACADEMY

Fully accred. ROTC Honor School. College Prep & General. Grades 6–12 & P.G. 46th Year. Guidance. How-to-Study. Honors Courses. Sports. Moderate all-inclusive fee. Summer School & Camps. Catalog. **10687F Biscayne Blvd., Miami, Florida 33138**

MILLER SCHOOL OF ALBEMARLE

College prep and vocational—gr. 8–12 & P.G. Sep. Jr. School, gr. 3–7. Privately endowed, non-denominational. 1400 acre campus in Blue Ridge. ROTC Honor School. Summer School & Camp. **Dr. R. J. Lawton, Box N, Miller School, Va. 22901**

MISSOURI MILITARY ACADEMY

Also Separate Jr. Schl. 42nd yr. Sml. classes. College prep. Gr. 8–12. All sports. Golf. Riding. ROTC. 10 beautiful new bldgs. in 16 yrs. Incl. library, dorms, largest field house in state. Catalog. **Col. Charles Stribling, III, 916 Main, Mexico, Mo. 65265**

NORTHWESTERN MILITARY ACADEMY

Fully accred. purposely small college prep. Gr. 7–12. Concern for individual. Promotes scholarship, ambition, confidence. ROTC. All sports. Scholarships available. Chicago 85 mi. Catalog. **56 S. Lake Shore Rd., Lake Geneva, Wis. 53147**

Riverside...two ideal climates

Fall and Spring in north Georgia mountains, Winter in Florida. Year-round outdoor sports. Grades 8-12. Fully Accredited College Prep., General & Postgraduate. Honor Military School 45 years. Economical cost. Summer School. Write for Catalog to Supt.

RIVERSIDE MILITARY ACADEMY
Box 308, Gainesville, Ga. 30501

ROOSEVELT MILITARY ACAD.

"Brigadiers of Men." Accred. Gr. 7-12. College Prep, general courses. Small classes. Emphasizes fundamentals, how to study. Guidance. ROTC. Sports. Aviation. Catalog. **Col. Glen G. Millikan**
Box N, Aledo, Ill. 61231 Phone: 309*582-5166

St. Andrew's School

Grades 7-12

Episcopal boarding school, for boys of all denominations. Coed day. College prep. Developmental reading. Well-equipped labs. Sports. Olympic-size pool. Modern campus, air-conditioning. Catalog. **Eugene J. Curtis, Jr. Boca Raton, Fla. 33432**

St. John's Military Academy 1884

A Tradition of Excellence

stressing character, leadership, scholarship. Accred. college prep., gr. 7-12. Tutorial, developmental reading programs. All sports, hockey, flying, rifery. Golf, stable, pool, boats, lake. ROTC. Band. Interdenominational. Chgo. 100 mi. Write: **Wm. J. Wood, Headmaster, Box 1361, Delafield, Wis. 53018**

ST. JOHN'S MILITARY SCHOOL

Gr. 7-12
Since 1887

Full accredited. Individual attention in a friendly atmosphere. College prep curriculum. ROTC. Sports. Driver's Ed. Episcopal—all faiths welcome. Catalog: **Col. Keith G. Duckers, Box NG-701, St. John's Military School, Salina, Kansas 67401**

SAINT THOMAS ACADEMY

Accred. College prep. Catholic. Gr. 9-12. 88th year. Modern suburban campus. New lakeside residences. Small classes. Tutorials. Lang. Lab. ROTC. All sports. Indoor pool. Catalog: **Box 21, Saint Thomas Academy, St. Paul, Minn. 55118**

SANFORD NAVAL ACADEMY

An Outstanding Florida Private School. Every 10th graduate to college (Harvard, Ga. Tech, Carnegie, Univ. Florida, Tenn., Va.) Ideal school environment. Sep. Jr. School. Write Box 67 TN. **The Sanford Naval Academy, Sanford, Florida 32771**

Sewanee MILITARY ACADEMY

A Secondary School of the University of the South.... Est. 1868.

Superior college preparation in Grades 9-12. Fully accredited. Special instruction & counseling. All sports. Episcopal. 10,000 acre mountain campus. Summer School-Camp. Catalog. Write Dir. Adm., SMA, Room 106, Sewanee, Tennessee 37375.

SHATTUCK SCHOOL

Boys Grades 9-12 Balanced academic. AF ROTC, on 330-acre wooded campus. Episcopal school. Accred. college prep. Small classes. Sports, gym, pool, golf course, ice arena. Est. 1858. Catalog. **Dir. of Adm., 715 Shumway Hall, Faribault, Minn. 55021**

STAUNTON MILITARY ACADEMY

In Beautiful Shenandoah Valley. Thorough college preparation; fully accredited. Individual guidance. Band. All sports. 2 gyms. Pool. Fine health record. Junior R.O.T.C. Program. Separate Junior School. Illus. Catalog write Supt. SMA, Box D-6, Staunton, Va. 24401.

Founded 1860

LEADERSHIP, CITIZENSHIP & SELF DISCIPLINE STRESSED

TMI TENNESSEE MILITARY INSTITUTE

98% of 1970 graduates entered colleges of their choice. In grades 8-12, TMI boys receive individual attention in small classes where emphasis is placed on developing learning skills. Beautiful 148 acre campus with athletics for all. 98th Year. Summer school. Write for Catalog and application to Col. C. R. Endsley, Jr., Pres., Box 147, Sweetwater, Tennessee 37874.

VALLEY FORGE MILITARY ACADEMY

"At the Nation's Shrine" Valley Forge, shrine of our freedom, has loaned its name to this fully accredited, distinguished Mil. Acad. and Jr. Coll. Small classes, highest academic standards. Prep. School, grades 7 thru 12 & Jr. Coll. All sports. Arty., Cav., Infantry, Band. Senior Div. ROTC. **Catalogue, Box M, Wayne, Pa**

WENTWORTH MILITARY ACADEMY

Preparation for the rigors of business or higher education. Accred. 4-yr. H. S. and 2-yr. College. Sr. ROTC. New million-dollar field house. Golf, FAA flying. Summer School, younger boys' camp. 71st year. Catalog: **Col. Wikoff, 851 Wash. Place, Lexington, Mo. 64067**

WESTERN MILITARY ACADEMY

Courses on self-confidence, self-direction, how-to-study. Small classes, guidance. Gr. 7-12. Career analysis. R.O.T.C. Athletics; band. 32nd yr. Fully accredited. Near St. Louis. Catalog. **Col. Ralph B. Jackson, Supt., Box N-6, Alton, Ill. 62002**

Home Study

CALVERT SCHOOL

If you plan to live abroad, educate your child with approved Calvert home-study course. Kindergarten-8th grade. Step-by-step teaching manual. Used by thousands. Ideal for parent/tutor. Non-profit. 56th year. Catalog. **Box N6-L, Tuscany Rd., Baltimore, Md. 21210**

Rhode Island

SWIM • GOLF • FISH • CAMP • SAIL
SIGHTSEE • EXPLORE or just RELAX

Send for FREE Rhode Island Vacation Kit

Name
Address
City State Zip

RHODE ISLAND DEVELOPMENT COUNCIL
Department 709
Roger Williams Bldg., Prov., R. I. 02903

Minifish...for sailors of any age.

—write for free color folder.

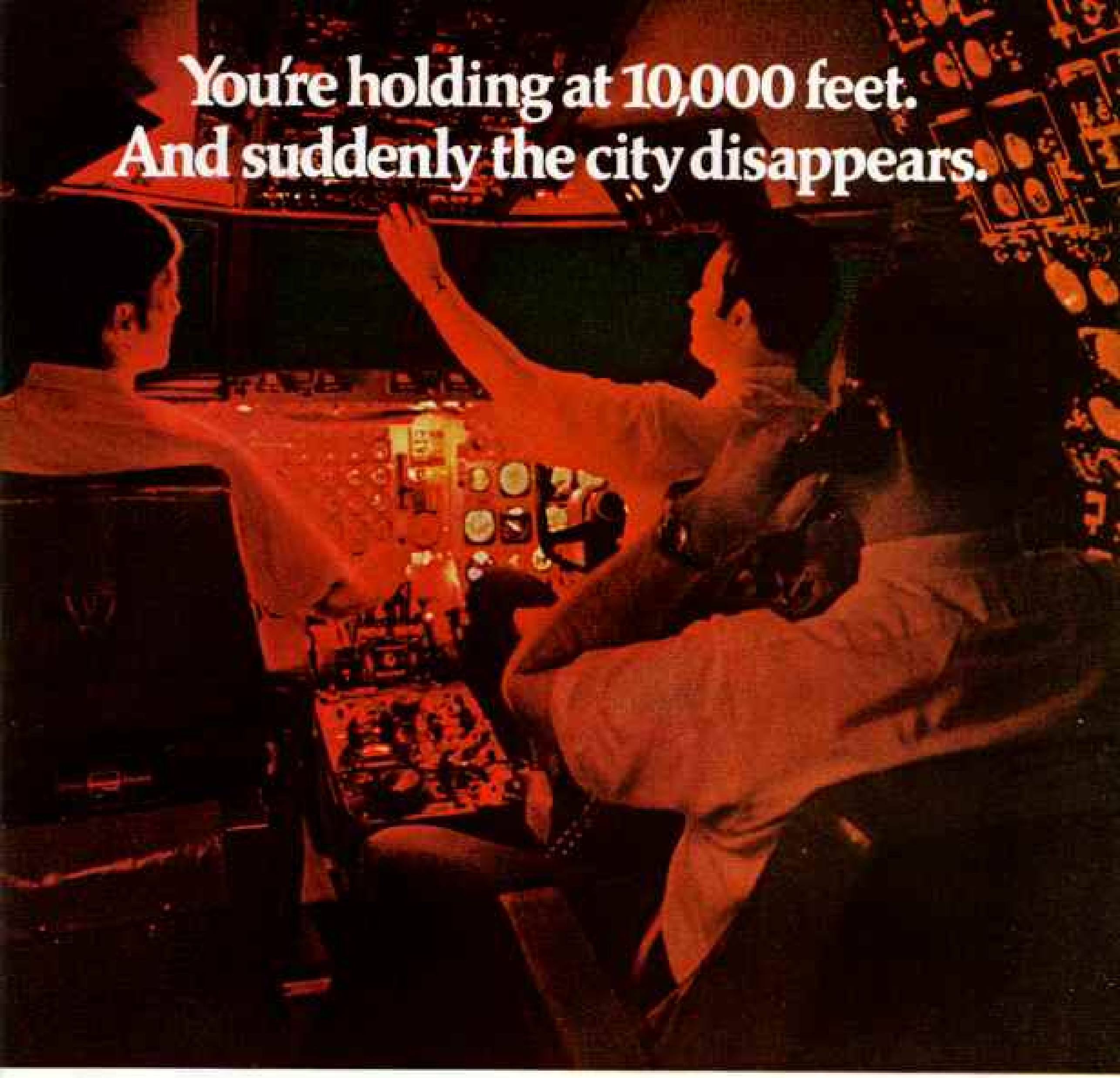
AMF, Alcort Division, Dept. NG-61, S. Leonard St., Waterbury, Ct. 06720

permanent binders for
NATIONAL GEOGRAPHIC MAGAZINES

Easy, do-it-yourself binding transforms your National Geographic magazines into permanent hard-bound volumes for your home library. Illustrated literature portrays available styles in detail, including description of exclusive patented binding method.

WRITE TODAY FOR FREE LITERATURE

The SUCKERT Loose-Leaf Cover Co.
15555 Woodrow Wilson • Detroit, Mich. 48238 • U.S.A.



It happened to 18 planes in the crowded skies over New York City. It could happen again. To your city.

For most of us, a power failure is hardly more than the inconvenience of no lights or air conditioning. For others, it is a serious threat. To life. And property.

It's hard to understand why every hospital operating and emergency room isn't protected by a standby power system. Or all airport runway lights and control towers. Or crowded public places, industrial complexes involving volatile processes, water and sewage plants.

Check your police and fire departments. The hospital that cares for you. Your local airport. The place where you work. Your children's school.

Find out which facilities are protected with standby power. And which aren't.
And why not.

Your life might depend on it.

For a free copy of "The Night The Lights Went Out," the New York Times account of the 1965 Northeast power failure, write to: Caterpillar Tractor Co., Dept. 627G, Peoria, Illinois 61602.

We can make the world a safer place to live in. Caterpillar Engines and Electric Sets will help.

CATERPILLAR

If experience makes a pro, this man has 11 years on jets. If it's skill, he has 2 FAA licenses.

And if it's some personal quality, he's got what it takes. He's Joe Leyden, Delta lead mechanic. Another Delta Air Lines professional.

Delta is ready when you are.

The Product 19 Story.

As America has become more nutrition-conscious, more people than ever are discovering Product 19.®

It is one of the country's leading high nutrition cereals.

Much of the story is on the front of the box.

The rest of the story is in the taste.

Product 19 is a delicious blend of four grains—corn, rice, wheat and oats.

The firm texture and pleasing taste have won thousands of new friends of all ages.

Kellogg invites you to join the growing number of people who are discovering how good tasting a high nutrition cereal can be.

You get 100% of the officially established minimum daily adult requirements for VITAMINS and IRON in one serving (1 oz.) of Product 19.