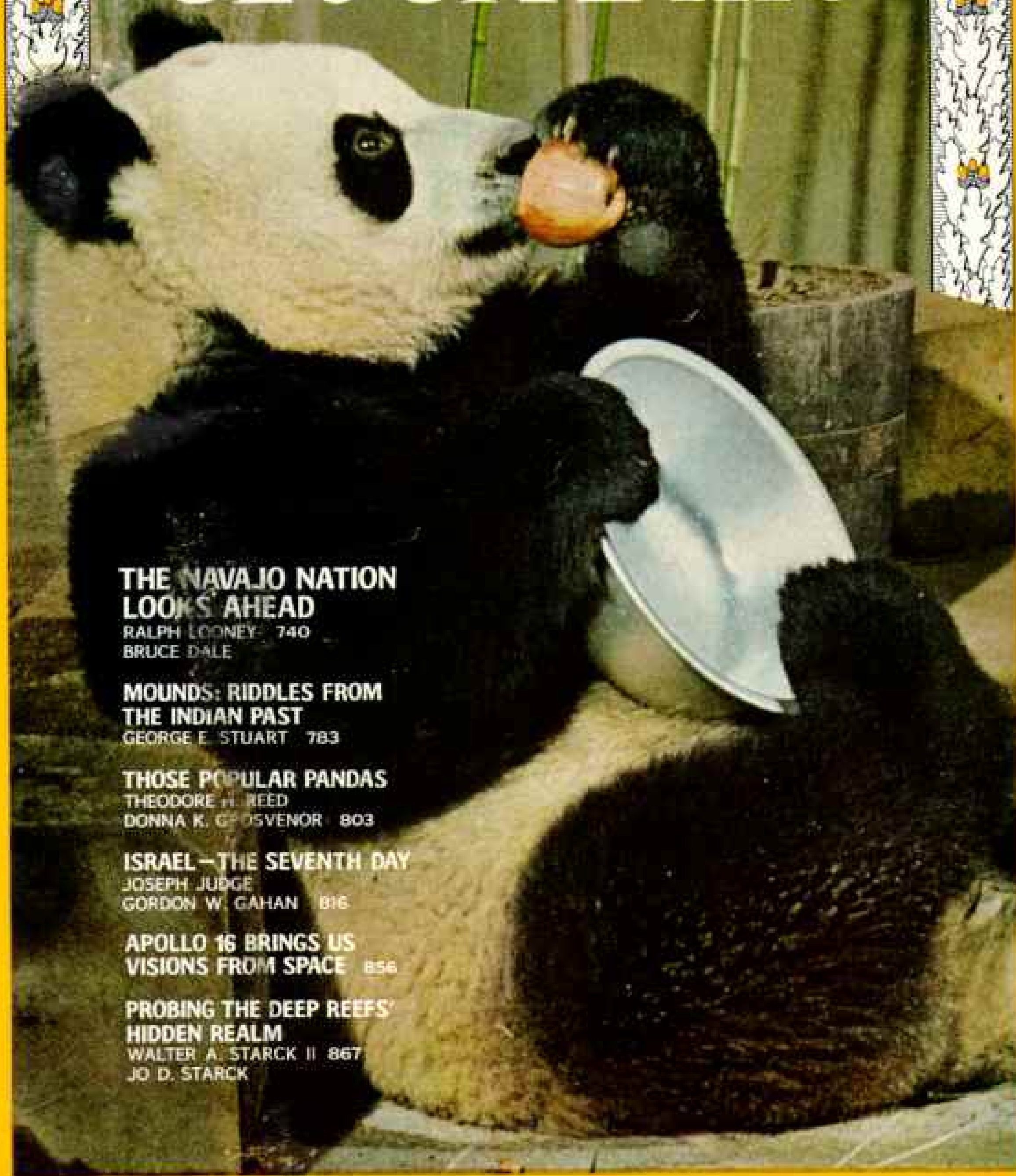


VOL. 142, NO. 6

DECEMBER 1972

NATIONAL GEOGRAPHIC



THE NAVAJO NATION LOOKS AHEAD

RALPH LOONEY 740
BRUCE DALE

MOUNDS: RIDDLES FROM THE INDIAN PAST

GEORGE E. STUART 783

THOSE POPULAR PANDAS

THEODORE H. REED
DONNA K. GOSVENOR 803

ISRAEL—THE SEVENTH DAY

JOSEPH JUDGE
GORDON W. GAHAN 816

APOLLO 16 BRINGS US VISIONS FROM SPACE 858

PROBING THE DEEP REEFS' HIDDEN REALM

WALTER A. STARCK II 867
JO D. STARCK

**NATIONAL
GEOGRAPHIC
SOCIETY**

WASHINGTON, D. C.

*Organized "for the increase and
diffusion of geographic knowledge"*

GILBERT HOVEY GROSVENOR

Editor, 1899-1954; President, 1920-1954

Chairman of the Board, 1934-1966



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 821 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 30 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 expeditions 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 BOSCHER**,

C. VERNON YANDERS, 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. HANSON, General Counsel, National Geographic Society

CARYL P. HASKINS, Former President, Carnegie Institution of Washington

CARLISLE H. HUMELSINE, President, The Colonial Williamsburg Foundation

CURTIS E. LEMAY, Former Chief of Staff, U. S. Air Force

H. RANDOLPH MADDON, Former Vice President, American Telephone & Telegraph Company

WM. MCCHESNEY MARTIN, JR., Former Chairman, Board of Governors, Federal Reserve System

BENJAMIN M. MCKELWAY, Former Editor, 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., Former 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, **THOMAS W. MCKNEW**, **T. DALE STEWART**, Physical Anthropologist Emeritus, 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**, **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: Administrative: Earl Corbin, Jr., Harnet Carey, Frederick C. Gale, Accounting: Jay H. Givans, George F. Fryle, Alfred J. Hayre, William G. McGhee, Martha Allen Buggett, Statistic: Thomas M. Kane, *Printed and Retriever*: Howard R. Hudson (Supervisor); Mary L. Whitmore, Dorothy L. Dimeron (Assistants); Procurement: J. P. M. Johnston, Thomas L. Fletcher, Robert G. Corey, Sheila H. Immsel, Membership Research: Charles T. Kneeland, Membership Fulfillment: Geneva S. Robinson, Paul B. Tylor, Peter F. Woods, Computer Center: Lewis P. Lowe; Promotion: Robert J. Warfel, Towne Windum, John S. Shilgalis, Printing: Joe M. Butler, 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.; Translation: Zbigniew Jan Lutyk

COVER: Ling-Ling enjoys an apple at her new home in the United States (pages 803-15). **DIANA S. BRIDGEMAN**

POSTMASTER: SEND CHANGE OF ADDRESS FORM 3578 AND UNDELIVERED COPIES TO NATIONAL GEOGRAPHIC MAGAZINE, 1775 AND M STS., N.W., WASHINGTON, D. C. 20038

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, W. E. Garrett

Assistant Editors: Jules B. Hillard, Andrew H. Brown, James Carruth, Edward J. Linahan, Carolyn Bennett Patterson, Howell Walker, Kenneth F. Weaver

Senior Editorial Staff: William S. Ellis, Rawie Findley, William Graves, Bryan Hodgson, Robert F. Jordan, Joseph Judge, Nathaniel T. Kanney, Samuel W. Matthews, Barr McDowell, John J. Putman, Gordon Young; Senior Scientist: Paul A. Zahi

Foreign Editorial Staff: Luis Marden (Chief); Thomas J. Abernethie, David S. Boyer, Howard La Fay, Volkmar Weitzel, Peter T. White

Editorial Staff: Harvey Arden, Kent Britt, Thomas Y. Casby, Louis de la Haba, Mike W. Edwards, Noel Grove, Alice J. Hall, Werner Janney, Jerry Kline, Michael E. Long, John L. McIntosh, Elizabeth A. Mouze, Ethel A. Starbird

Editorial Layout: Howard E. Paine (Chief); Charles C. Uhl, John M. Lavery
Graphic Art: William N. Palmstrom (Chief), Artists: Peter V. Bianchi, Leo Biganoli, William H. Bond, John W. Lathers, Robert C. Magy, Robert W. Nicholson, Ned M. Seidler; *Cartographic Artists:* Victor J. Kelley, Soejnka 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)

Research: Margaret G. Bledsoe (Chief); Ann K. Wendi (Associate Chief); Newton V. Blakeslee (Assistant Chief for Geographic Information), Carolyn H. Anderson, Alice M. Bowsher, Bette Ann Goss, Jan Hölldornsa, Lesley B. Lane, Levenia Loder, Frances H. Parker; *Correspondence:* Carolyn F. Clewell, Clifford R. Dubois

Library: Virginia Carter Hills (Librarian); Patricia Murphy Smith (Assistant Librarian), Melba Barnes, Louise A. Robinson, Esther Ann Manion (Librarian Emerita)

Editorial Administration: Joyce W. McKean, Assistant to the Editor; Virginia H. Finnegan, Winifred M. Myers, Shirley Neff, Inez D. Wilkinson (Editorial Assistants); Dorothy M. Corson (Indexes); Rosalie K. Millard, Lurise Wendling (Files); Evelyn Fox, Dolores Kennedy (Transportation); Jeanne S. Duiker (Archives)

ILLUSTRATIONS STAFF: *Illustrations Editor:* Herbert S. Wilburn, Jr., *Associate Illustrations Editor:* Thomas R. Smith, *Art Editor:* Andrew Puggenpohl, *Assistant Illustrations Editors:* Mary Griswold Smith, O. Louis Mazzarella, Chaeleze Murphy, Robert S. Patton, *Layout and Production:* H. Edward Kim (Chief), *Picture Editors:* David L. Arnold, Bruce A. McElfresh, Elie S. Rogers, W. Allan Joyce, Jon Schaefferberger, *Research:* Paula C. Simmons, Barbara A. Shattuck (Asst.), *Librarian:* L. Fern Dume

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

PHOTOGRAPHIC STAFF: *Director of Photography:* Robert E. Gilka, *Assistant Directors:* Dean Conger, Joseph J. Scherschel, *Photographers:* James L. Amos, James P. Blair, Bruce Dale, Dick Dorrance II, Gordon W. Gahan, Otis Imboden, Emory Kristof, Bruce Littlehales, George F. Mobley, Robert S. Dakes, Winfield Parks, Robert F. Sisson (Natural Sciences), James L. Stanfield, Lilian Davidson (Administration), *Film Review:* Guy W. Stirling (Chief), *Photographic Equipment:* John E. Fletcher (Chief), Donald McBurn, *Pictorial Research:* Walter Meyers Edwards (Chief), *Photographic Laboratories and Photocopying:* Carl M. Shrader (Chief); Milton A. Ford (Associate Chief); Herbert Artemus, Jr., David H. Chisman, Lawrence F. Ludwig (Assistant Chief, Photocopying); Claude E. Ferrone, J. Frank Pyles, Jr., Donald E. Stemper, George V. White

RELATED EDUCATIONAL SERVICES OF THE SOCIETY

Cartography: William T. Peete (Chief); David W. Cook (Assistant Chief), *Cartographic Staff:* Margery K. Barkisell, Charles F. Case, Ted Dauchters, Richard J. Darley, John F. Dorr, Russell G. Fritz, Richard R. Farno, Charles W. Gotthardt, Jr., Catherine M. Hart, Donald A. Jaeger, Harry D. Kaufman, James W. Killion, Manuela G. Kogutowicz, Charles L. Miller, David L. Moore, Robert W. Northrip, Richard K. Rogers, John F. Shupe, Charles L. Stern, Douglas A. Strobel, George E. Stuart (Archaeology), Tibor G. Tóth, Thomas A. Wall, Thomas A. Walsh

Books: Merle Severy (Chief); Seymour L. Fishbein (Assistant Chief); Thomas B. Allen, Ross Bennett, Charles O. Hyman, Anne Dirkes Kober, David F. Robinson, Wilhelm R. Sasse, Verla Lee Smith

Special Publications and Educational Filmstrips: Robert L. Breedon (Chief); Donald J. Crump (Asst. Chief); Josephine B. Buh, David R. Bridges, Linda Bridge, Margary G. Dunn, Johanna G. Farran, Ronald Fisher, Mary Ann Farrell, Margaret McKelway Johnson, Geraldine Linder, Robert Messer, Cynthia Ramsay, Philip B. Silvert, 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, Charles H. Sloan, Janis Knudsen Wheat

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

Television: Dennis B. Kane (Chief); David Cooper, Carl W. Harmon, Jr., Sidney Platt, Patricia F. Northrop (Administrative Assistant); Marjorie M. Mooney (Research)

Lectures: Joanne M. Hess (Chief); Robert G. Freegal, Mary W. McKamey, Gerald L. Wiley, Carl E. Ziebe

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

EUROPEAN OFFICE: W. Edward Roscher (Associate Secretary and Director), Jennifer Moseley (Assistant), 4 Curzon Place, Mayfair, London, W1Y 8EN, England

ADVERTISING: *Director:* William A. Boeger, Jr., *National Advertising Manager:* William Turgeon, 1211 Ave. of the Americas, New York, N.Y. 10020, *Regional managers—Eastern:* George W. Kellner, New York, *Midwestern:* Robert R. Henn, Chicago, *Western:* Thomas Marts, San Francisco, *Los Angeles:* Jack Wallace, *Canada:* Robert W. Huran, New York, *Aeronautics:* John F. Grant, New York, *Travel:* Gerald A. Van Spilmer, New York, *International Director:* James L. Till, New York, *European Director:* Richard V. Macy, 21 rue Jean-Mermoz, Paris 16, France, *Production:* E. M. Posey, Jr.

COPYRIGHT © 1975 NATIONAL GEOGRAPHIC SOCIETY, 1775 AND M STS., N.W., WASHINGTON, D. C. 20038. ALL RIGHTS RESERVED. REPRODUCTION OF THE WHOLE OR ANY PART OF THE CONTENTS WITHOUT WRITTEN PERMISSION IS PROHIBITED. PRINTED IN U.S.A. SECOND-CLASS POSTAGE PAID AT WASHINGTON, D. C., AND ADDITIONAL MAILING OFFICES. COVER DESIGN AND TITLE PROTECTED BY U. S. AND FOREIGN TRADEMARK REGISTRATIONS. \$5 A YEAR, \$1 A COPY.

The 1973 Olds Ninety-Eight Regency.
Henredon Furniture's Director of Design,
Kenneth R. Volz, says it provides the most luxurious
comfort he's ever found in a car seat.

Maybe you'll agree. Maybe you won't.

But if you're planning to spend \$5,000 or more
to get a comfortable car, shouldn't you come in,
sit down, and see for yourself?



Henredon
fine furniture
THE SCHOONBECK CO



"Comfort is my business, and to me, comfort is the ultimate luxury in a car of this type. The Ninety-Eight Regency is the first one I've experienced that really gives you the comfort of fine furniture, with the support you need in an automobile seat," comments Kenneth R. Volz, Henredon's design chief, after an extensive personal trial.

"The unique loose-cushion effect is the secret. It provides tactile softness plus the flexibility to adapt to almost any body size and shape. You've come up with a distinct improvement in luxury cars."



1973 Oldsmobile Ninety-Eight.
Drive it and draw your own conclusion.

Oldsmobile puts a lot of thought into every detail of the Ninety-Eight Regency—from the seats inside to the new hydraulic front bumper system. Because Oldsmobile feels that a car priced \$5000 or more should be superior to an ordinary car, right down to the last detail.

There are some other cars that can be considered in Ninety-Eight's class. And most are more expensive. But we don't think they're any more car.

Oldsmobile.
Always a step ahead.

THE TIME MACHINE. \$125

A micro-computer inside keeps it accurate to within 15 seconds a month.*



The TIMEX Quartz Watch is The Time Machine.

Second by second, day by day, month after month, this remarkable timepiece is one of the most accurate watches in the world.

To make the watch extraordinarily accurate, Timex began with a tiny crystal of quartz. When electric current is passed through it, the crystal vibrates exactly 49,152 times every second, so regularly and so constantly, that it becomes the heart of an exceptionally accurate timekeeping system.

Timex then incorporated the vibrating crystal of quartz into a highly sophisticated micro-computer system, packed with 300 transistors. This system serves as the brain of the watch, to control its accuracy. If, for any reason, this accuracy should vary, the micro-computer system readjusts, and restores the watch to its programmed accuracy.

The TIMEX Quartz Watch is engineered to be as rugged and dependable as you expect a TIMEX to be. It's powered by a replaceable energy cell that lasts for a year, so you never have to wind it.

It's also equipped with an automatic calendar, a sweep second hand, and an adjustable metal link band.

Protected inside a water resistant, dust resistant case, the TIMEX Quartz Watch is indeed The Time Machine: a milestone in the history of measuring time.

THE TIMEX QUARTZ WATCH

MODEL ILLUSTRATED: 876812
* Regulation may be necessary to achieve this accuracy.

This Christmas give the gift that pleases everyone.



Send National Geographic Society Gift Memberships to:

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

ADDRESS

CITY, STATE, ZIP CODE

Send gift card signed.

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

ADDRESS

CITY, STATE, ZIP CODE

Send gift card signed.

ONLY \$7.50

1973 MEMBERSHIP DUES in the United States and throughout the world are \$7.50 U.S. funds or equivalent. To compensate for additional postage and handling for mailing magazines abroad, please remit, for Canada, \$8.65 Canadian or U.S. funds; for all other countries, \$9.50 by U.S. bank draft or international money order. 60% of dues is designated for subscription to the magazine.

Life membership is available to persons 10 years of age or older. The fee for U.S. and its outlying areas is \$200 U.S. funds or equivalent; for Canada, \$216 Canadian or U.S. funds; for all other countries, \$250 U.S. bank draft or international money order. Remittances should be sent direct to National Geographic Society.

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

ADDRESS

CITY, STATE, ZIP CODE

Send gift card signed.

PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS)

ADDRESS

CITY, STATE, ZIP CODE

Send gift card signed.

mail to: THE SECRETARY
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C. 20036

MY NAME

PLEASE PRINT (MR., MRS., MISS)

ADDRESS

CITY, STATE, ZIP CODE

1973

Total remittance enclosed \$



Under \$90
with Focused Flash.
Under \$80 without.

Under \$175
with Focused Flash.
Under \$165 without.

Under \$110
with Focused Flash.
Under \$100 without.

Under \$70
with Focused Flash.
Under \$60 without.

Under \$20.

Under \$37.

Under \$25.

Merry minutes from Polaroid. From under \$20.

Nothing adds to the excitement of Christmas quite like a Polaroid Land camera. With color pictures you see in 60 seconds.

There are 7 Polaroid Land cameras you can give that will add to anyone's Christmas. And 7 prices to choose from. **Big Shot. Under \$20.**

Our special camera just for color portraits. Beautiful head and shoulder close-ups in 60 seconds. So simple you just "walk" into focus. Built-in flash for portrait lighting indoors and out. Built-in development timer. Makes the perfect "growing-up" album of the kids for Mom. **Square Shooter 2. Under \$25.**

Our most inexpensive all-purpose color camera. Uses our square film so you can save up to 25%* on every shot. Automatic electronic exposure system. 3-element lens. Built-in flash. Strictly color. **Square Shooter. Under \$37.**

A fully equipped automatic. Including our Focused Flash system that gives you beautifully exposed flash shots auto-

matically. Easy to use distance finder. Uses our inexpensive square film. Strictly color.

Model 420. Under \$70 with Focused Flash.
Under \$60 without.

Our most economical folding camera. Uses Focused Flash. Big color pictures in a minute or black-and-white in seconds. Electric eye. Electronic shutter. Dual-image rangefinder-viewfinder.

Model 430. Under \$90 with Focused Flash.
Under \$80 without.

A lot more gift for a little more money. A built-in mechanical timer buzzes until your picture is developed. Uses Focused Flash. Automatic electronic exposure system for other shots. Dual-image coupled rangefinder-viewfinder. Precision triplet lens. Uses optional accessories.

Model 440. Under \$110 with Focused Flash.
Under \$100 without.

Uses Focused Flash. Fold-down, dual-

image coupled rangefinder-viewfinder. Transistorized electronic shutter that can take automatic time exposures up to 10 seconds. Mechanical development timer. Uses optional portrait and close-up attachments.

Model 450. Under \$175 with Focused Flash.
Under \$165 without.

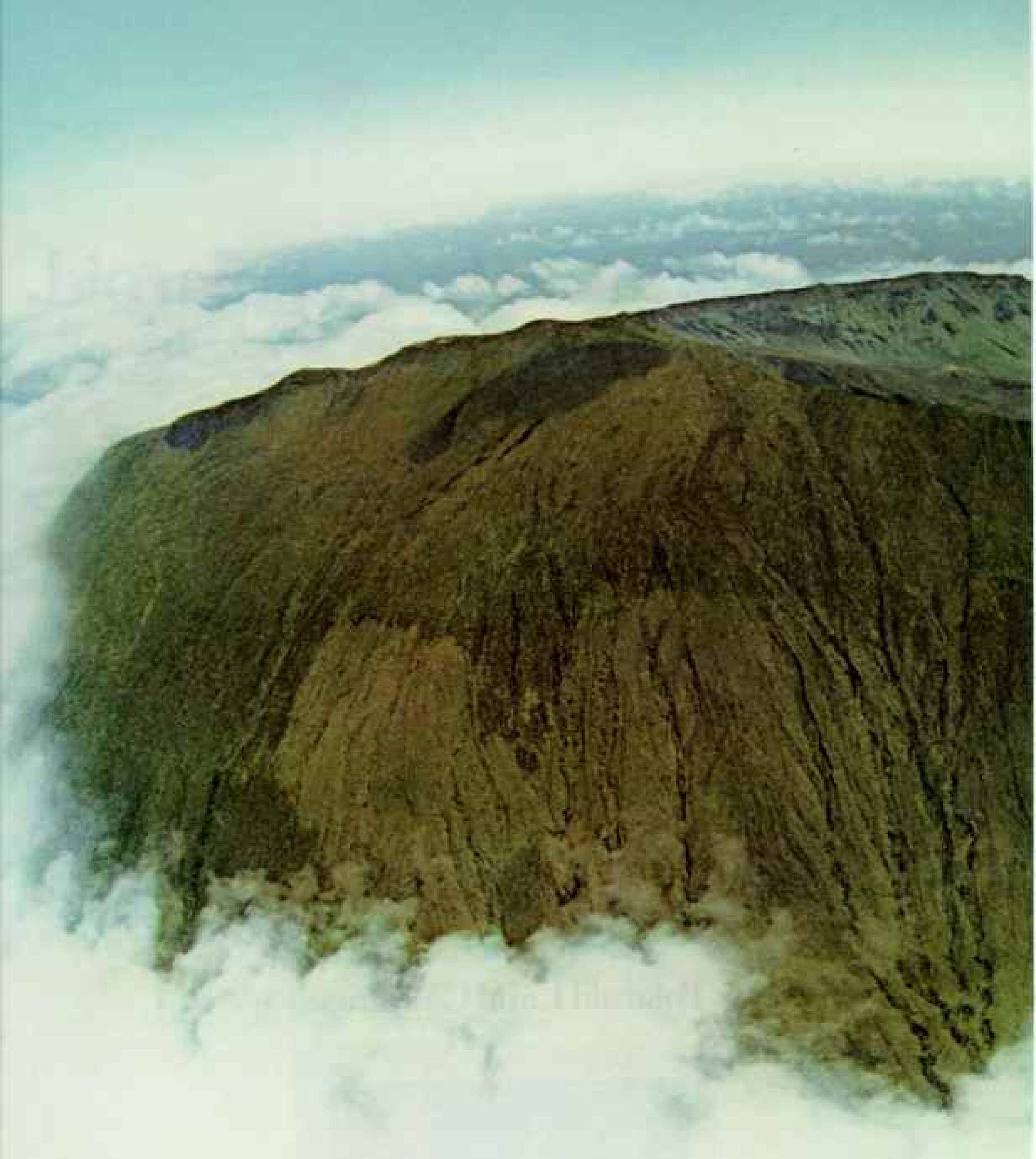
The most deluxe Polaroid 400 camera anyone can give. An electronic development timer even "Beeps" to tell you when your picture is ready. Uses Focused Flash. Automatic electronic exposure system for all other shots. Zeiss Ikon single-window rangefinder-viewfinder. Black all-metal body with brushed chrome finish. Uses all Polaroid camera accessories.

Colorpack Film.

Give someone 2 packs of Colorpack film—and watch it turn into 16 instant Christmas gifts. Type 88 for Square Shooters; Type 108 for our other pack cameras.

Polaroid Land Cameras.





After carefully considering how to improve telephone service

At one end of the island of Maui, the village of Hana lies almost isolated. On the island's central plain stands Wailuku, Maui's largest city, and the bulk of the island. In between, presenting a nearly impassable barrier, looms Haleakala, the world's largest dormant volcano.

Haleakala, the House of the Sun, where, according to Hawaiian legend, the demigod Maui caught the sun by its rays and refused to let go until it had promised to pass by more slowly, allowing Man more daylight in which to harvest his fields and bring in fish.

Haleakala, sometimes snowcapped even in this tropical climate, rising some 10,000 feet over the island, and plunging almost perpendicularly down to the sea. With a

moonscape crater larger in circumference than Manhattan island.

Any way you look at it, a tough place to run telephone lines.

So the Hawaiian Telephone Company, a subsidiary of General Telephone & Electronics, updated the ancient legend by using the top of Haleakala to catch radio microwaves instead of sun rays.

Since microwave beams travel in a direct line-of-sight, Hawaiian Telephone's Hana station transmits calls to a relay station atop Huehue Mountain, 65 miles away on the big island of Hawaii. From there, the signals are beamed back across the water to the relay station on Haleakala,



between Hana & Wailuku, we decided not to move the volcano.

and from Haleakala, the microwave signal hops to the company's call-switching center in Wailuku.

The straight-line distance covered by the Hana-Wailuku link amounts to 157 miles, even though the two points are only 35 miles apart. Nevertheless, the microwave relay system cost less than half of what building a cable route would have cost.

Bringing people closer together with microwave relay systems has become a substantial part of General Telephone's business, not just in Hawaii, but all over the world. In Africa, South America, the Middle East—wherever normal telephone line installations are impractical—GTE International, another GTE subsidiary, has provided better,

faster and cheaper communications.

In the last 15 years alone, we have built microwave systems in 51 different countries.

Perhaps this isn't the stuff that legends are made of, because, after all, our work is less dramatic than a demigod capturing the sun. But we think that making it easier for people to communicate with each other is important enough work for mere mortal Man.



GENERAL TELEPHONE & ELECTRONICS

Eldorado by Cadillac. Is there anything else like it on the motoring scene?

We think not.

One, Eldorado is unique in what it is—the only luxury car with front wheel drive, Automatic Level Control, variable-ratio power steering and an 8.2 litre engine. What this all means in handling ease under all road conditions has to be experienced to be appreciated.

*Eldorado.
Three things make it unique.*

Two, there is the matter of choice.

The first luxury of Eldorado is the luxury of choice.

There's the Classic Eldorado Coupe.

The Eldorado Convertible, the only luxury convertible built in America.

And the Eldorado Custom Cabriolet, a special edition car with unique roof styling.

Three, Eldorado is a Cadillac creation. And you know what that means in the quality of the car.

In the capabilities of those who sell and service it. Your authorized

Cadillac dealer invites you to experience the unique

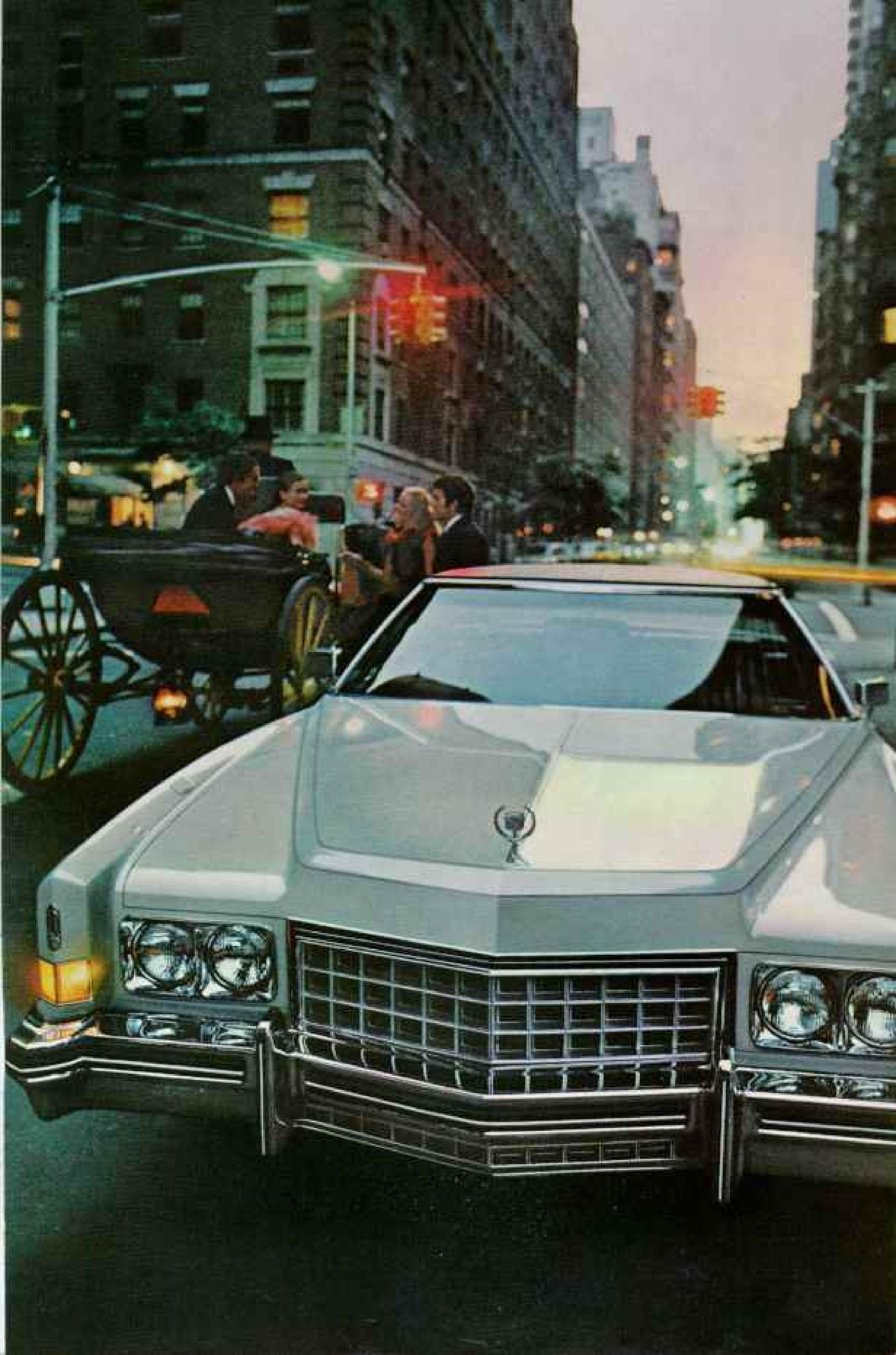
luxury car for yourself. Eldorado.

Cadillac 



OUR AIR,
IT'S UNIQUE, TOO . . .
and we all have a responsibility
to keep it clean. Automakers have
made great progress, but you can
also help. By using no-lead or
low-lead fuels, getting a regular
tune-up and having your control systems checked often.
Thank you, Cadillac Motor Car Division.







Christmas is a time for closeness.

A. Rechargeable Tripleheader 50 VIP™. The ultimate shaver: revolutionary adjustable dial with 9 closeness-comfort settings and up to twice the shaves per charge as any other rechargeable. **B. Tripleheader 40 VIP.** Our unique rotary shaving system plus adjustability to suit *your* beard, *your* skin. The VIPs . . . a new standard of closeness. **C. New Lady Norelco Home Beauty Salon® 35LS.** A faster, closer shaver plus eleven glamorous grooming gifts for manicure, pedicure, massage and facial. **D. Lady Norelco 20L.** Extra-large head and two trimmers to

shave very fast and close. **E. Lady Norelco 15L.** A beautiful inexpensive gift gracefully designed for a woman's hand. **F. Speedshaver® II 20.** Inexpensive shaver with the famous Norelco floating heads and rotary blades. **G. Cordless 20B.** Perfect portable: shaves up to 7 weeks on just 4 penlight batteries. **H. Tripleheader III 35T.** Rotary blades, floating heads, pop-up trimmer—the unique combination that made it the world's best-selling shaver. **I. Rechargeable Tripleheader 45RT.** Shave-anywhere convenience at an economy price.

And closeness is what Norelco is all about.

©1977 North American Philips Corporation, 100 East 43rd Street, New York, N.Y. 10017. Norelco consumer products include Men's and Women's Electric Shavers, Remington Electric Razors, Lighted Shaving Mirror, Sun & Hair Care, Heated Styling Gels, Dryers/Blowers, Handheld and Salon-Style Hair Dryers, Unwaxing Hairbrush, Razor Heavers, Cordless Cordless Brush, Travel Kit, Cuffee (M) Cuffee Maker Combination, Hearing Aids, Tape Recorders, Cassettes, Staff Party Components, Electronic Educational Kits.

Norelco®



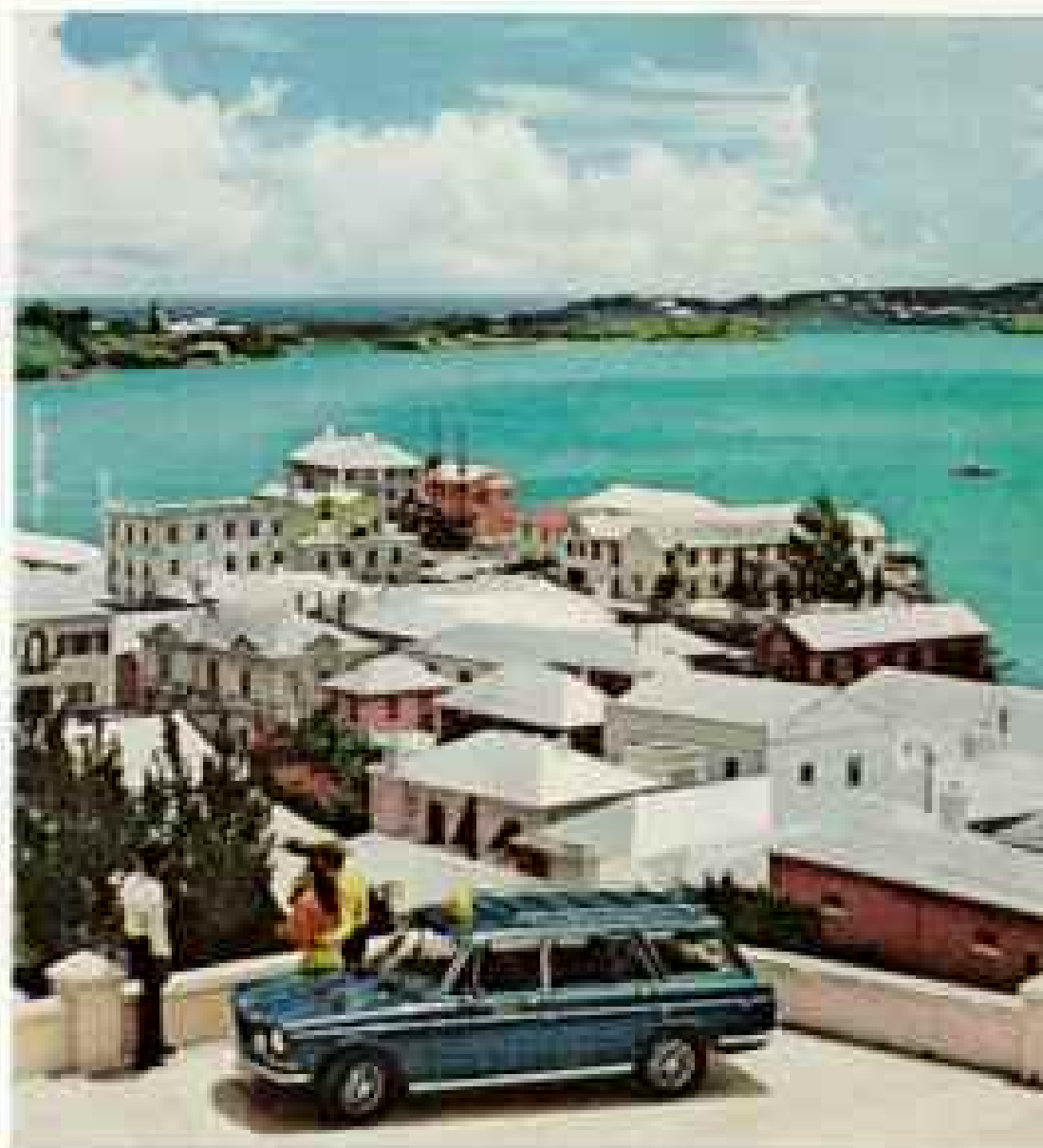
**Can you imagine
what your shopping center
would look like on a postcard?
Or your taxis? Or your waterfront?**

In Bermuda, we try to keep every place and every thing pretty enough for a postcard. We don't want to spoil what Nature was kind enough to give us. Perhaps that's why so many people come back. And Bermuda is easy to come back to... because it's easy to get to. Only 600 miles away from the coastline of the U.S. Talk to your travel agent. Or write Bermuda: 610 Fifth Ave., New York, N.Y. 10020—6 North Michigan Ave., Chicago, Illinois 60602.



Bermuda

Wish you were here.



FIVE GIFTED WAYS TO SAY HAPPY HOLIDAYS

PARKER UNICUBE DESK SET

The sleek, stainless steel ball pen is embedded in a solid two-inch block of aluminum. A contemporary gift for home, office or dorm. \$17.50.

PARKER BIG RED PEN

Shades of the Roaring Twenties. This nostalgic replica now comes with a soft tip or ball point. Four vivid ink colors. Free monogram. \$5.

PARKER 75 CLASSIC BALL PEN

Looks good, writes better months longer—three times longer than the ordinary ballpoint. Guaranteed for life against defects. Ultra-slim, 22 K gold electroplated case. Free monogram. \$8.50.

PARKER 75 SOFT TIP PEN

Now a gift-quality pen for the newest way to write. Made of titanium, lightweight metal of spaceships. Expressive nylon tip puts down a clean, bold track. Free monogram. \$15.

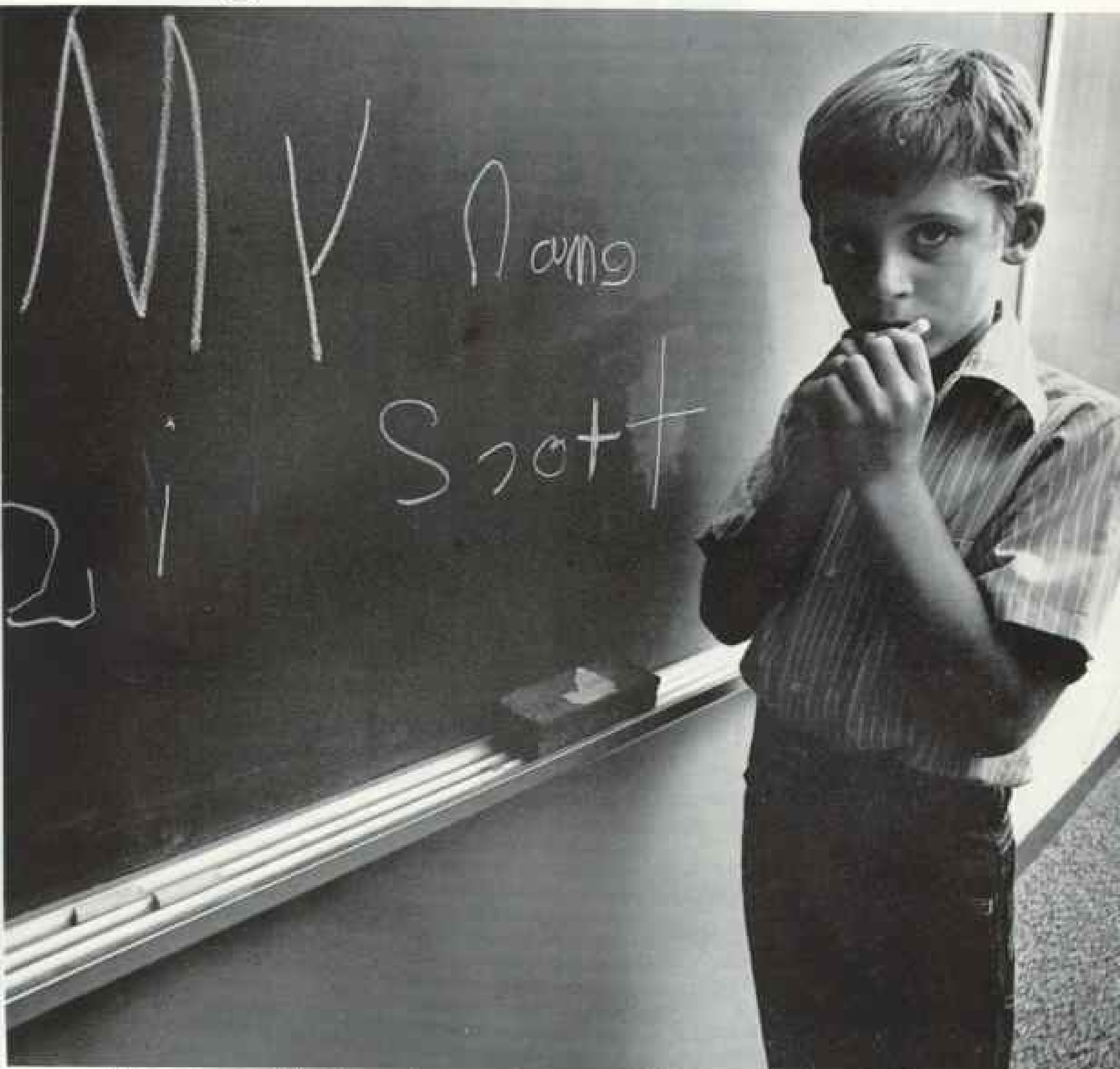
PARKER 75 PEN

in solid sterling silver. Point rotates to fit the individual way its owner naturally holds a pen. Choice of convenient cartridge or economical bottle-filling. Four point sizes. Free monogram. A superbly personal gift. \$25.

 **PARKER**
World's most wanted pens

©1997 THE PARKER PEN COMPANY, JARVISVILLE, W. VIRGINIA, U.S.A.

Scott isn't stupid. But it took a smart teacher to recognize it.



What's wrong with Scott is what's wrong with at least one kid in almost every classroom.

Scott has a learning disability. A perceptual problem.

When he writes, the letters are mostly illegible shapes. When he does his arithmetic, the answers are usually incorrect.

If you wanted to guess how many kids have ever had a problem similar to Scott's, you could start by counting many of the kids who've dropped out of school.

The sad part is:
You can correct the problem

if you spot it soon enough. Before a child has failed and been frustrated and lost his self-confidence.

So in 1969, Metropolitan Life began showing teachers and parents how to spot early signs of physical disorders that can interfere with a child's learning.

We produced a film called "Looking at Children," and a companion booklet.

Very often, they're the first time a child's teachers or parents ever see "backwardness" as a disability that many times can be corrected.

We'll send the film to your com-

munity or school group.

Write "Children," Metropolitan Life, 1 Madison Avenue, New York, N.Y. 10010.

You may have to wait, even with hundreds of prints of the film in constant circulation.

But the wait is worth it.

To keep a child's learning disability from becoming a life-long handicap.



Metropolitan Life

We sell life insurance.
But our business is life.

INTRODUCING
**BUICK
CENTURY.**
PRICED
UNDER **\$3700.***



It's the steal of the Century.

We've taken big Buick features
and put them in a new smaller size.

Some examples:

AccuDrive. Buick-built for stable
handling even on bumpy roads.

Dual-Rate Body Mounts. To
isolate car from road vibration.
For smooth, quiet ride.

Solenoid-Actuated Throttle
Stop. For quick, sure engine
shut-off.

Time-Modulated Choke. For
quick starts in cold weather.

Air Injection Reactor.
For emission control and smooth,
smooth idling.

Front Disc Brakes. For
confident straight-line stops.

Computer-Selected Chassis
Springs. For superb ride and han-
dling, based on weight of the car
and equipment you order.

Padded instrument panel,
padded head restraints, padded
sun visors.

Inner fenders for added
protection.

BUICK
The solid feeling for '73.

CENTURY LUXUS COLONNADE HARDTOP COUPE PRICED UNDER \$3700*

*Manufacturer's Suggested Retail Price for the Century Luxus includes vinyl top, bucket seats, whitewall tires and deluxe wheelcovers, outside rear-view mirror, protective moldings, bumper strips, bumper guards, and dealer new vehicle preparation charge. Other options, state and local taxes and destination charges are additional.

INDIANS OF NORTH AMERICA

IN TENT on creating a new Europe in the wilderness, North America's early settlers understood little about the land's aboriginal inhabitants. They were savages—to be exploited, or simply pushed aside. In those times people even argued about whether Indians had souls! Traditional teaching still presents American history as a saga that began when Columbus reached the New World and pictures the typical Indian as a war-bonneted horseman.

If we look more closely, however, we find a chronicle of staggering complexity. The Aleuts practiced advanced medical arts. Northwest Coast Indians created one of the great primitive art styles. Plains tribesmen appointed wardens to regulate bison hunts. Indians of the East raised thousands of earthen mounds, some of them among the largest of man-made structures. Political organization came to flower in the multitribal League of the Iroquois.

Once familiar only to anthropologists, such "new" truths today bring us all a fresh appreciation of people long ago shunted to the Nation's hinterlands, out of sight and out of mind. To assemble



BRADY SCHILLING

the threads of North America's Indian past into a meaningful pattern, the National Geographic has combined the talents of writers, photographers, artists, cartographers, ethnologists, and archeologists. The result is **Indians of North America**—another in the Society's unique series of double-sided cultural maps.

One face of the new supplement reveals the Indians' incredibly rich cultural life, as pieced together by archeological detective work in burial mounds, hunting-camp sites, and villages. Complementing this side of the map is a probing look at the people who built the East's still-mysterious mounds.

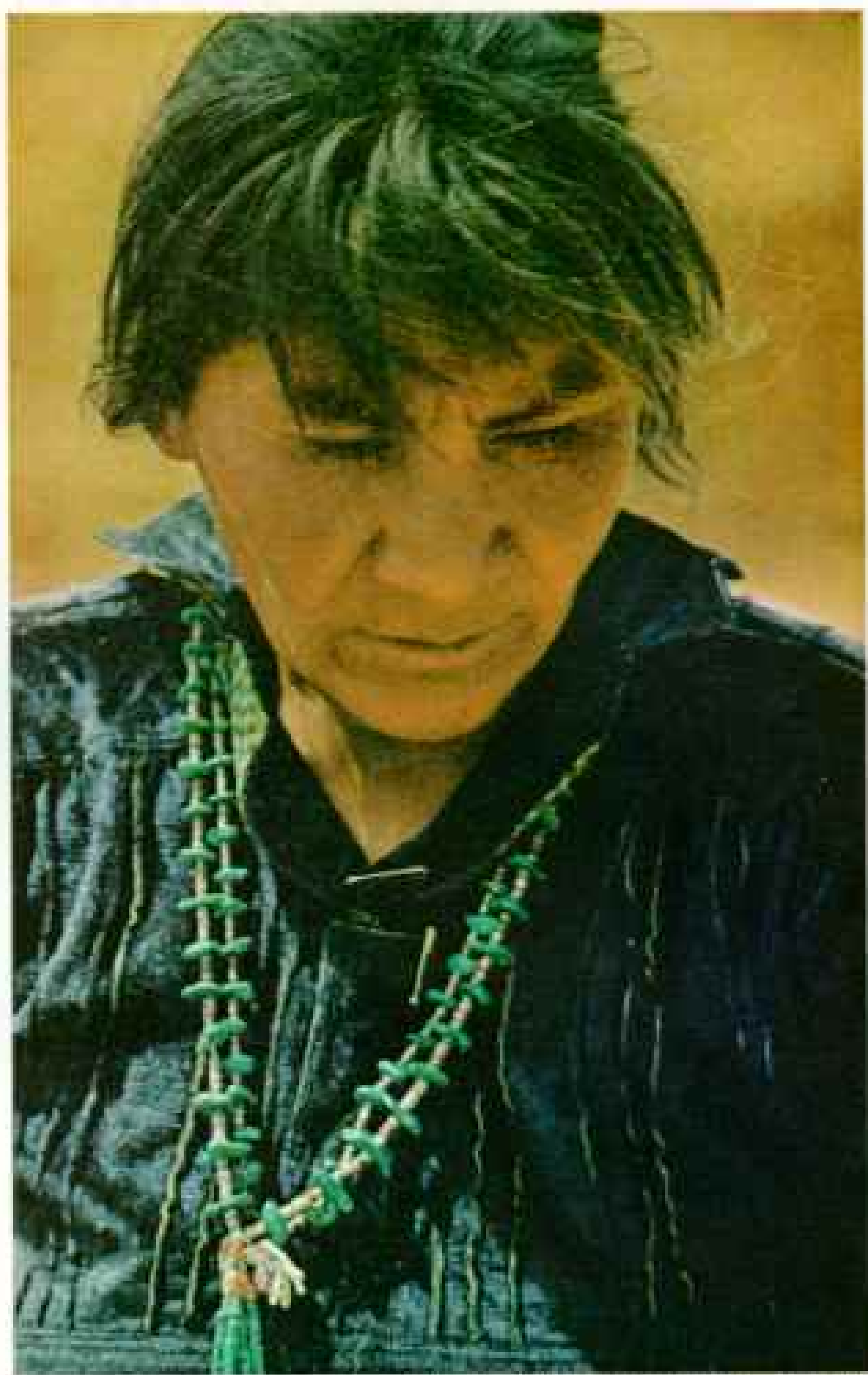
On its opposite face the map classifies every major tribe within 12 main cultural areas of North and Middle America and the Caribbean.

Finally, beginning on the next page, this issue finds exciting news in the largest surviving tribe in the United States. The Navajos—about to become masters of their own destinies after generations of control by a faraway bureaucracy—are showing how today's Indian can regain the independence of spirit that once characterized his kin from coast to coast.

CONCH-SHELL FRAGMENT (1600-1800)



Long mired in poverty and neglect, the largest and wealthiest Indian nation in the United States slowly regains control of its own destiny



SHEPHERDS, MONUMENT VALLEY, ARIZONA TERRY OLLER

THE NAVAJOS

By RALPH LOONEY

Photographs by
BRUCE DALE

NATIONAL GEOGRAPHIC PHOTOGRAPHER

LEADERS OF THE NAVAJO NATION jammed the council chamber, silent, tensely waiting; you could have heard a moccasin drop. I sat with them in the big room at Window Rock, Arizona, on July 25, 1972, sharing a moment that marked a turning point in Navajo history.

As we listened, Council Chairman Peter MacDonald accepted the United States' offer to let the Navajo people run their own reservation. He outlined a plan that would, within two years, give the tribe total control of the 110-million-dollar-a-year operations administered up to now by the Department of the Interior's Bureau of Indian Affairs.

For the first time in more than a century, the Navajos would become masters of their own future. Here was the beginning of resurgence by a proud people long entrapped in the quicksands of poverty, neglect, and disease. The significance of the event was that the Navajos themselves had taken the initiative in doing something about their problems and were displaying the confidence and will needed to solve them.

Pooled Money Works for All

They had shown wisdom before. In the mid-1950's the tribe, North America's largest, began to reap a windfall from mineral leases and bonuses on oil, gas, and uranium. The tribal government could have distributed the funds among the people, but it would have amounted to less than \$400 each. Instead, the council put the money in the United States Treasury, where it drew interest, and later invested in public works, factories to employ Navajos, and a ten-million-dollar college scholarship fund.

But even such wisdom has until now made only small improvements in Navajo life. "The reservation is like a foreign colony within the country," MacDonald had told me. "It is underdeveloped. We've got 16 million acres, but they support only a fraction of our 133,500 people. Unemployment is 65 percent. There is sickness, malnutrition. The poverty is terrible."

Sprawling across parts of Arizona, New Mexico, and Utah, the reservation, with its 25,000 square miles, is about the size of West Virginia (map, pages 748-9). It is arid and infertile—a place of anthill-like hogans with dirt floors and kerosene lamps, where people sleep on sheepskins and cook on stoves made from oil drums.

What brought the proud and once-fierce Navajos to such a plight? Early settlers had called them "lords of the earth," a people who dominated much of the American Southwest. But symbolizing the beginning of the end for them was the incident at Massacre Cave in Arizona (page 759). I stood there in the dust of their bitter past, 16 lonely miles up the Canyon del Muerto, and looked down on a scattering of bleached human bones. The October wind, whipping clouds across the sky, seemed to turn colder.

My young Navajo friend, 24-year-old Billy Joe, had led me there on a climb up almost sheer canyon walls 600 feet high. At about 500 feet we reached the cave, actually a 300-foot-long shelf, one to eight feet wide, shielded from below by great rocks. The overhanging canyon rim gave some protection from above—but not enough. Billy pointed upward. "It was from there, the rim, that the soldiers shot at my people."

The year was 1805 and Lt. Antonio Narbona had led the Spanish cavalry from Santa Fe to this wild place to punish the Navajos for raids on settlements. A group of Indians hid high on the ledge, but, according to one account, they were betrayed by one of their own and the Spaniards slaughtered them.

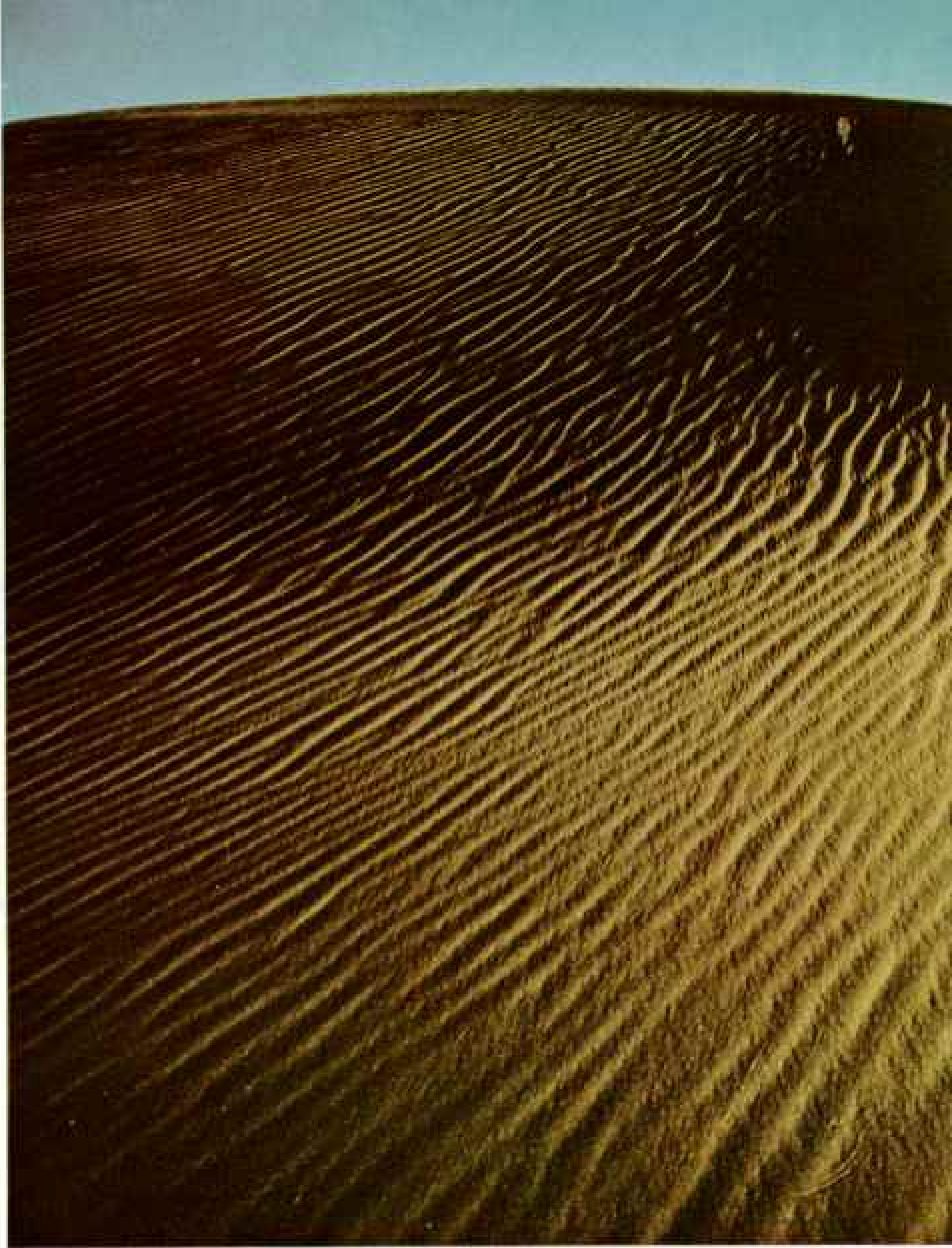
Peering at the bones, Billy Joe told me his people said 25 victims died on the ledge. There may have been more, however. Narbona recorded that 115 were killed in that canyon, and, with his report to the governor, he delivered the ears of 84 Indians.

"Long Walk" Led to Four-year Exile

The episode made a deep impression on the Navajos. They must have sensed that their valiant struggle against the superior forces of the white man was hopeless. The inevitable end came 59 years later, on January 6, 1864, near Massacre Cave, at the hands of a man the Indians had once called friend, Col. Kit Carson of the United States Army.

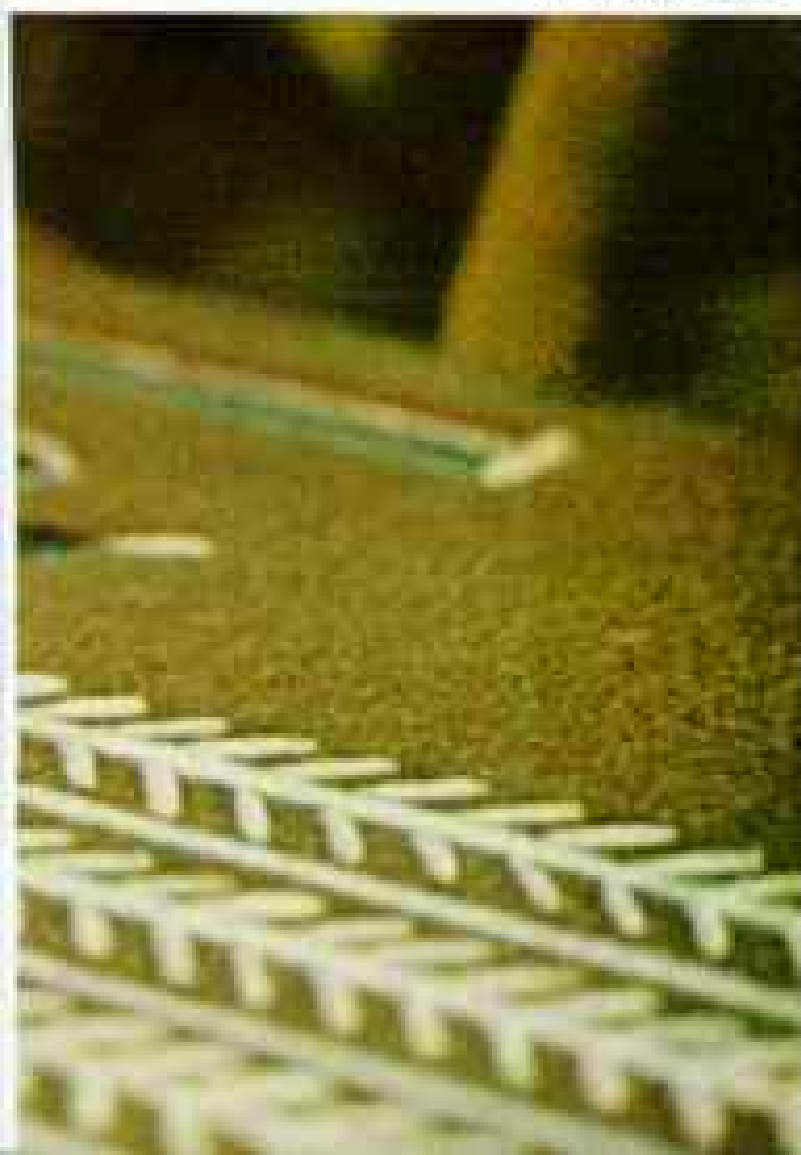
Acting on orders, Carson and his troops had destroyed everything in their path—hogans, crops, stock, and carefully tended peach orchards. Under this punishing psychological blow, 8,500 Navajos—more than half the tribe—wilted and surrendered. They were sent on the "Long Walk"—a 350-mile march from Fort Defiance, Arizona, to a concentration camp near Fort Sumner, New Mexico. There they endured four years of starvation

(Continued on page 746)





TERRY O'LEARY (BELOW)



"Mother Earth and Father Sky": Thus the Navajos express kinship with their harshly beautiful homeland. Traditionally, they seek harmony with nature—from the wind-rippled sand dunes of Monument Valley (above) to scrub-dotted range and forested peaks. When life goes amiss, a medicine man performs a curing ritual centered on sand painting (left). Crushed red sandstone, charcoal, and sand flow between thumb and forefinger to create a symbol of power. By sitting on

such a design, the patient hopes to absorb its benefits and shed his illness.

Navajos keep their faith in medicine ceremonies but tackle problems of unemployment and poverty with modern education and industrialization. Their fast-growing population, now 133,500 strong, outstrips the resources of the West Virginia-size reservation that extends over parts of Arizona, New Mexico, and Utah.



Keeping home fires aglow, women prepare food in the old ways. The corn Mrs. Chee Draper scrapes will be ground for mush (upper left). "Fry bread" cooks over an open fire



(left) Clara Singer has a recipe for every part of the sheep she butchers (above), except the skin and hooves. Beyond household tasks, Navajo women enjoy their own version of women's

rights. Property passes through the wife's clan, and a husband lives with her people. He owns only his clothes, jewelry, and saddle. Navajos like to say. Traditionally a man considered

himself divorced if his wife put his saddle outside the door; today tribal courts have jurisdiction over family matters.

and disease before they were allowed to return to their red-rock homeland.

Since that humiliation, a century of evil times has befallen the lords of the earth. But today a new drum is sounding for them, though as yet its beat is faint.

I heard it first in the unlikely precincts of a banquet hall in Albuquerque, New Mexico, in September 1971. There, 175 leaders of the Navajos, including a dignified medicine man, had invaded the white man's stronghold, the largest city near their reservation. In an approach revolutionary for the withdrawn Navajos, the Indians had invited 60 white business leaders to join with them in solving Navajo problems.

"The last time Navajos broke bread with the people of Albuquerque was more than a hundred years ago, before our people made the Long Walk," Chairman MacDonald said. "Now we have returned. . . . We can help one another. . . . There's much to be done in housing, jobs, economic development. But we're not asking for handouts. We've got coal,

oil, gas, and uranium—and talented people. We want investment. . . . Help us develop our resources."

Hogan-born grandson of Lefty Curley Hair and Little Grandmother, who both made the Long Walk, MacDonald was elected chairman in 1970 on a pledge to "get the tribe moving." Supporters of the 43-year-old engineer think they got what they wanted.

"We're finally starting to move," Marshall Tome, a MacDonald aide, told me. "We're not going to roll over and play dead Indian anymore."

We were talking, a week after the Navajo Tribal Fair in Window Rock, Arizona, the Navajo capital. The atmosphere of the little town was electric with the new mood of resurgence. Sprinkled among the hundreds of pickups that the tribesmen had driven to the fair were many bumper stickers proclaiming: RED POWER! INDIAN POWER! CUSTER HAD IT COMING!

The pickups themselves, in such unwonted abundance, also proclaimed a measure of



Weathered as the land he loves, shepherder Clifford Singer built this log-and-earth hogan for his family years ago near Kayenta, Arizona. While retaining close ties to his mother's kin, a Navajo husband manages his wife's flocks and shares profits with her clan. "A man can't get rich if he looks after his family right," goes a tribal saying.

Navajo independence. Jokingly called "Navajo convertibles" by the Indians themselves, these vehicles have revolutionized reservation life. By giving their owners mobility, they have freed many Navajos from a kind of economic bondage to local trading posts—a matter that was the subject of a federal investigation last summer.

The Navajo families visiting the fair shopped eagerly at Window Rock's symbol of the white man's capitalism—the Fed Mart, a huge department store. There they snapped up groceries, hardware, clothing, radios, television sets.

Century-old Fashions Still in Style

Though I have been studying and writing about the Navajos for 15 years and welcome improvements in their lives, I can't quite get accustomed to seeing a Navajo woman in traditional dress pushing a supermarket cart and picking canned food off the shelves. I am happy, though, that those bright, floor-length skirts and velveteen blouses (copied from the dress of white officers' wives a century ago at Fort Sumner) haven't faded from the scene. Navajo women buy them right at Fed Mart, where they hang beside the mini-skirts worn by some of the young Navajo secretaries.

The modernity and prosperity of the capital is further underlined by the presence of a new bank, a Kentucky Fried Chicken parlor, and the Navajo Motor Inn. The tribe built the inn three years ago, leased 50 rooms to a white man for a motel and 40 to the Indian Health Service for offices. It proved so remunerative that the tribe plans to add rooms.

During the fair, Chairman MacDonald rallied tribal leaders from all over the country against bureaucratic interference by the *belagoana*, the whites. Meeting in the Tribal Council Chamber, designed to resemble the traditional octagonal hogan, the group demanded more authority for Indians in the Bureau of Indian Affairs. Shortly after, the White House ordered the Interior Department to improve Indian authority in the bureau. Now some key jobs are going to tribesmen, including Navajos.

The bureau area director at Window Rock is, for the first time, a Navajo, Anthony P. Lincoln, a 31-year-old economist. Like MacDonald, he has worked for full Indian control of the bureau and now sees his hopes being realized. Until take-over time comes the

Navajos will try to widen every crack in bureaucratic control.

They rejoice in what the Office of Economic Opportunity has done. Marshall Tome, who is a University of Missouri journalism graduate, said: "The bureaucrats in Indian Affairs always made the decisions on spending federal funds for Indians. Then the OEO comes along with 11 million dollars a year and asks Navajos how *we* think the money should be spent. Navajos were like a snake in a jar until OEO let the snake out. What happens when you free the snake? When he realizes he's free, he begins to move!"

Movement, independence—these are the watchwords of the Navajos today. They speak of their tribe more often as the "nation"—and rightly so, since Navajo nationhood exists by treaty, signed with the United States in 1868. The tribe has its own legislature, police, and courts. Except for traffic regulations, state laws do not apply to Indians in the reservation. The Federal Government retains jurisdiction only over the so-called 14 major crimes, such as murder, rape, and robbery.

But the Navajos want to be more a part of the United States as well. During the past decade, two Navajos have served in the New Mexico Legislature. And when the Arizona Legislature, in a 1972 reapportionment, gerrymandered the reservation out of representation, MacDonald went to court and got the district boundaries redrawn.

Remote Trading Post Guards a Treasure

With all this thrust toward modernity, I could not help but ask, was the Navajo resurgence occurring at the expense of the old cultural values? What, for example, was happening to the ancient craft of weaving? Navajos are famous for their rugs.

The finest are woven in Two Grey Hills, New Mexico, though rugs from Crystal, Wide Ruin, Teec Nos Pos, and Ganado are also renowned. Driving from Window Rock to Two Grey Hills, I wondered whether I was going to make it when, at Newcomb Trading Post, I turned off onto six miles of bone-breaking washboard road. At last I came to a long, green stucco building dozing in the sun. A small, crudely lettered sign labeled it as "Two Grey Hills T.P." (Trading Post).

Three pickups nosed up to the front porch. An old Navajo, his leather-hard face worn into a thousand tiny wrinkles, nodded in the friendly shade. He looked up, smiling, and



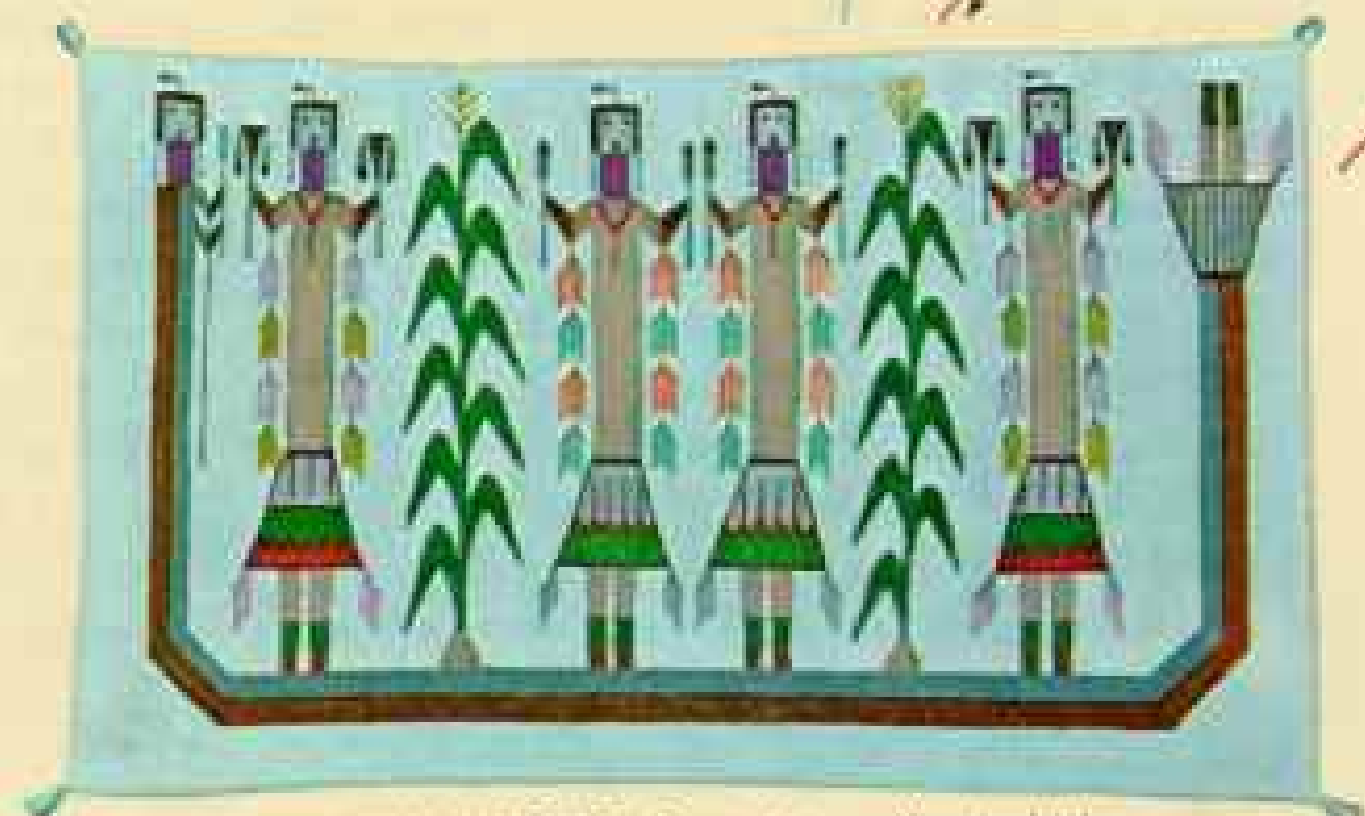
CHIEF-PATTERN BLANKET of about 1855. Such blankets were traded to leaders of other tribes as prestige symbols.



REARVIEW FROM THE MARSHALL MUSEUM OF ANTHROPOLOGY OF THE UNIVERSITY OF NEW MEXICO, ALBUQUERQUE, PAINTED BY STAFF ARTIST NED W. SEDLER. MAP BY GUNAR J. RUTING AND ENGLISH STEFANOFF



TWO-FACED RUG, 1946; illustrates an unusual weave, one of many styles adopted in this century for sale to traders.

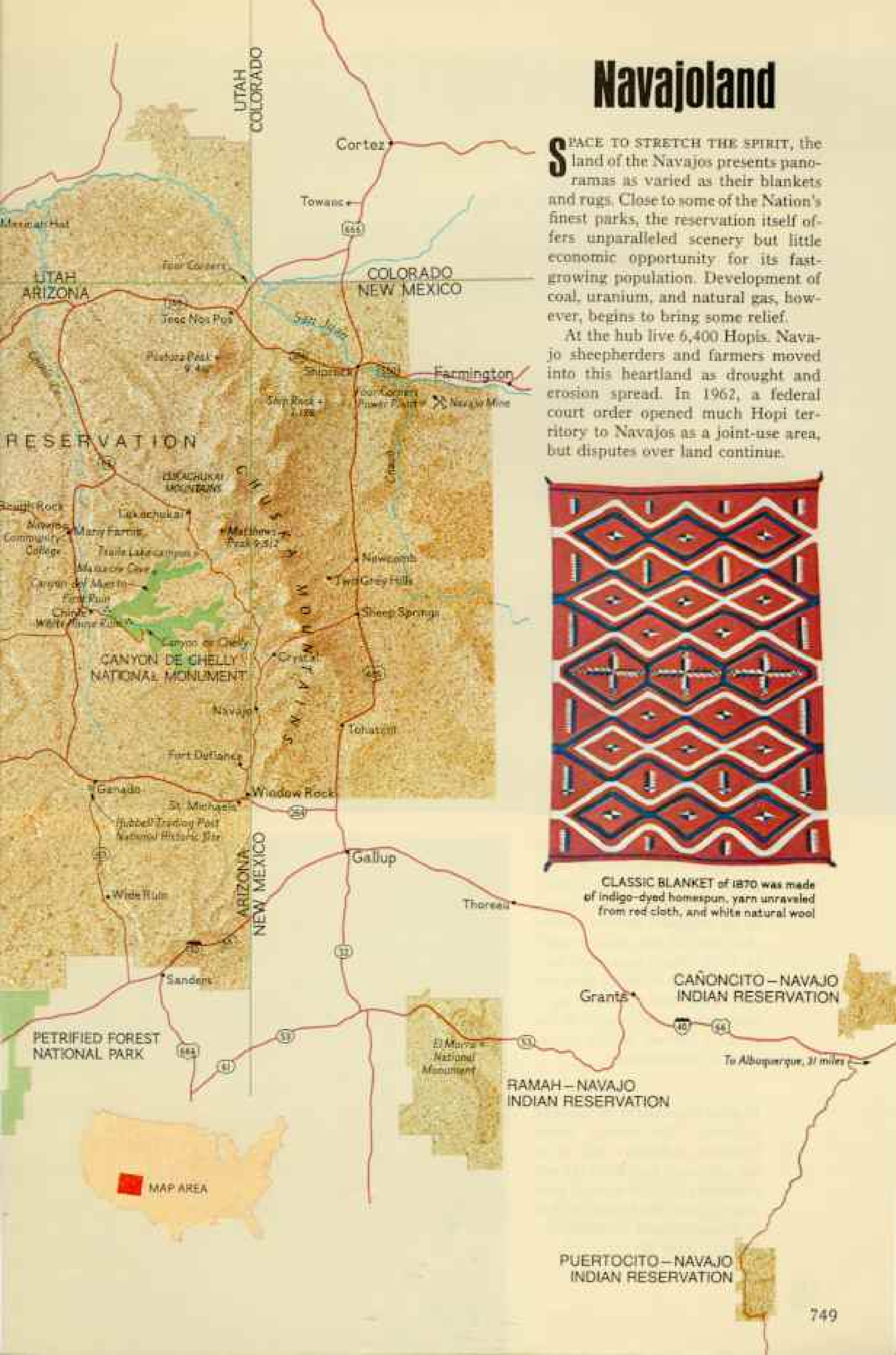


YEI WALL HANGING of 1957 pictures Navajo deities.

Navajoland

SPACE TO STRETCH THE SPIRIT, the land of the Navajos presents panoramas as varied as their blankets and rugs. Close to some of the Nation's finest parks, the reservation itself offers unparalleled scenery but little economic opportunity for its fast-growing population. Development of coal, uranium, and natural gas, however, begins to bring some relief.

At the hub live 6,400 Hopis. Navajo shepherders and farmers moved into this heartland as drought and erosion spread. In 1962, a federal court order opened much Hopi territory to Navajos as a joint-use area, but disputes over land continue.

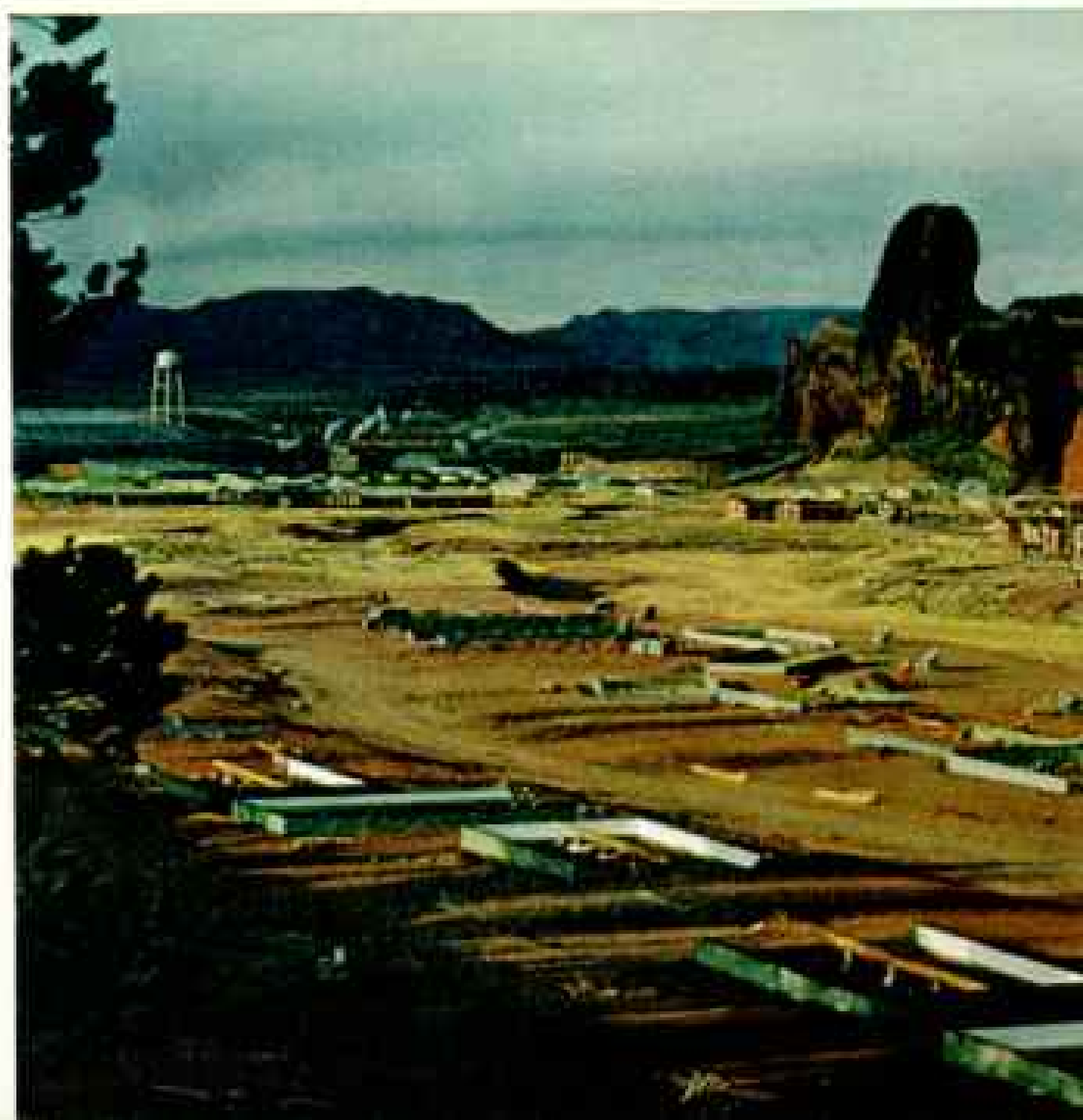


CLASSIC BLANKET of 1870 was made of indigo-dyed homespun, yarn unraveled from red cloth, and white natural wool



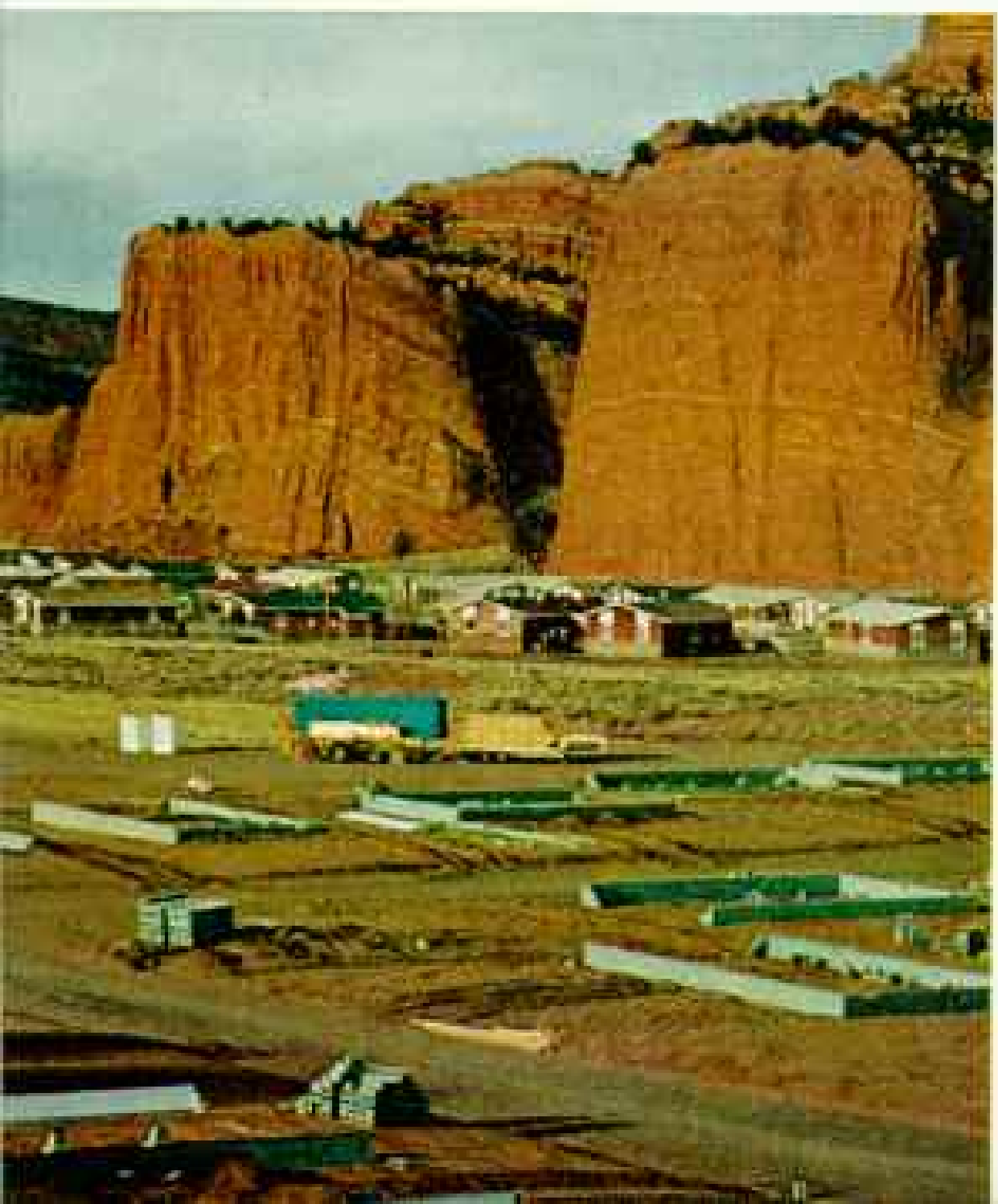
"He who clasps hands with strength" was the Navajo name given at birth to Peter MacDonald (above, left). Trained as an engineer, he was elected chairman of the tribal council in 1970. The 74-member governing body recently took the first steps toward achieving a long-sought goal, control of Bureau of Indian Affairs operations in Navajoland.

Indian capitalism in red-rock splendor: The Navajo Forest Products Industries mill at far left processes logs from the reservation's 450,000 acres of ponderosa pine. Here rises the first Indian-planned community, Navajo, New Mexico.





STEVE WINTHROP LIBRARY



extended his hand. "Ya-ta-hey!" he said, speaking the Navajo "hello."

A shaggy white Samoyed napped in the dust. A pair of Navajo girls scrubbed a white car in the lee of the corral. Sheep bleated inside the fence. The wind off the Chuska Mountains whipped up a dust devil that went dancing off across gray-yellow hills.

Inside the trading post a fascinating array of everything from groceries to stovepipes packed the store, but I could see no Navajo rugs. Jovial round-faced trader Derald Stock told me the rugs were in a back room and led the way. Lighted by a single bare bulb, the room was cluttered with things Indians had pawned—radios, saddles, blankets, and handcrafted silver-and-turquoise jewelry. Pawn is a big business among the Navajos, and some large stores, like Little Bear Market at Gallup, often hold hundreds of thousands of dollars' worth of jewelry (page 768).

Thin Gray Line Lets Spirit Out

Stock uncovered a pile of rugs, all in the Two Grey Hills design, woven from natural brown, black, white, and gray wool fibers.

I asked him whether the Navajos are weaving as many rugs as they once did, and he shook his head sadly. "Fewer. But because they're scarce, they bring higher prices. We handle about \$40,000 to \$50,000 worth of rugs a year and wholesale about 85 percent of them."

From a small safe he drew out three fine rugs. One, only three by five feet, bore a \$3,250 price tag. "Seems a lot," Stock said, "but don't forget that the weaver put about 400 hours into it." The weave is so tight people boast that such rugs hold water. A good rug may have 30 threads to the inch; this rug probably had at least 90.

The trader pointed to a thin gray line of yarn woven into one rug from near the center to one border. "Some people say that's the weaver's signature," he said. "Actually, weavers put the yarn there so their spirits can escape from the rugs. They feel they've spent so much time on them that they've put their spirits into them. If they don't let the spirits get out, they believe they'll go crazy."

Stock told me a woman can earn \$3,000 to \$5,000 a year weaving, but few want to weave large rugs because they take so long. "An eight-by-fourteen rug I ordered took two and a half years to make and sold for \$5,000. But I had to carry the weaver's groceries

and supplies on credit the whole time."

Later I drove out into the hills and watched Elsie Napoleon work at her loom as her grandchildren played about her in the dust. It was a picture of simple beauty, a timeless scene springing vividly from 250 years ago, when Navajos learned weaving from Pueblo Indians. But the rugs are an expression of something deep within the Navajos themselves—their obsession with beauty, which permeates their religion and lives. Like one of their chants, the rugs proclaim to all, "May you walk in beauty."

Just 75 miles northeast of Two Grey Hills, on the lonely mesas and canyons around the San Juan River and its tributaries, lies the region that the Navajos consider the cradle of the tribe. The Navajos call themselves the Diné, the People, and so they call this homeland the Dinétah, the People's Country. Here

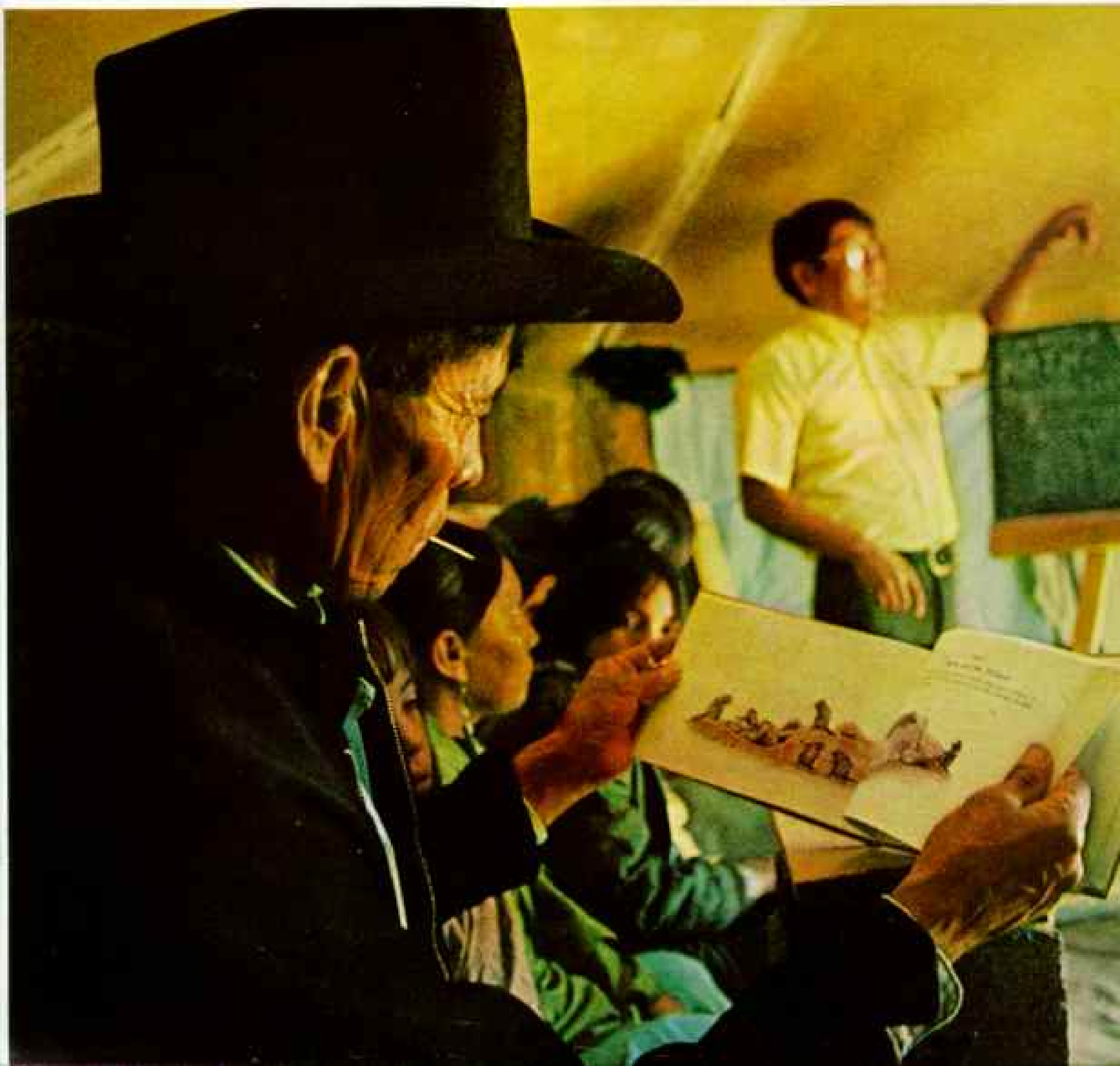
the earliest relics of the People have been found, indicating that the Navajos probably settled the region about 1500.

Legend Points to an Underground Home

Out of Farmington, New Mexico, a town near the northwest corner of the Dinétah, I went exploring with Harry Hadlock, an oil-field supervisor and amateur archeologist.

As we bumped along a dusty road, Hadlock explained through a luxuriant walrus moustache: "The Navajos arrived from the north and settled around Gobernador Canyon in New Mexico. Their own legend is that the People emerged from underworld regions through a hole near Silverton, Colorado, about 75 miles north of the canyon."

Anthropologists think the ancestors of the Navajos and the Apaches drifted slowly southward from western Canada. Both tribes



speaking Athapaskan languages that are closely related to Indian languages of Alaska, Canada, and the Pacific Northwest.

"This is it," said Hadlock, as the car stopped. I followed him on foot into the juniper and piñon, flourishing at the 6,800-foot elevation. After hiking a mile, we emerged on the rocky edge of a mesa. There, clinging to a sandstone pinnacle about 35 feet high, was a small rock fortress.

"The Navajos built this about two centuries ago," Hadlock said. He pointed to a dim white image of a corn plant carved on the sandstone. "This is how the fortress got the name Three Corn Ruin. There used to be two other corn pictures, but they eroded away."

We clambered up a great gray log into which a Navajo, now long dead, had chopped shallow notches, then hoisted ourselves into the fortress. Even with some walls tumbled,

Opening the pages of new learning, a construction worker ponders an elementary English reader (left) in a twice-weekly class at Low Mountain. Instructor James Ashike, at the blackboard, comes from Navajo Community College at Many Farms, Arizona, the first college in the United States owned and operated by Indians.

Only Navajo physician, Dr. Taylor McKenzie, director of the Public Health Service Indian Hospital in Shiprock, New Mexico, heads a surgical team of Indian assistants. Plagued by malnutrition and respiratory and digestive ailments, tribesmen in growing number seek out the free federal service. A limited budget restricts equipment, staff, and health programs.



TERRY O'NEIL (ABOVE)

Wrapped in the dun-colored world of a blinding dust storm, a Navajo trudges homeward. Each day he must find his way between two sets of standards, those of his tribal elders and those of the white culture. He lives with a history of broken treaties, neglect, and exploitation, and must still cope with prejudice as well as unemployment. Most Navajos adjust, believing the world holds a balance of good and evil. But a sense of aimlessness overwhelms many.



Escaping prohibition at home, Navajos frequent liquor stores that prosper beyond reservation borders. Alcoholism is a serious problem, and the tribal council is establishing rehabilitation centers.





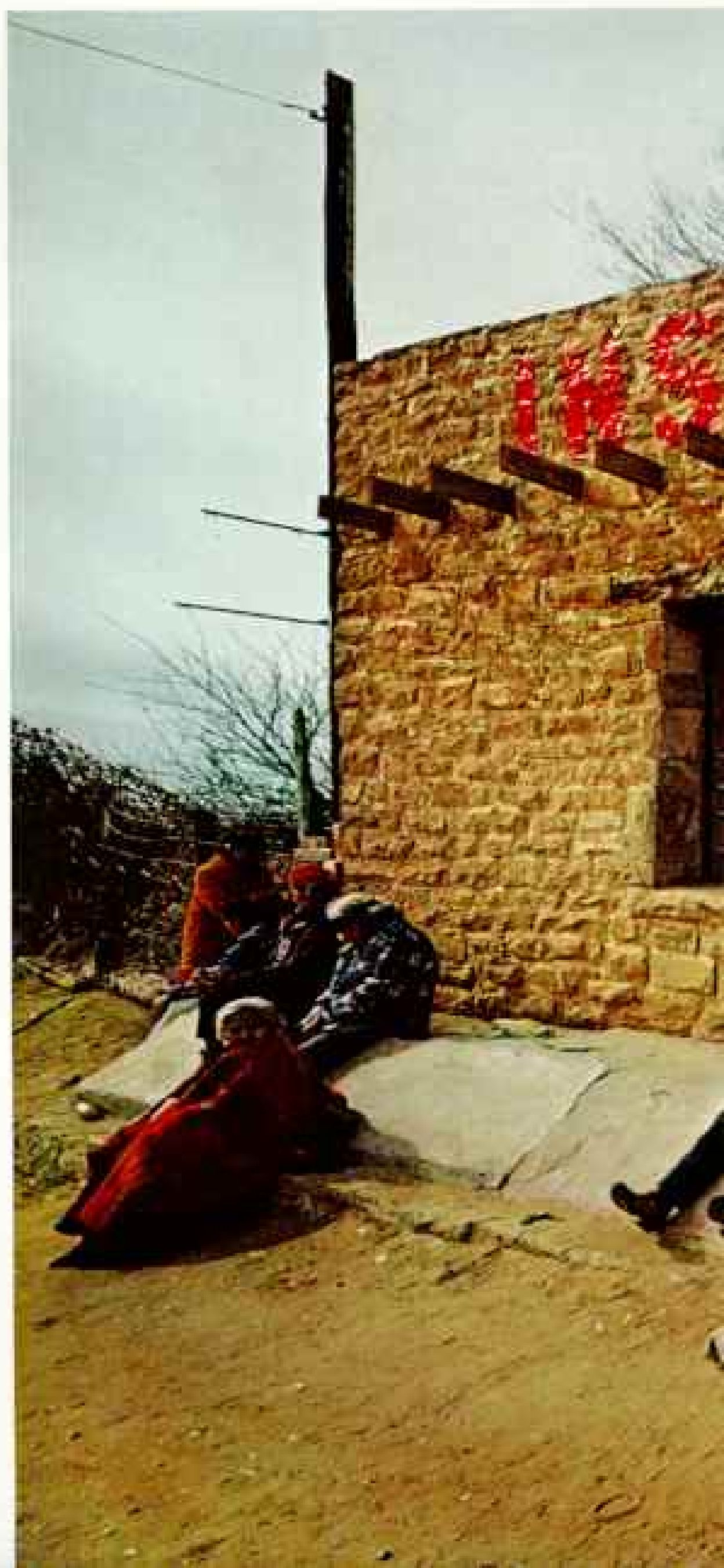
it looked impregnable. The cliffs plunged sheer on all sides. Standing atop the tower, I looked across the rolling lonely land, trying to see across the centuries, wondering about the men who farmed in these valleys and built this bastion as a defense against marauding Utes and Comanches.

The ruins of the Dinetah date from the so-called Refugee Period, when Navajo and Pueblo Indians lived together. In 1680 the Pueblos revolted and drove out the Spanish, who, more than a century before, had begun probing up from Mexico and settling. In 1692 the Spanish reconquered them, and many Pueblos from the Rio Grande area fled west and sought refuge with the Navajos.



Signs of the times: U. S. flag decorates the jacket of a young Navajo in Gallup, New Mexico. The banner also marks the sleeve of a tribal policeman, a member of the 200-man force that upholds Navajo laws on the reservation.

During vacation from a welding job in Utah, James Madman dons Indian jewelry (right). He waits for a lift at Inscription House Trading Post.



From their Pueblo friends, with whom they intermarried, the Navajos borrowed not only weaving skills but probably the clan system as well. Today the People are organized into 75 clans. A Navajo is born into his mother's clan, but is linked by blood with his father's. Fellow clan members are called "brother" or "sister," even though blood relationship may be distant. Most tribesmen believe marriage with another member of one's clans (either mother's or father's) is incest.

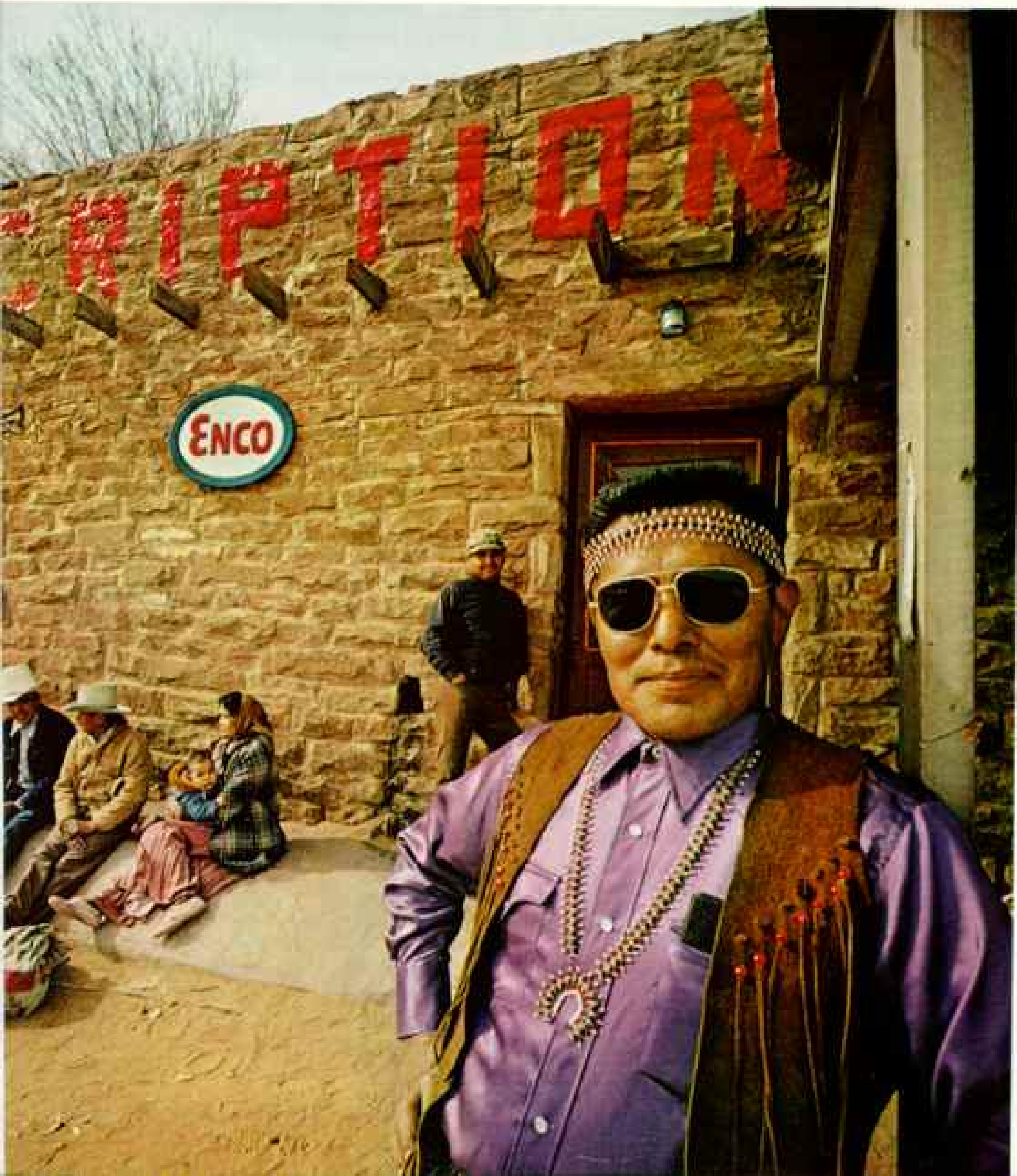
"You will be punished if you marry within your clan," my friend Billy Joe told me. "Your kids will be crazy or crippled."

I had returned to the region of Massacre Cave, and Billy was guiding me again.

Around 1700 the People had spread westward from the Dinetah into this canyon network dominated by the Canyon de Chelly.

Billy lives on the rim of the Canyon del Muerto, one of de Chelly's main branches, but helps with the family farm down on the canyon floor. About 175 Navajos farm the canyons in summer. In winter, when canyon trails often become impassable and firewood is scarce, they move to the rim.

I wanted to visit Navajos deep in the Canyon del Muerto, and Billy took me there in his pickup. The route up 35-mile-long de Chelly and 26-mile-long del Muerto is the stream bed. It is made perilous by quicksand even when the stream is dry. The sand



has swallowed wheeled vehicles and horses impartially. When the stream is running, the best way to navigate the canyons is to send a savvy Navajo horseman ahead to stake safe crossings around the quicksand pockets. You cross and recross the orange flood dozens of times. In between you drive straight up the river's middle. But, above all, you keep going; stop, and you may get mired.

The canyons are awesome, with sheer, thousand-foot sandstone walls (page 773). Many shelter well-preserved cliff dwellings, such as First Ruin, an ancient pueblo nestled in a hollow partway up a 500-foot cliff that looks like a gigantic rust-colored stage drape.

"The Old Ones lived here, long time ago," said Billy.

The word translated as Old Ones is "Anasazi." Anthropologists use it to describe prehistoric Indians, forebears of today's Pueblos, who settled the canyons around A.D. 300. By the end of the 13th century the Anasazi had left these gorges, driven away by drought. The canyons were only occasionally inhabited from their departure until the Navajos arrived in the 1700's.

At a point where Canyon del Muerto widened, three small houses clung to a low hill in its center. Smoke curled upward from a "shadehouse," a three-sided log shelter thatched with cottonwood boughs. Mrs. Chee Draper, a lean Navajo woman wearing the traditional long skirt, was stirring a small fire in a primitive rock fireplace in front of the house. A rusty hood from an old truck shielded the flames.

Radio Speaks in Navajo Tongue

The shadehouse is a fixture of Navajo country, providing an airy home in warm weather. Mrs. Draper's contained a bed, a table, groceries, clothing, and pots and pans. Several sheepskins hung around the sides. A small transistor radio blared the voice of country singer Charley Pride. As he finished, an announcer began speaking in Navajo.

"Gallup," Billy said. "They've got a Navajo disc jockey." Stations in cities bordering the reservation often employ Navajo announcers to reach the estimated 65,000 members of the tribe who understand little or no English. One such announcer, Raymond Nakai, became tribal chairman and served two terms before being defeated by MacDonald.

Mrs. Draper smiled and extended her hand. "Ya-ta-hey," she said. She speaks no

English and since I speak no Navajo, Billy translated. Mr. Draper and their sons were off with the sheep and the few cattle the family owns. She was tending their peach trees and vegetable garden.

Billy told me that the Drapers live on the rim during the winter. "They have electricity there, but not here," he said. "But this is good—coming down here, they don't forget the old way of living."

We sat by the fire and munched on cold roasted ears of corn. Then Mrs. Draper made "kneel-down" bread. Kneeling before a metate, she ground corn, then made a mush and wrapped it in cornhusks. She put the husks in hot ashes, covered them with leaves and sand, and built a small fire over them. The product was delicious.

Indian Church Has Dual Traditions

After our meal, Billy led me outside to show me how the Drapers get their irrigation and drinking water. He scraped a hole in the dry stream bed with a pointed rock. A foot down the sand darkened. Inches farther, water appeared. "It is good," he said.

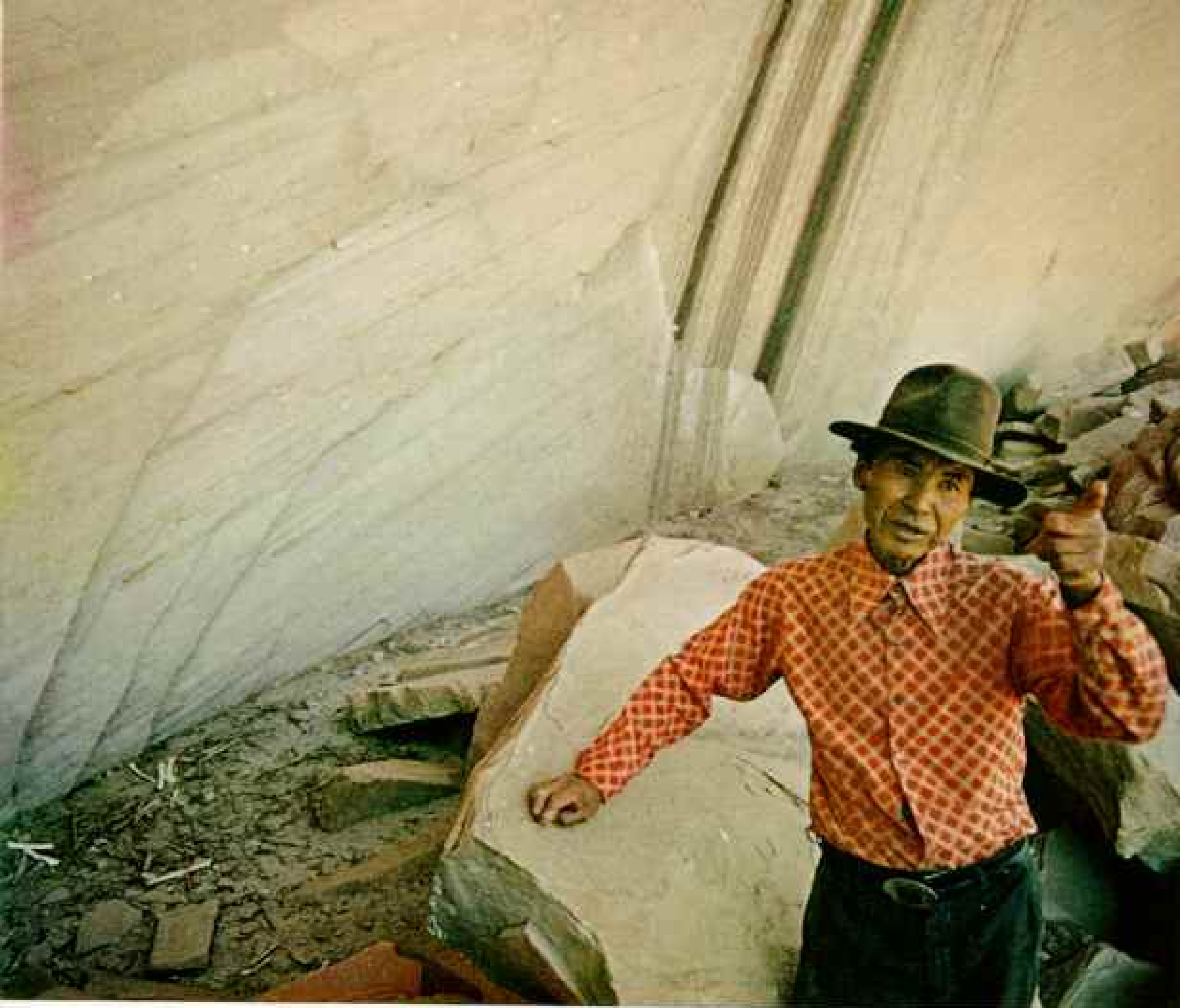
I mentioned how the Old Ones had left these canyons because of drought. But Billy was emphatic: "No! They disobeyed nature. The gods sent hurricanes and lightning and drove them away."

Billy believes in the *yei*, the Navajo gods, but he also believes in Christianity. He is a member of the Native American Church, a sect that combines Christianity and Indian traditions. In the church ritual, peyote, a cactus containing hallucinogenic mescaline, plays an important role. To the 40,000 Navajo members claimed by the church peyote is a sacrament given to the Indians by God so that they may commune more directly.

"My family has used peyote since 1959," Billy said. "Until then we only had a hogan. Now we live in a house. We sleep on beds instead of sheepskins. Now my parents don't fight. I have a job and a pickup."

Billy's conviction that the peyote rites have improved Navajo life overall is shared by most church members. To Dr. Robert L. Bergman, a psychiatrist who has attended many Native American Church services, the rites, lasting all night, are somewhat like group therapy. The worshipers sit around a hogan, taking several peyote buds as the night wears on. Dr. Bergman, Public Health Service

(Continued on page 764)



Specters from the past haunt Massacre Cave in lonely Canyon del Muerto. Tradition-minded Navajos avoid this place of death, but Chee Draper, a Christian, took photographer Bruce Dale there. The Spanish, retali-

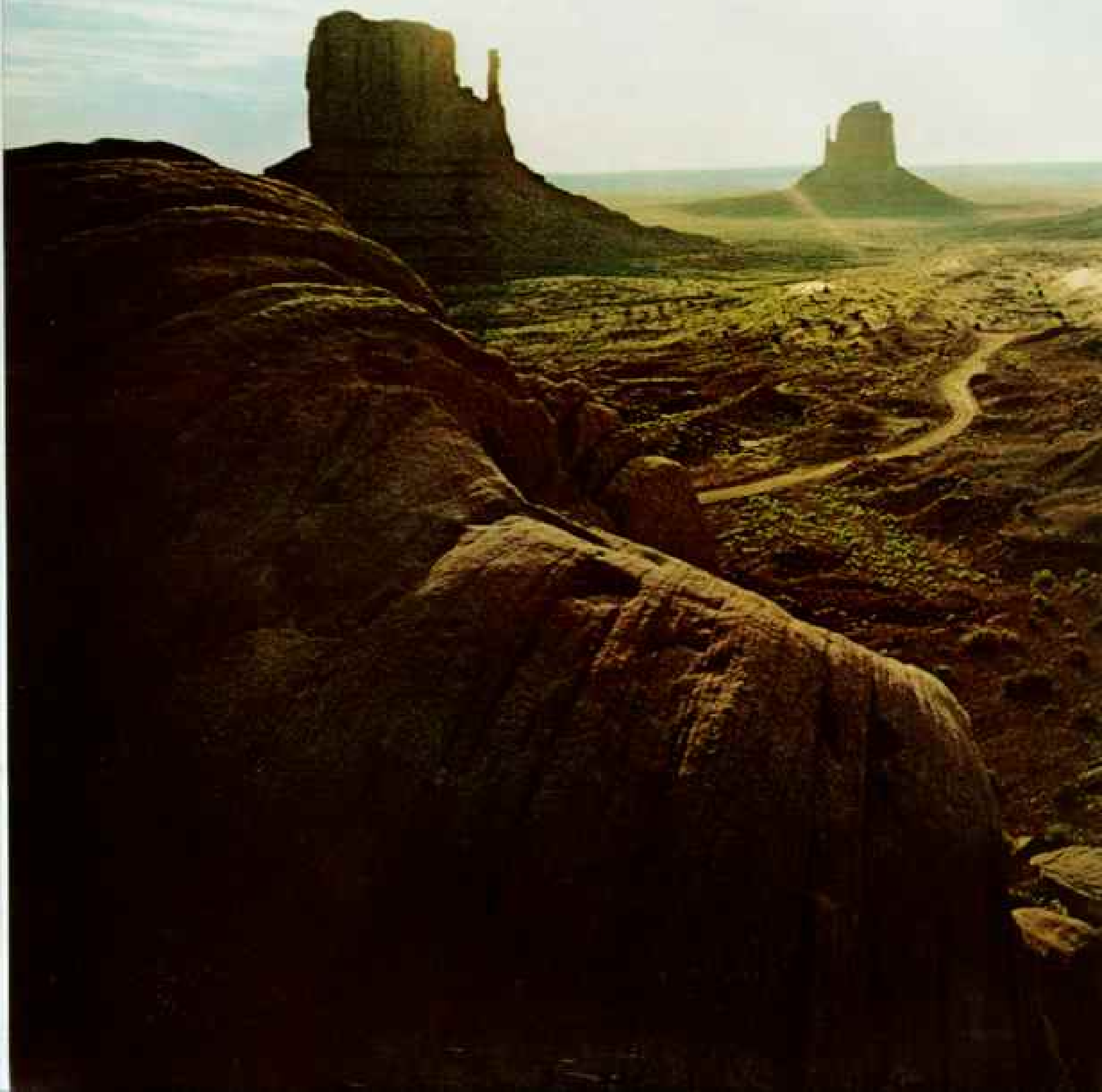
ating against Navajo raids for horses and sheep, sent a regiment swooping into the canyon stronghold in 1805. A traitor, according to one account, pointed to this cliffside ledge, where a group of Navajos had taken refuge. From

the canyon rim riflemen pinned down the Indians with gunfire, while other soldiers climbed the cliff face and overwhelmed them with swords and knives. Ghostly handprints (below), were left by earlier canyon dwellers.



MONOLITHS MARCH toward
the horizon in Monument
Valley on the Utah-Arizona
border. Few visitors were
able to enjoy this stark
grandeur until a nearby
road was paved; in 1960
the Navajo council declared
the valley a tribal park.

760





Blanket of wool surrounds a ewe as Mrs. Anna Cly shears her flock at a Monument Valley summer camp. A neighbor (below) lifts out another sheep to be clipped. Flocks spell status, as they have since the Navajos acquired sheep from the Spanish in the 1600's. Improved marketing practices have attracted buyers from as far away as Japan and this year brought the Navajos increased income from wool.



BOTH BY TERRY OGDEN





consultant for the Navajo area, says that hallucinations are generally limited to seeing "beautiful colors in the fire," and that the danger of emotional disturbance is slight.

The peyote ritual is fundamentally a prayer service for the sick, an approach in line with traditional Navajo religion, which concentrates on healing ceremonies. The old rites are still a powerful force, despite the Navajos' exposure to intensive missionary efforts. The tribe has issued permits for the establishment of 300 Christian missions!

The Navajo religion concerns itself with life on earth, not life after death. It teaches that disease and other evils result when a person is out of harmony with nature. The remedy is to consult a medicine man for the proper rituals to counter the affliction.

Sand Painting: an Ephemeral Art

Out among the drifted pink sands of Monument Valley, I once sat in a ceremonial hogan and watched a medicine man direct two assistants in making an intricate sand painting on the dirt floor. With it, they intended to cure a wrinkled old woman of her back pains.

They used ground charcoal, crushed red sandstone, white sand, and yellow ocher. Occasionally one of the assistants would make an error and the medicine man would correct him at once, for Navajos believe that the slightest deviation in such a ritual can cause great trouble. The medicine man pulled the images in the painting from his mind; he had no book or pictures as guides.

When it was finished, it contained elongated figures of gods, geometrical shapes, and corn plants. The patient was brought into its center and made to sit down. Chanting, the medicine man touched the woman with sand scooped from the painting so she would absorb its power and be drained of her illness. Then the patient was led away, and the medicine man, carefully and methodically, destroyed the painting. The treatment continued outside the hogan with ritual dancing.

The Navajo religion has at least 35 different rituals. But, because of their complexity, no one medicine man knows them all. Most spectacular is the *Veibichai*, a ceremony performed in fall and winter, in which Indians impersonate the gods. Traditionally the *Veibichai* coincides with the Northern Navajo Tribal Fair at Shiprock, New Mexico, and is held nearby.

Attending the final night of this nine-day

ritual, I was surrounded by hundreds of Navajos, each wrapped in a blanket against the chill. Four bonfires crackled in a roped-off area in front of the ceremonial hogan. The medicine man and his patient—a man—were seated by the hogan's door. The *Veibichai* dancers appeared wearing buckskin masks, bodies painted ghostly white. They carried pine boughs and rattles, and emitted weird, high-pitched cries.

All night they danced and sang, while the medicine man attended the patient. At dawn, with the patient looking far less weary than I felt, I faced east with the crowd as they sang the "Prayer to the Dawn," ending the ceremony.

How much longer can the medicine man keep his grip on the Navajo imagination? Dr. Taylor McKenzie, director of the Public Health Service hospital at Shiprock and the first Navajo to become a medical doctor (page 753), thinks the medicine man is on the wane.

"It takes years for a medicine man to teach an apprentice one ceremony, and few younger Navajos will spend the time. Even if they are willing, there's no guarantee they'll have the gifts to become medicine men.

"Navajo healers must find their places in a hierarchy. The medicine man is at the top because he knows the rites necessary to cure various illnesses. Below him is a kind of diagnostician. This man goes into a trance; his hands may tremble. He examines the patient, and by his supernatural gift determines what ceremony is needed to cure him—but he can't perform it himself.

"At the bottom is the herbalist, a sort of druggist who can give temporary relief until the patient can afford a medicine man. Since we medical doctors lack supernatural powers, Navajos figure we're like the herbalists."

Health Lags Behind National Level

Dr. McKenzie, who has been practicing in Navajoland since 1964, said, "I never had any doubt I would come back here. There is a real need for a Navajo-speaking doctor." He believes the Navajo health picture is improving but is still about twenty years behind the rest of the country.

Dr. George E. Bock, Navajo Area Indian Health Service director, agrees: "We still have a long way to go. The infant death rate per 1,000 live births is 42.3—twice as high as for the United States at large. But 17 years ago it was 90! Navajo life expectancy is 63.2 years

compared with 70.5 for the United States population as a whole."

For the young, however, conditions are improving. Thanks to supplemental feeding programs for children up to five, the incidence of withering, stomach-bloating deficiency diseases like marasmus and kwashiorkor is declining. But for the rest of the Navajos, something more than proper diet and medical care is indicated. The real problem is still jobs and economic development.

Tribal Venture in Space Age Technology

In the new spirit of controlling their own destiny, the Navajos are taking bold steps to solve the problem for themselves. The tribe's most successful economic project is Fairchild Semiconductor's big electronics plant at Shiprock (page 767). Products include tiny transistors and miniaturized integrated circuits (complete electronic circuits in a package sometimes no larger than a dime). The tribe built the million-dollar installation, then leased it to Fairchild, the first major firm to open a plant on the reservation. With 750 employees, it is the biggest nongovernment employer in Navajoland. Only 24 employees are non-Indian, and 30 of 34 supervisors are Navajos. Though the plant runs happily today, it was at first a battleground of warring cultures.

"We were our own worst enemies when we opened in 1965," manager Paul Driscoll told me. "We tried to run on white man's rules. Strict. And we had a turnover rate of 12 percent a month!"

Driscoll took control in 1967 and stopped all firings: "These people had no previous exposure to industry. We decided we'd better start seeing things from their point of view.

"We had rules requiring dismissal after five days' absence. What do you do when many of your employees take off for a traditional nine-day ceremonial? Instead of saying 'Thou shalt not,' we started saying 'You should.' Instead of saying they'd be fired, we said they ought to come to work so they could continue to feed the kids."

Turnover now is less than one percent.

There was also a language barrier. Navajos had no equivalent for some English words. So oscillator became "tunnel," aluminum became "shiny metal."

"Despite such difficulties," Driscoll said, "the plant assembles the most sophisticated devices known in our industry. This clearly



Too young to wrangle, this jeans-clad toddler will soon learn responsibilities as mature as his style of dress. Parents once feared education as an enemy that banished children to boarding schools and robbed them of their identity. Now adults demand more schools along with more Indian control. Because of bad roads, almost half the reservation's youngsters still attend boarding schools, though many students come home for weekends.

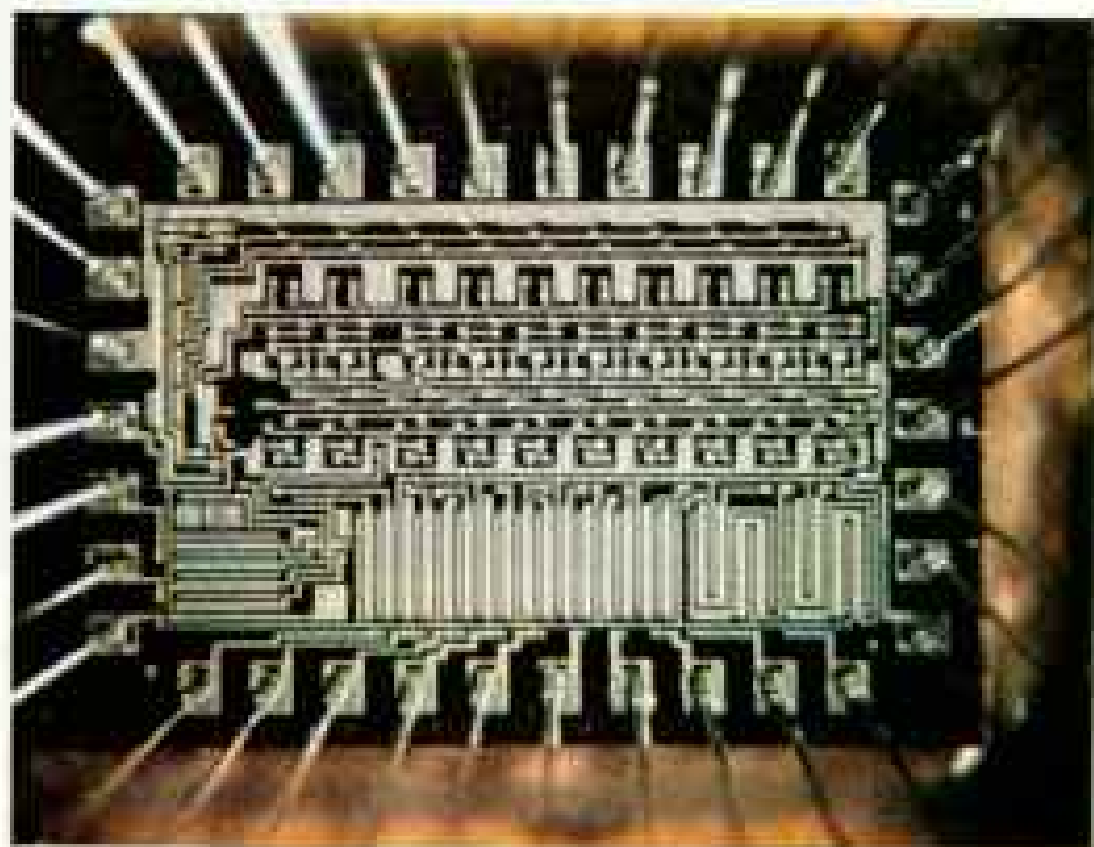




TERRY BLUE (ABOVE)

On looms and assembly lines, Navajo women turn their skills into income. Weavers create a rug (left) in the storeroom of Hubbell Trading Post in Ganado, Arizona. Two months in the making, the rug was sold for \$2,700.

Weaving for the Space Age, Navajos peering through microscopes wire miniaturized circuits (below, magnified 200 times) for use in satellite communications. "These women can visualize a complicated pattern when they weave a rug. They're able to memorize circuit designs the same way," says Paul Driscoll, manager of Fairchild Semiconductor at Shiprock. More than 700 Navajos work in the plant, built by the tribe to Fairchild's specifications.



demonstrates the confidence our top management has placed in our Navajo employees."

I watched them at work. Green-smocked, but adorned with their turquoise-and-silver jewelry, they sit for hours peering into microscopes, wiring the tiny circuits with delicate instruments.

Fairchild's 4½-million-dollar annual payroll has made Shiprock boom. It has also created a housing shortage. To meet it, a five-million-dollar project is blossoming near the plant—streets of neat modern homes, 214 houses and 41 apartments, the largest such development on a reservation. Fairchild put up \$100,000 and acted as catalyst to form a nonprofit corporation with various federal agencies. In recognition of Fairchild President Lester C. Hogan's role in the project, Navajo humorists have dubbed the houses "Hogan's hogans."

At another oasis of Navajo prosperity, on the reservation near Kayenta, Arizona, Peabody Coal's Black Mesa Mine No. 1 employs

a hundred Navajos, whose pay averages \$11,300 a year.

Trading-post owner Brad Blair told me, "I've never seen Navajos with this kind of money. Some of these miners get \$4.60 an hour, a few \$5.70."

Mining of Mesa Offends Tradition

But this prosperity has its price. The Navajos, whose religious philosophy is to live in harmony with nature, now find themselves in the ecology controversy. The strip-mining has been characterized as a "rape" of Black Mesa, an accusation all the more disturbing in that by Navajo tradition the mesa is believed to be the body of a gigantic female figure. Descheeny Nez Tracey, a medicine man, told me, "The sacred mountain is being tortured."

At the mine I stood in the cab of a giant dragline as the three-million-pound machine "walked," and at each step ripped up a 36-cubic-yard gout of earth and rock covering



Coffers of Indian country, pawnshop vaults hold fortunes in silver jewelry. Annie Skeets (above) records some 3,000 Navajo and Zuni pieces, the \$400,000 inventory of Little Bear Market in Gallup. From another shop a man redeems a rifle and blanket

(right). Navajos who own vehicles often prefer such off-reservation stores, where they usually pay lower prices for goods and lower interest rates for pawn than at reservation trading posts.

the coal. By late 1973 the mine will be producing five million tons annually. A second Black Mesa mine, now under construction, is expected to yield eight million tons a year when it reaches full production in 1976. The Navajos already get a million dollars a year in royalties from a mine near Four Corners, also on the reservation (pages 776-7), and the combined Black Mesa operations will bring in another three million.

Both companies are doing reclamation work, but some people are bothered by the mines' effect on the land. Others feel differently. Mrs. Samuel Holiday, Navajo manager of the crafts center at Kayenta, asked, "What are you supposed to do if you're sinking in quicksand and somebody throws you a rope? So it's a little dirty. Do you argue?"

I can understand what Mrs. Holiday means. Every month the onetime lords of the earth queue up for welfare food handouts at many of their tribal centers. If a job will rescue them from this humiliation, they are not likely

to worry about its effect on the environment.

In most of Navajoland I saw little prosperity. Navajo income averages \$300 a year per person. When I visited old friends Clifford and Clara Singer and their family near Black Mesa, the prosperity of the miners was as distant as the moon. The Singers' only income is from their flock of sheep and Clara's weaving. But they are happy.

Sitting on an iron bed in their hogan, I watched their pretty married daughter Tena make "fry bread" (page 744). Her hair is long and glossy, her eyes like a doe's. She chopped piñon and kindled a small fire in the stove, made from an 18-inch section of oil drum. She kneaded the dough between her palms. In the dimness behind her, Clara scrubbed dishes in a tiny white pan containing barely an inch of cold water.

Clifford had hauled the water in a wagon from Owl Spring, two miles away. Eighty percent of Navajo homes have no running water. According to Chairman MacDonald, it would cost nearly a hundred million dollars to put water and sewers into 12,500 homes like the Singers'. To bring them electricity would cost an additional 50 million.

Family Groups Share Neighboring Hogans

Clifford returned from corralling the family sheep for the evening, bringing a granddaughter, Christina Cody, and her baby, Valencia. Seven people live now in the Singer hogan: Clifford and Clara, Tena and her two children, and Christina and her baby. The building is an octagonal room about 15 feet across. It contained an old picnic table, three beds, and a gas refrigerator.

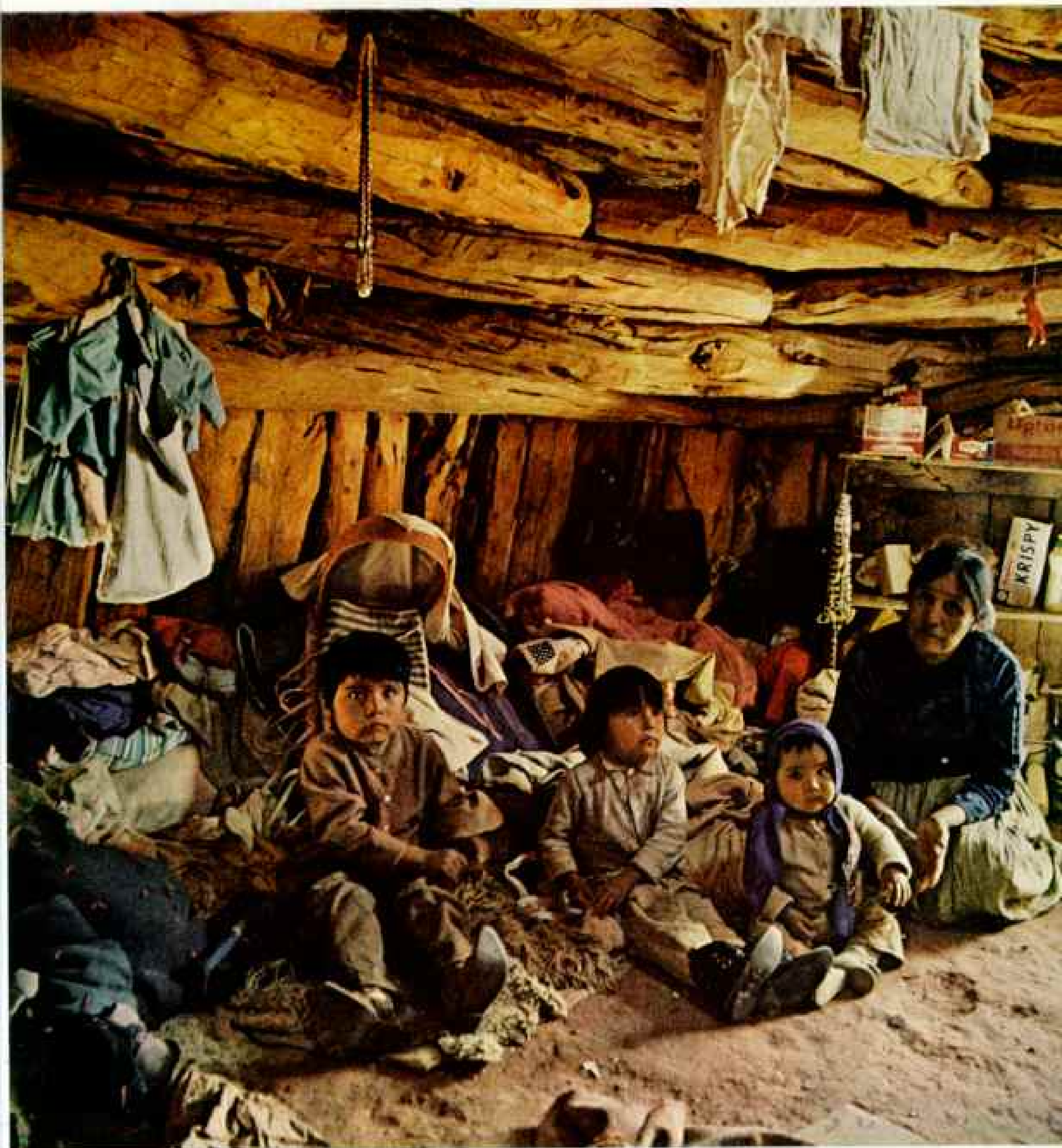
Navajos usually build their hogans in clusters, according to family groups. When one of the family has income, he shares with the others. When a man marries, he usually builds a hogan near his wife's family. Property, including the hogan and grazing land, is owned by the wife and passed on to the children. The husband is only a kind of trustee.

That night the fry bread was dinner. Meat is a special feast, and we'd had mutton stew for lunch.

After dinner in the soft amber kerosene lamplight, we drank strawberry pop and talked of sheep. "A bad year," Clara said. "Dry. Up on the mesa the sheep could drink only every second day."

"I say it is the jets," Clifford put in. "They
(Continued on page 774)

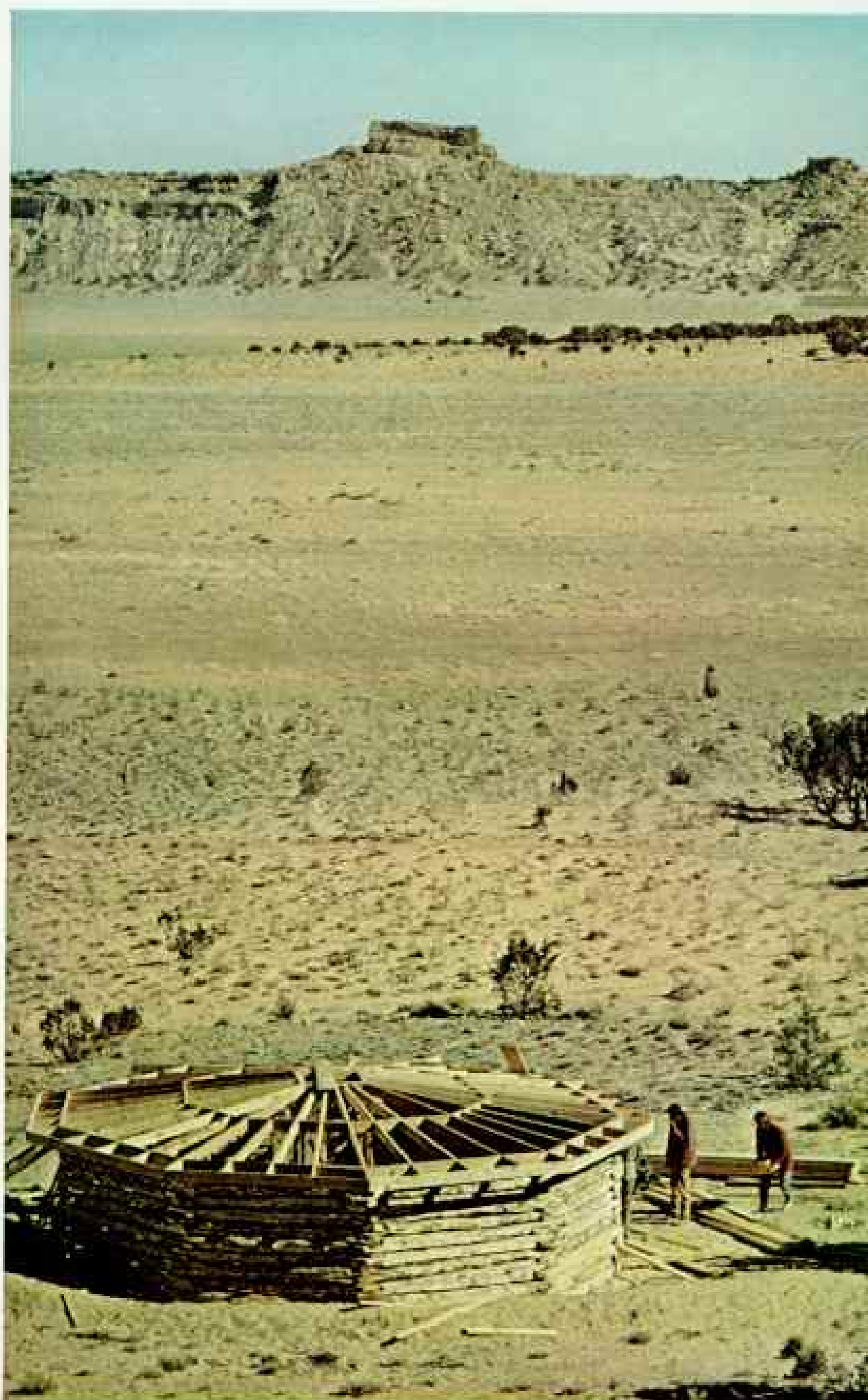




Snug in winter and cool in summer, hogans provide compact residences for one of every four Navajo households. Mary Fatt's family stacks bedding and trunks against the wall;

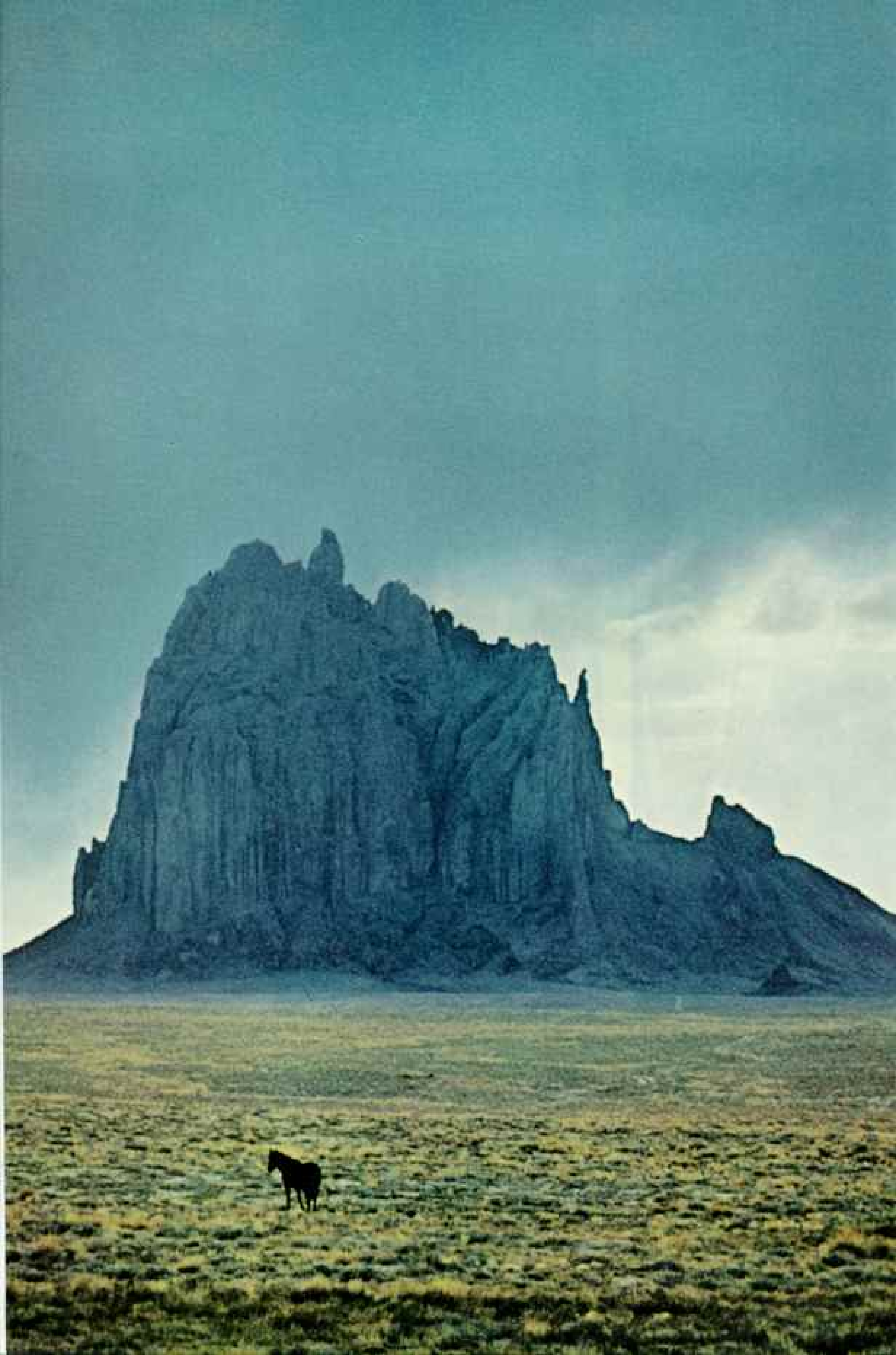
they sleep around the oil-drum stove in winter and outside in summer. Mrs. Fatt stashes trinkets and papers in the beams and keeps supplies in a cupboard by the door that tradi-

tionally faces east. Lack of running water and of sanitation facilities contributes to poor health. Even those who live in modern houses often keep hogans for religious ceremonies.



Raising a new home in only ten days, men of the Singer family build a large hogan near Kayenta. When the dwelling was finished, the Singers held a Blessingway rite: a medicine

man smeared corn pollen on the poles; "that the place will be happy." Unlike their village-dwelling Hopi neighbors, Navajo sheep raisers and farmers live in scattered family clusters.





"Rock with wings," Navajos call Ship Rock (far left), memorializing a tradition that the monolith once was a great bird that brought Navajos here. They see in the wild and empty Painted Desert (below) the varied face paints used by mother earth.

All of Navajoland is sacred to its people and its landmarks are steeped in lore, but old-timers avoid telling stories in the summer, when dreaded lightning and spirits are abroad.

Anthropologists believe that the first Navajos settled in the Southwest about 1500. Some 250 years later, they came to Canyon de Chelly, where they found abandoned ruins of the Anasazi—the Old Ones—such as White House (left). Pueblo descendants of the Anasazi later mingled with the Navajos, teaching them weaving and pottery.



PHOTOGRAPHS BY TERRI STEER

make that smoke. It interferes with nature. It prevents the rain."

The Navajos have been shepherds since Spanish days, but the life becomes ever harder. To prevent the severe erosion that overgrazing was causing, the Department of the Interior ordered flocks cut in half in the 1930's. Most Navajos could not make a living with reduced flocks and were forced to seek wage-earning jobs. There were not—and are not—enough jobs for all, and so welfare and free-food programs have had to fill the gap.

The People are still bitter against the government for creating this situation and will never understand why the flocks were cut. Yet I saw evidence that there are still too many sheep for the land. They had cropped all the lower foliage off the little scrub trees around the Singers' place. But even more than overgrazing, economics threatens the herders that survive. In 1971 wool prices dropped to the lowest mark since the '30's.

Bad Roads Lead to Boarding Schools

I said good-bye to the Singers and returned to Kayenta along a rutted misery of a road. Of the reservation's 7,458 miles of roads, only 1,334 are paved. To put them in reasonable shape would cost nearly a billion dollars. But to do nothing means the continued uprooting of young children from their families.

Because of bad roads, the Bureau of Indian Affairs operates 49 boarding schools for 21,000 youngsters. Tena's son, Ronnie, goes to boarding school in Kayenta, though it is only ten miles from his home. No bus could navigate that nightmare road.

Thousands of youngsters like Ronnie are relegated to boarding school at the age of 6. There they are strictly regimented and thrust into classrooms where they hear little but English—to them a foreign language.

Dr. Bergman, the psychiatrist, told me, "It's as if you or I were to be forcibly enrolled in Moscow University and expected to learn astronomy in classes taught in Russian." Some Navajos never recover from the shock; every year they fall farther behind.

Aware of the problem today, both bureau and public schools (which teach more than half the 55,000 Navajo youngsters) are improving instruction methods, especially in the teaching of English.

Perhaps the most exciting educational development on the reservation is the Navajo-controlled Rough Rock Demonstration

School, at an Arizona trading-post settlement lost in rugged, broken country. It lies about 120 miles northwest of Gallup and twenty miles from any paved road.

I was startled to see Navajo women in velveteen and calico acting as "classroom parents," making fry bread in electric skillets and showing bright-eyed youngsters how to weave a rug. I watched Navajo teachers instructing classes in the Indian tongue, and teaching English as a second language.

"We stress community involvement," said Dillon Platero, the soft-spoken Navajo director. "If change is to take place, it must come from the Navajo community."

An all-Navajo board controls the school. A member, Yazzie Begay, a handsome, dignified man who wears his long gray hair clubbed in back, told me through an interpreter. "It is important for Navajo children to know that they are children of Navajos. This makes them strong, not weak inside."

A Rough Rock innovation in line with this respect for Navajo tradition is classes for medicine men. Six medicine men instruct 12 students, each medicine man working with two students in his own home.

Navajos have already taken over three other reservation schools. Since 1968 they have also been running Navajo Community College at Many Farms, Arizona, the first institution of higher learning in the United States owned and controlled by Indians. Congress has provided 5½ million dollars for a new campus at Tsaile Lake, in the foothills of Arizona's Chuska Mountains; the tribe, private industry, foundations, and individuals have contributed another 11½ million.

Adults Feel Need for Knowledge

College President Ned Hatathli, who was born in a hogan, told me: "The college turns down no Navajos, whether they have a formal education or not. They can take college or technical courses, even rug weaving or silversmithing."

The college has 656 full-time students, including members of 12 other Indian tribes plus a few whites and blacks. It is also teaching adult Navajos to read and write in English (pages 752-3). The Bureau of Indian Affairs runs similar adult programs.

In the bureau school at lonely Navajo Mountain, Utah, I watched 23 men write over and over in their tablets. "In the summer the trees are green." Keith Fat, 60, proudly showed

me his tablet. I asked him what motivates a man of 60 to learn to read. "I think I need to know," he answered.

Many Navajos burn with such a desire to improve their lot, and some have achieved exceptional success. At Chinle, I talked with tough, crew-cut little Fleming Begaye, whom Chairman MacDonald calls "the first Navajo millionaire." In 1960 Begaye started a service station with \$3,000 in savings. Today the station has grown to include a café and a department store selling groceries, dry goods, hardware, and sporting goods. The complex is worth about \$750,000 and the business grosses about \$350,000 yearly, but Begaye, with a wry smile, pleaded not guilty to the charge of millionaire: "If a guy had that much, he wouldn't even need to be in business."

He is proud that he employs 26 Navajos, and would like to help more of his people find the opportunities he has found. "Lack of capital—that's the problem," he said. "I'm trying to get the tribe and the bureau together on a fund that Navajos can borrow from to start their own businesses."

Water a Key to Navajo Future

Another Navajo who would like to use his success to help his people is Frederick Young. Just completing his thesis for a doctorate in nuclear physics, Young has traveled a long road from a hogan near Towaoc, Colorado, to the Los Alamos Scientific Laboratory.

"I know how it feels to starve," he said, "and to be sentenced to boarding school. The first day, they shaved my head and poured kerosene on me to kill the lice."

This articulate man, who speaks Navajo, Ute, English, and Japanese, and reads French and German, told me of his plan to desalt seawater and pump it to Navajoland. "We could build nuclear desalting plants on the Pacific or Gulf of California coast. The same plants could produce electricity to pump the water to the reservation.

"Or we could build nuclear plants underground on the reservation to pump saline groundwater from 3,000- to 5,000-foot depths. The same power could desalt it.

"Still another way to process this water for irrigation would be to use off-peak power from conventional power plants."

Water looms big in the Navajo mind, for it means life. Not surprisingly, the Navajos covet some of the vast supply in Lake Powell, which borders their reservation for about 90

miles. Every state in the Colorado River basin has already staked out a healthy swallow.

The United States Supreme Court in 1908 held that Indian tribes had first claim to waters passing through or by their lands. On this basis, the Navajos' general counsel, George Vlassis, believes that "Navajos are entitled to a very substantial share of Lake Powell waters."

Chairman MacDonald told me that as soon as engineering studies determine the best places from which to irrigate and pump, "We're going to put a pipe in the lake and start using that water."

And that no doubt will kick up as much dust as all those Sioux did that day at the Little Bighorn. Colorado River water has been divided by agreement between seven states and Mexico. Since there isn't enough to meet agreed-upon quotas, any Navajo move for Lake Powell water would probably lead to court action. A decision might take years.

Someone is bound to bring up the fact that the Navajos are slated to get irrigation water, but Chairman MacDonald will have a story to tell about that. In 1962 Congress authorized the Navajo Indian Irrigation Project, designed to bring water from the San Juan River to 110,000 acres of semiarid land near Farmington, New Mexico, and provide a livelihood for 6,550 Navajo farm families. At the same time Congress authorized a companion work, the San Juan-Chama Project to divert San Juan River water over the Continental Divide and supply the growing needs of north-central New Mexico. San Juan-Chama is almost complete, but the Navajo project has proceeded at a much slower rate. Agitation in recent years resulted in increased appropriations for the Navajo project and the first water could reach Indian land by 1976—maybe.

In the meantime, the tribe is thinking of a more immediate and radical way to use some of the water on the reservation. With Marshall Tome and his son and daughter, I was booming up Lake Powell in a speedboat when, 25 miles from Wahweap, Arizona, we roared into Padre Bay (map, pages 748-9). The largest stretch of open water in the lake, the bay is nearly five miles across, rimmed by stunning red canyon walls and weirdly eroded buttes.

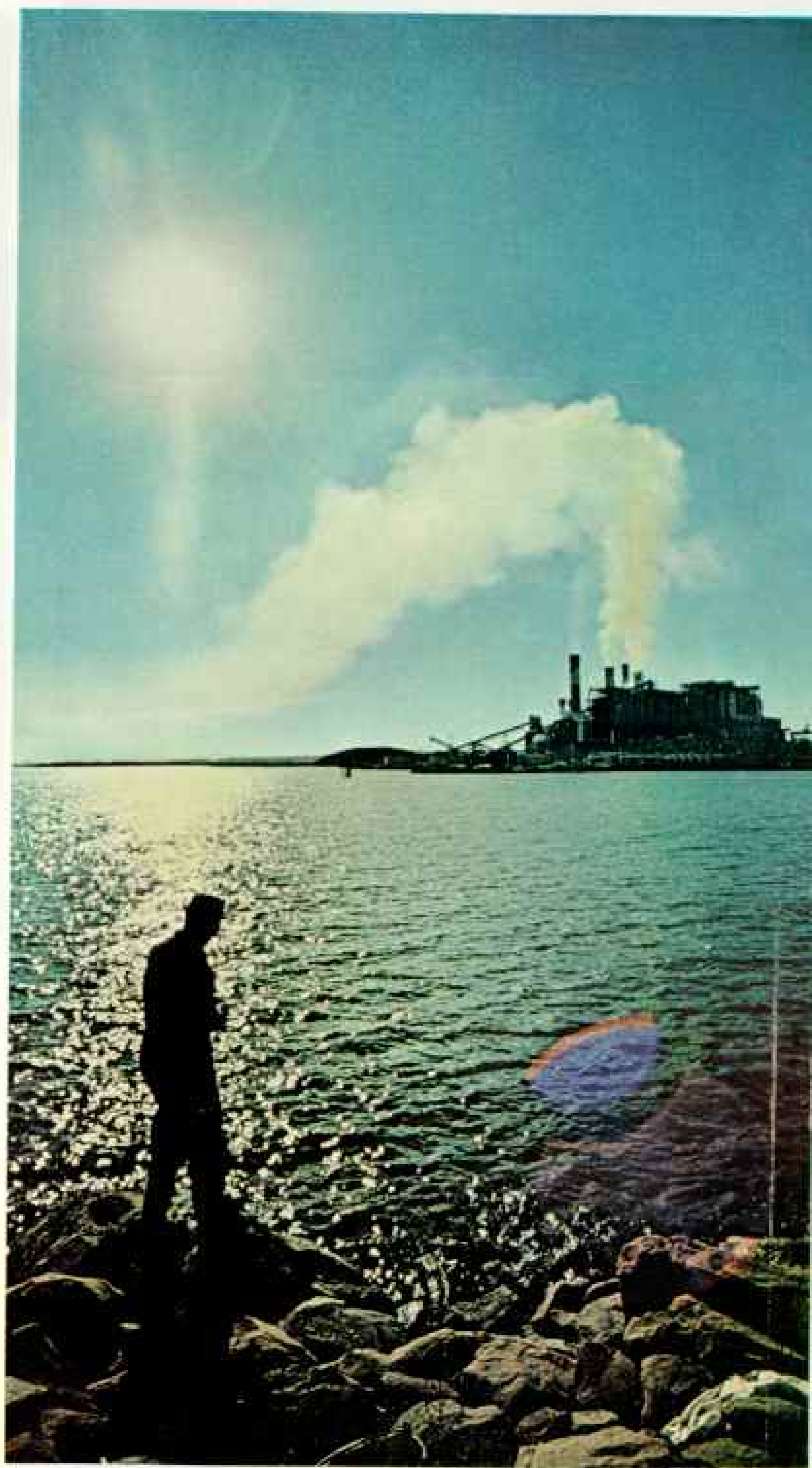
In the shadow of Gunsight Butte, towering 1,000 feet above us, Marshall waved across the water toward Padre Point. "That's where

(Continued on page 780)

Ecological debate comes to Navajo country as traditional reverence for the land yields to economic pressures. Vast coal deposits on the reservation fuel plants that generate power for much of the Southwest and southern California. But despite the financial benefits they reap, some Indians lament the scarring of the land. As one said, "They can never put it back the way it was." Attuned to public opinion, mining companies say they will. At Four Corners (below) a dragline exposes a seam of coal in a billion-ton deposit that feeds the plant at far right; ash from the plant will be buried beneath these spoil piles and the land recontoured. Another mine at Black Mesa operates under a lease that calls for fill-as-you-dig procedures. Mopping up powdery soft coal from a seam's edge, a loader at Four Corners fills a truck amid a cloud of dust (right).



What price power? The Four Corners plant has installed controls that lower fly-ash emission from 264 to 64 tons a day; further reductions are planned. Together, the plant and mine bring Navajos substantial royalties and an average of \$800 a month each for some 300 workers. But smoke plumes still pollute the air, and conservationists fear the impact of five more coal-burning giants planned for the blue-sky country.





RALPH LOONEY

Gathering of the clans draws thousands each fall to Navajo-run fairs at Shiprock and Window Rock. Indians arrive in herds of pickups (upper left), their favorite vehicles. "Red power" gets a boost from a visiting Apache dancer (above). Navajo 4-H Club member Lorraine Nash (right) tops all competitors with her grand-champion sheep. Heritage-proud teen-agers (left) wear traditional dresses in a style their great-grandmothers copied from the wives of frontier officers.

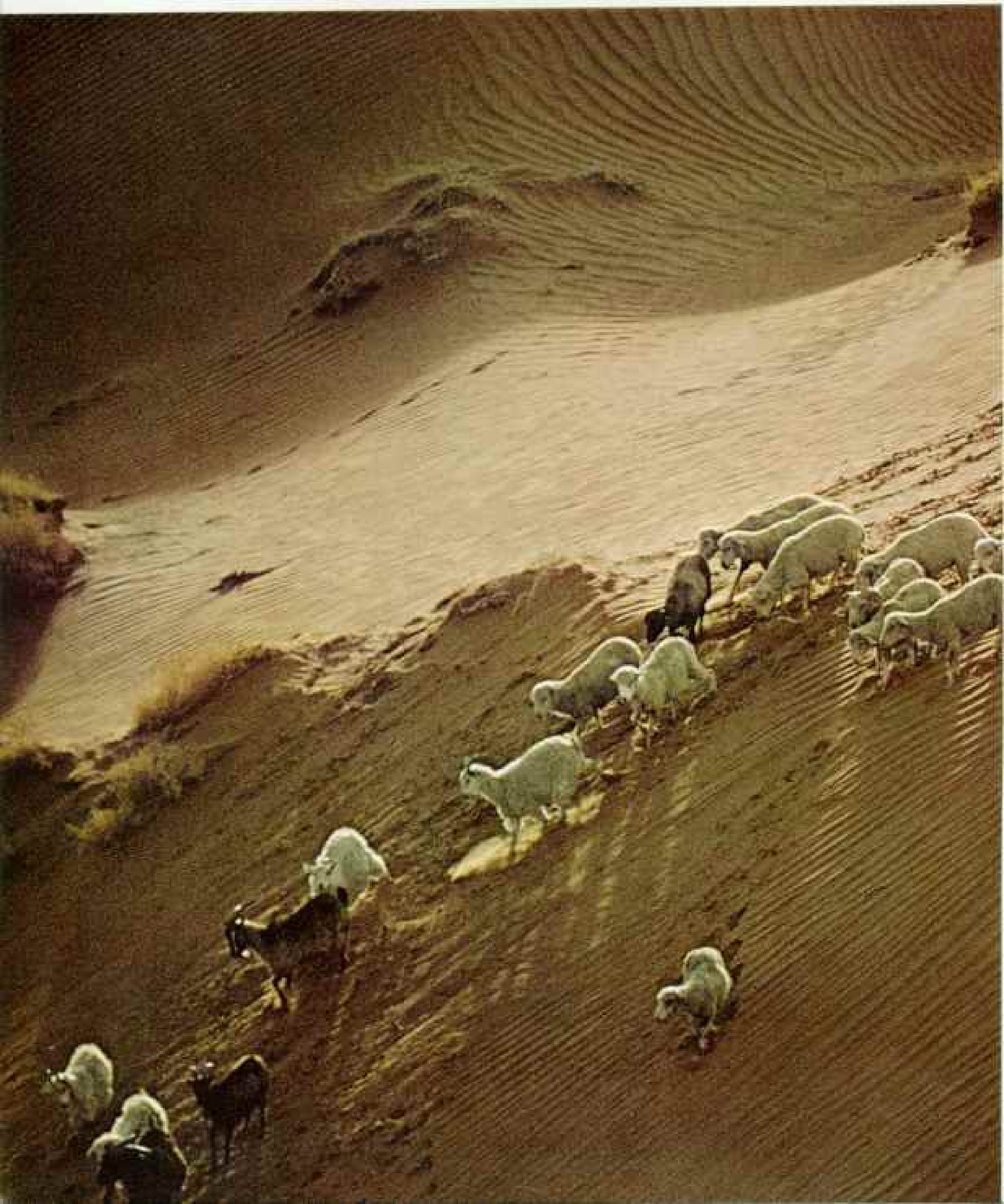


Ceaseless search for forage and water draws sheepherders across Monument Valley dunes. With the same perseverance, the Navajos seek a better life. But they advance with caution, lest in the quest for change their treasured values vanish as the wind wipes footprints from the sand.

780

we're going to develop a major resort," he said, "with a hotel, a landing strip for jets—and a floating gambling casino."

I almost shuddered at the thought of depositing a Las Vegas type of casino in the midst of all this natural beauty. But the tribe believes it can legally sanction gaming on the reservation and, if it can find investors, wants to go ahead.



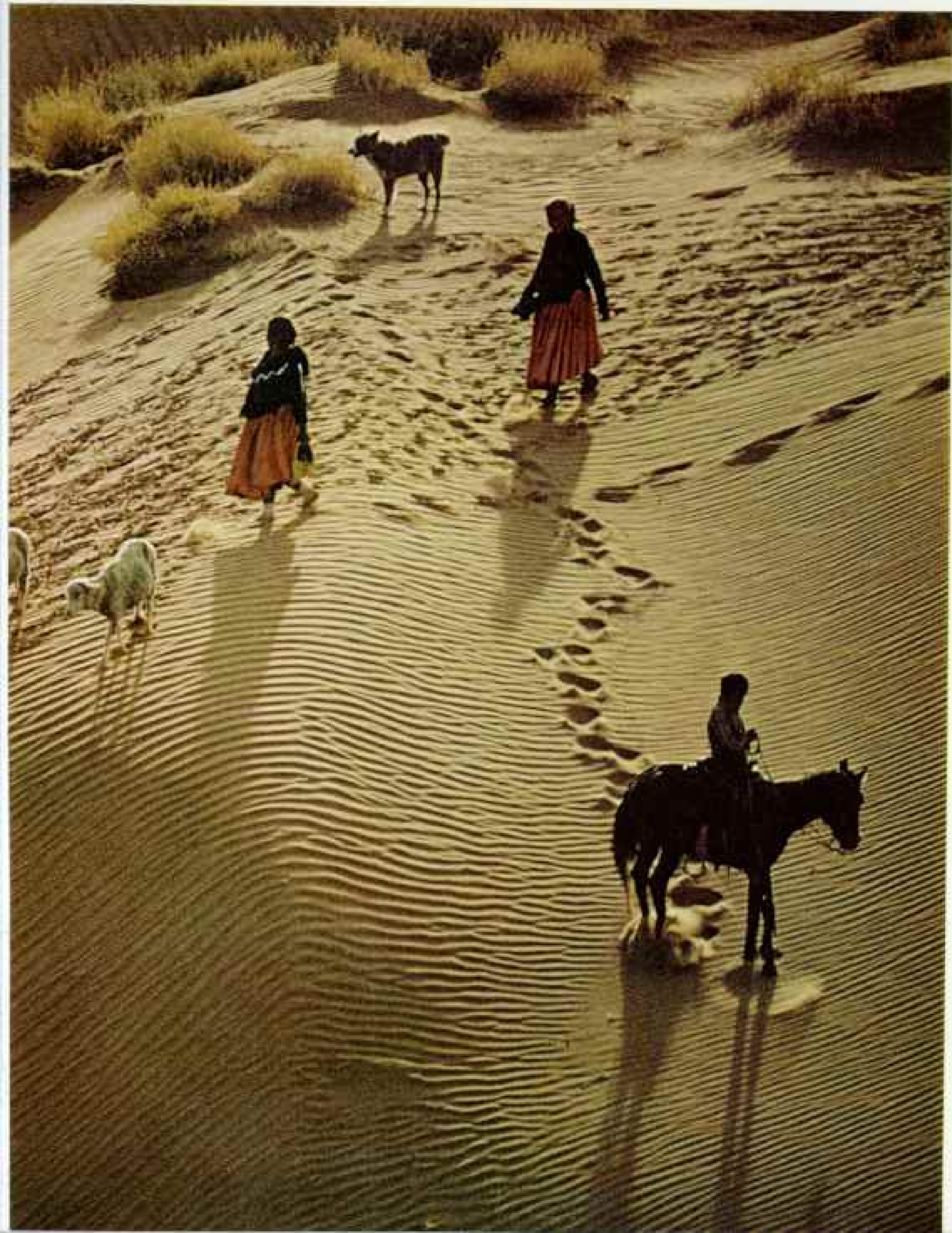
"We have a lot of beauty in our land," Marshall said. "People should come and enjoy it, and it will benefit the Navajos."

Knowing the Navajos, I think that no matter how they change their land under the insistent pressures of progress, they will strive mightily to respect its raw and rugged beauty. For love of beauty is the very substance of the Navajo soul. The

haunting chant called the "Navajo Beautyway" says it all:

"I will be happy forever, nothing will hinder me.

"I walk with beauty before me, I walk with beauty behind me, I walk with beauty below me, I walk with beauty above me, I walk with beauty around me, my words will be beautiful...."





FOR SIX CENTURIES the conical mound near Spiro, Oklahoma, stood overgrown and largely undisturbed. But in the fall of 1933, six treasure hunters leased the land and began to dig. By 1935 there remained only a moonscape of man-made craters, dirt piles, and the scattered fragments of what archeologists have termed “one of the most amazing caches of ceremonial material ever found in the mound area.”

No one will ever know for certain just what the diggers encountered in the mound’s center—for we have only cloudy, contradictory accounts of men more interested in keeping a distrustful eye on each other than in detailing their discoveries. Interviewed long afterward, the treasure hunters claimed that their tunnel broke into a large circular burial chamber. They trundled precious artifacts out in wheelbarrows. Selling what they could on the spot, they discarded the rest in the dirt. When their assault had ended, they destroyed the mound with a powder charge, frustrating rival treasure seekers.

Judging from the artifacts that survive—scattered in museums and collections across the continent—they represented some of the finest art of the prehistoric Southern Cult. There were textiles, shell beads, copper axes, a basket containing 30 copper-covered masks, stone maces, effigy pipes, and conch shells engraved with scenes of men, and perhaps of gods. Had they been excavated properly, those artifacts might have illuminated a crucial chapter of the American past.

Contrast the despoiling of the Spiro Mound with the precise excavation at another Southern Cult center—Etowah, Georgia. It was the first large-scale professional excavation on which I worked, and before a shovel touched the ground, Dr. Lewis H. Larson, Jr., director of the dig at Mound C, supervised the placement of a grid of numbered stakes over the low hump. Our trenches followed this grid so that the mound’s contents could be recorded accurately.

One find at Etowah stands out among my most memorable experiences. On a rainy Friday afternoon in June 1954, we were gathering up our gear after a day’s work. Suddenly a digger, Elishe Mulkey, pointed into a gully that was fast undercutting a wall of the main trench.

Survivor from a vanished past, this two-foot-high marble figure was found in one of Georgia’s Etowah Mounds; it may represent a woman entombed there 500 years ago. A similar image guards the dried bodies of 16th-century Virginia Indian chiefs in a watercolor by English artist John White (right).

European settlers refused to believe that the earthworks they found in North America could have been raised by the Indians they knew. Today’s archeologists, patiently assembling clues that range from spectacular finds like this to bits of charred food and flecks of pollen, now unearth the startling truth: Early North Americans built thriving towns in the East, raised mounds that rivaled Mexico’s pyramids, and created a network of trade that extended from the Great Lakes to the Gulf Coast.

ETOWAH MOUNDS MUSEUM; NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT L. SHAW

Who Were the “Mound Builders”?

By GEORGE E. STUART

NATIONAL GEOGRAPHIC STAFF



BRITISH MUSEUM



WRITHING ACROSS THE COUNTRYSIDE, Ohio's great Serpent Mound raises many questions about its mysterious creators. Archeologists believe it was formed only for ritual functions by people of the Adena culture, who began building mounds about 1000 B.C. Clustered in the Ohio River Valley, the woodland dwellers practiced a cult of the dead and constructed hundreds of mounds, mostly for burials.

Around A.D. 500, Indians in Georgia were building figures of piled stones like this bird near Eatonton (left), its wings spanning 120 feet. Today's visitors know it as Rock Eagle Effigy Mound. Basketful by basketful, early architects raised Town Creek Mound in North Carolina (right), typical of the Mississippian culture that flourished in the Southeast between A.D. 700 and 1700. Archeologists reconstructed the palisade, the temple atop the mound, and other buildings.



BEHNS DERAIN, ABOVE AND LEFT, MARTIN BOCCET, BELOW



Something red protruded from the mud. It looked like a stone ear.

We peeled away the dirt and mud to uncover a polished and partly painted figure of Georgia marble two feet high, apparently that of a woman (page 782). As more dirt was removed—ever so painstakingly, to protect the ancient paint—fragments of a second statue emerged! This one, a male figure, was broken, but careful sifting revealed the missing fragments. Once this site had held a large rectangular log tomb, and the statues had been placed with the corpses.

No other Southern Cult digs had uncovered such painted marble statues in their original setting, so we received a new glimpse of ancient craftsmanship at its best. Moments like these are highlights of an archeologist's life.

There had been another moment and another Indian mound many years before, which helped me decide to become an archeologist.

I was a youngster of 12. One spring morning I walked along the railroad tracks from my hometown of Camden, South Carolina, and cut off on a meandering trail into shady woods. Suddenly a mound loomed ahead—a seemingly limitless wall of fallen leaves merging with the forest floor.

I paced off its circumference and climbed up the steep slope to the flat summit, 32 feet high. Never will I forget my sense of awe at the mound's sheer mass, or my intense curiosity about its origin and purpose.

Myth of a Super Race Arises

Generations have seen and puzzled over the continent's man-made earthen lumps. The first settlers east of the Mississippi Valley came upon thousands, many flanked by geometric earthworks of astonishing precision. Some formed shapes of humans or animals; others were flat-topped (preceding pages).



SKULL-CLEAVING EXECUTIONER bends over the body of his victim on this 650-year-old stone pipe (left) from Spiro, Oklahoma. Such pipes may have figured in rituals of the Southern Cult of temple-mound builders. Three heads support an 800-year-old vessel found in Tennessee (below).

STONE PIPE, 8 3/4 INCHES HIGH,
NOTED SEZSEL, 7 INCHES HIGH,
BOTH MUSEUM OF THE AMERICAN
INDIAN, METE FOUNDATION,
NEW YORK, CARNELO QUARONE



And their discovery led to wild speculation. Accounts of the 18th and 19th centuries, reflecting the attitudes of their times, simply could not credit the mounds to those "forest primitives," the eastern Indians. Gradually conjecture crystallized into a myth of "Mound Builders," a highly civilized race that supposedly flourished before the Indians came.

Who were the Mound Builders? Survivors of sunken Atlantis, some said. Egyptians and Phoenicians wandering far from home, ventured others.

The real story is just as intriguing, and it does concern sophisticated people. Not a mythical super race, but American Indians—ancestors of the Creeks, Cherokees, Natchez, and others who first greeted the white men.

The past 20 years of archeological research has done much to solve the mystery of the mounds. More, in fact, than did all the explorations of the previous 170 years since

Thomas Jefferson, his curiosity aroused by a mound near Charlottesville, Virginia, became a founding father of American archeology.

Jefferson was a scientist, and the excavating methods he used have become standard practice today. "I proceeded... to make a perpendicular cut through the body of the barrow," he wrote, "that I might examine its internal structure."

Modern archeologists have deduced that widely different cultures built the mounds at different times; most date within the 2,500 years before Columbus (see special double supplement map, **Indians of North America**, distributed with this issue). But the mound epic had its beginnings far deeper in the past, and many nonmound sites were involved.

Theodore Koster's farm in Illinois, 45 miles north of St. Louis, Missouri, is one of these. Its 420 acres corner into limestone bluffs two miles from the Illinois River. Until

787



INDIAN SPORTSMAN on a pipe from Muskogee, Oklahoma, clasps a *chungke* stone (above). After tossing the stone, the player and his opponent hurl spears at the spot where they believe the stone will stop. An English observer in 1775 reported eastern Indians playing chungke. Ceramic bottle shaped like a nursing mother (right) came from Illinois.



STONE PIPE: 8 (2) INCHES HIGH, PIPING: 5/8 INCHES HIGH, BOTH MUSEUM OF SCIENCE AND NATURAL HISTORY, CLAYTON, MISSOURI; NATIONAL GEOGRAPHIC PHOTOGRAPHER OTIS IANSEN



788

PHOTOGRAPH BY OTTO HEDDICH



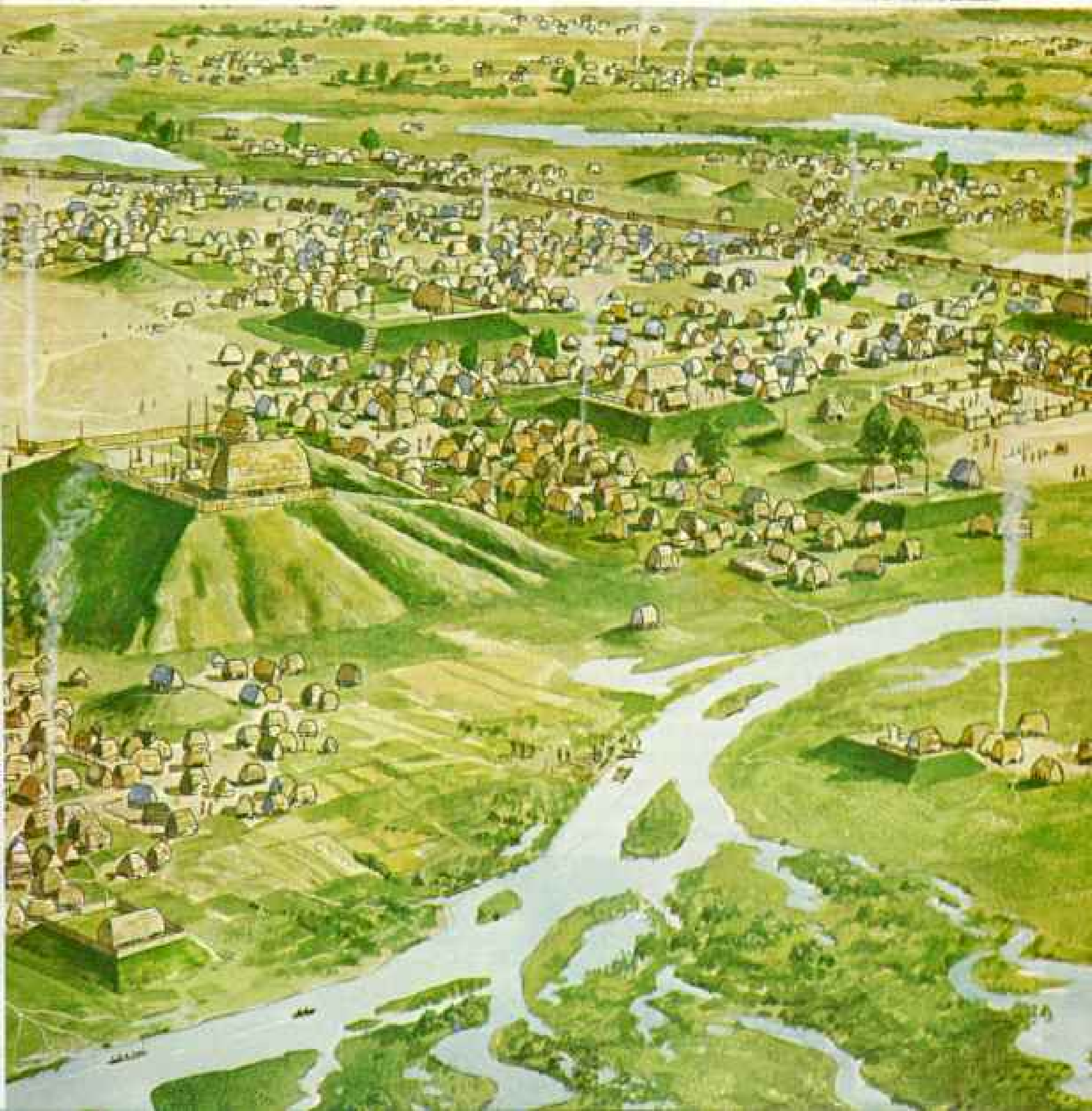
AMERICA'S FIRST METROPOLIS north of the Rio Grande, 12th-century Cahokia—re-created (below) in an artist's conception—supported a community of 30,000. Today, in sight of St. Louis's soaring Gateway Arch, flat-topped Monk's Mound (left) remains, its rectangular 16-acre base surpassing that of Egypt's Great Pyramid. From its 100-foot summit, chiefs once looked southward across a broad plaza to a truncated pyramid. There the dead were prepared for burial in the conical hillock next door. Some 100 other man-made hills held official residences, temples, and burials. Homes of clay-plastered poles clustered within and beyond a 15-foot-high wood stockade. Smoke rose from cooking and sacred fires.

Cahokia farmers grew corn, squash, and beans; hunters set out to bag deer, ducks, geese, and swans; lakes and streams yielded tons of fish. Craftsmen fashioned ceramics and baskets. Canoes on Cahokia Creek—now partly cemented over for an interstate highway—carried handicrafts afar.



KEY TO CAHOKIA'S PROSPERITY lay in a simple flint hoe, according to Dr. Melvin Fowler, the site's principal investigator. Bound to a wooden handle, the tool permitted efficient cultivation of cornfields.

PAINTING BY HOWARD BOLESLAF



recently, the "North Field" between the Koster home and the forested heights hid a cross section of human history more than 35 feet deep, spanning nearly 8,000 years.

During four summers, Northwestern University archeologist Dr. Stuart Struever, his staff, and a crew of students have excavated the North Field. Their deepest pit thus far cuts through 15 distinct horizons—or levels of ancient occupation—back to 6000 B.C.

Millions of pieces of a great archeological puzzle have been trucked to Kampsville, Illinois, nine miles from the site, for examination. Data is programmed for computers; their statistical readouts reveal subtle changes in artifact styles through the ages.

A Koster excavation in which I stood last summer could easily have held a two-story house. The hard floor of buff-colored sand marked ground level—the bottom of Horizon 8 in the sequence. One wall rose 18 feet to Horizon 1, latest use of the site, including, of course, Theodore Koster's farm. The time interval encompassed by those two horizons brackets the story of American Indian mounds and their origins.

When Horizon 8 knew the tread of men around 4200 B.C., the Ice Age lay only 4,000 years in the past. Mastodons and other large mammals had vanished. Man, predominantly a hunter, was gradually adapting to a new life based on small game, wild-plant foods, and fish. He had reached the approximate midpoint of the Archaic Period, an era of growing population amid natural riches, spanning the centuries from 8000 to 1000 B.C.

Beginning a Richer, More Settled Life

Man's wandering ways slowed, then virtually halted, in countless base camps for hunters, fishers, and gatherers. Distinctive regional cultures emerged from these settlements.

Even Koster's remarkable layer cake of prehistory tells only part of this story, and archeologists must turn elsewhere for other details. Between 3500 and 2500 B.C., while the people of Koster's Horizon 6 were making bone knives and drills, Indians at Lamoka Lake in southern New York State were making stone scrapers and beveled adzes. Those tools give us early evidence of a wood-carving capability. Contemporary Indians in eastern

Wisconsin were adding another element to prehistory—hammering nuggets of native copper into knives and spearpoints.

To the south, the Archaic Period burial grounds at Indian Knoll, Kentucky, slowly grew larger. We know, from a profusion of polished stone tools and ornaments found in those graves, that still another aspect of Archaic culture was developing: honoring the dead with material goods.

By 1100 B.C., the final Archaic Period occupants of the Koster site had departed, leaving thin horizontal bands of Horizons 4 and 5 in the dirt. Stone and bone artifacts have been found there, but no pottery lay among the debris of those levels. Knowledge of ceramics had not yet arrived in the Illinois Valley.

Seashells Formed the First Mounds

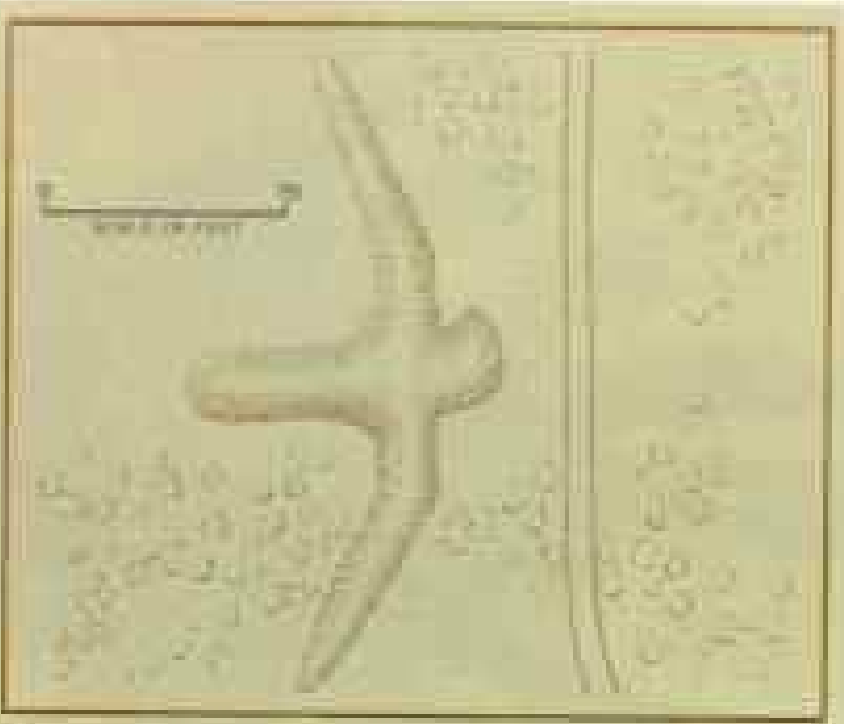
But earlier—around 2000 B.C.—pottery had appeared at Stalling's Island, Georgia, and at other river and coastal sites from Port Royal, South Carolina, to the St. Johns River in Florida. North America's first pottery was made of clay strengthened with vegetable fiber, and some of the pieces were decorated with complex geometric designs around the rims. Archeologists often find the ceramics within large circular enclosures made of piled shells—America's first Indian mounds.

At least 20 shell rings dot the Georgia and South Carolina coastal islands. The largest, located on Sapelo Island, Georgia, is more than 300 feet across, and forms a circular seven-foot embankment of saltwater shells.

What was the purpose? Archeologists don't know. But the layout suggests permanence, a plan. And perhaps a degree of ceremonial activity unparalleled in North America's Archaic East of 2000 B.C. "... at one happy time," wrote the late Dr. Antonio J. Waring, Jr., "the coast between Port Royal and the Altamaha [River] was presumably the most civilized spot in the Eastern United States. ..."

To some archeologists, the presence of fiber-tempered pottery and Southeast shell rings suggests an intriguing possibility: remarkably long coastal voyages from South America to Georgia and South Carolina about 2400 B.C. For the combination of shell rings and similar pottery is known from only one other area of the Western Hemisphere—on Colombia's

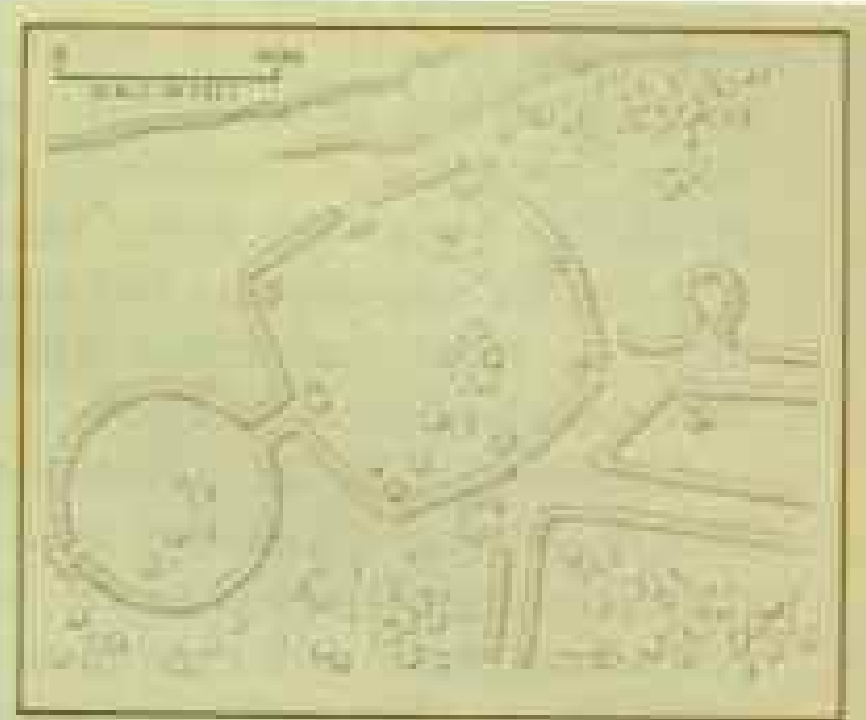
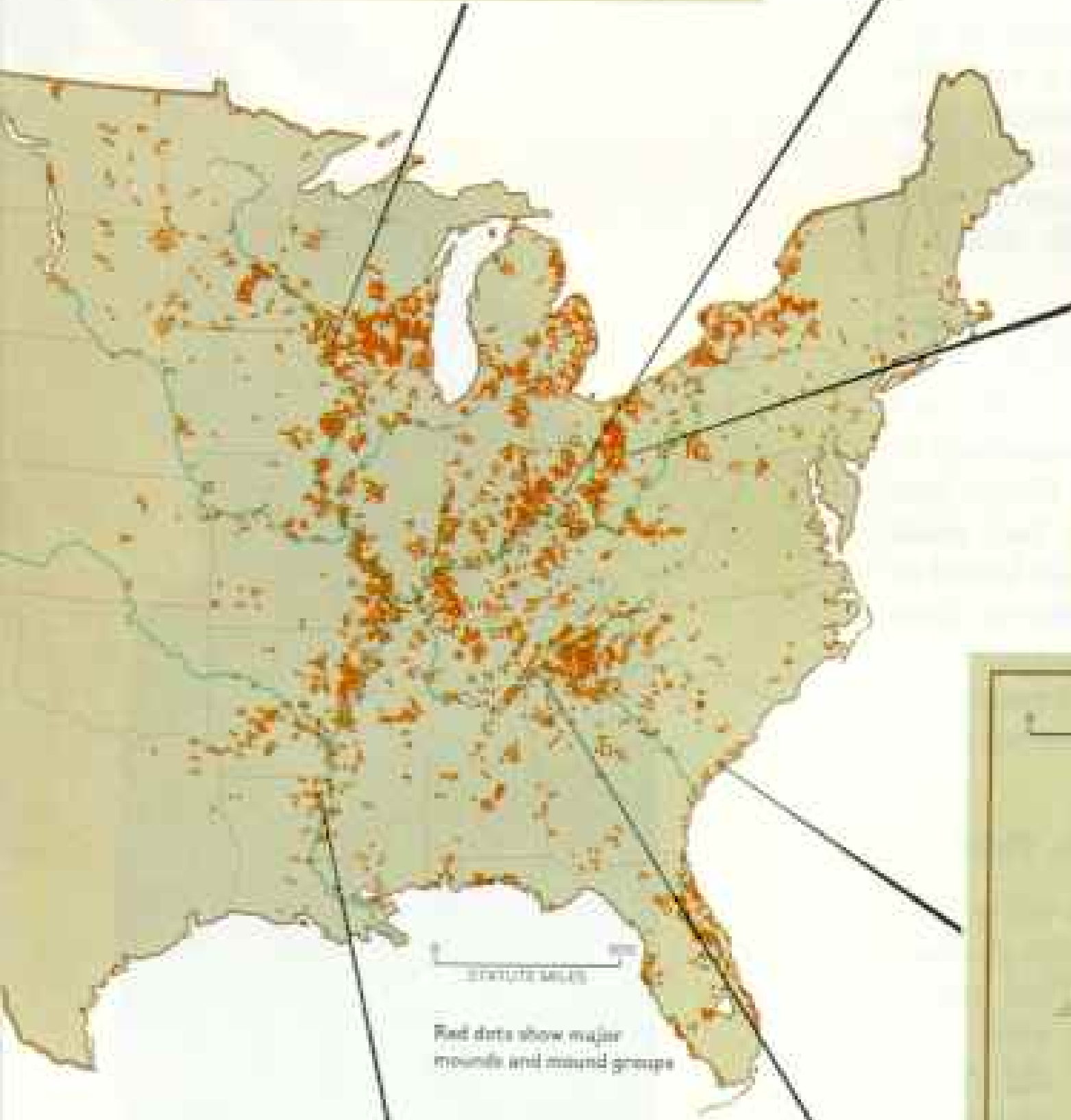
Clusters of mounds, their total in the uncounted thousands, pepper eastern North America. They show the astonishing extent and sophistication of the region's prehistoric cultures. MAP BY ALFRED TRÉBARTH AND PAUL W. BREZLER; RESEARCH BY ANN HUMMA



BIRD MOUND rises in southern Wisconsin, where 5,000 animal and human-effigy mounds contain burials but few offerings.



FORT ANCIENT's earthen ramparts ringed a dumbbell-shaped hilltop in Ohio during the waning days of the Hopewell culture.



NEWARK EARTHWORKS formed the largest Hopewell mound complex in Ohio. A golf course now covers the central area.

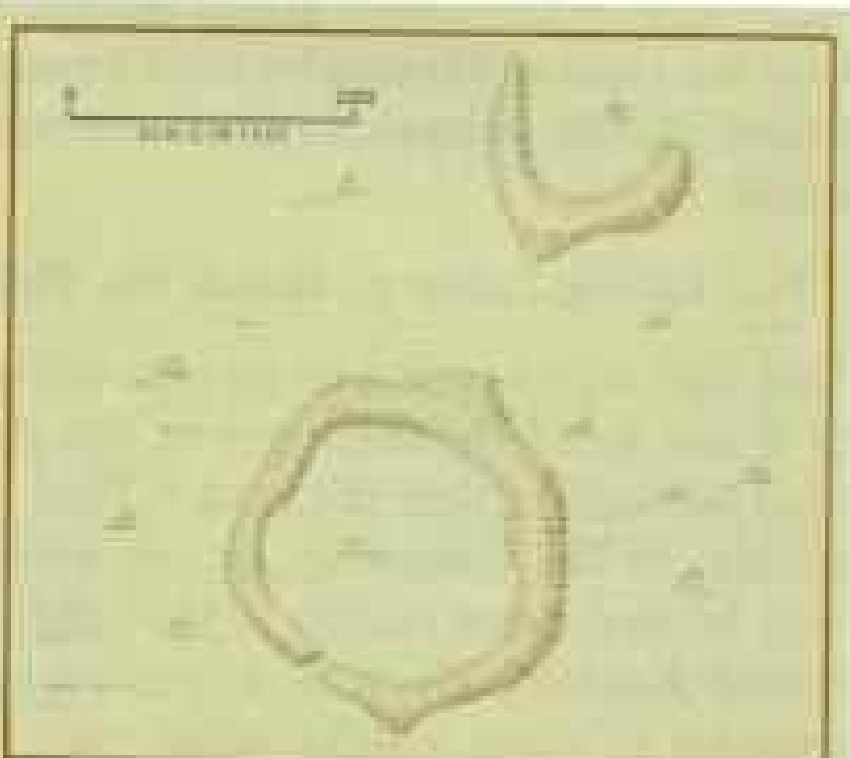
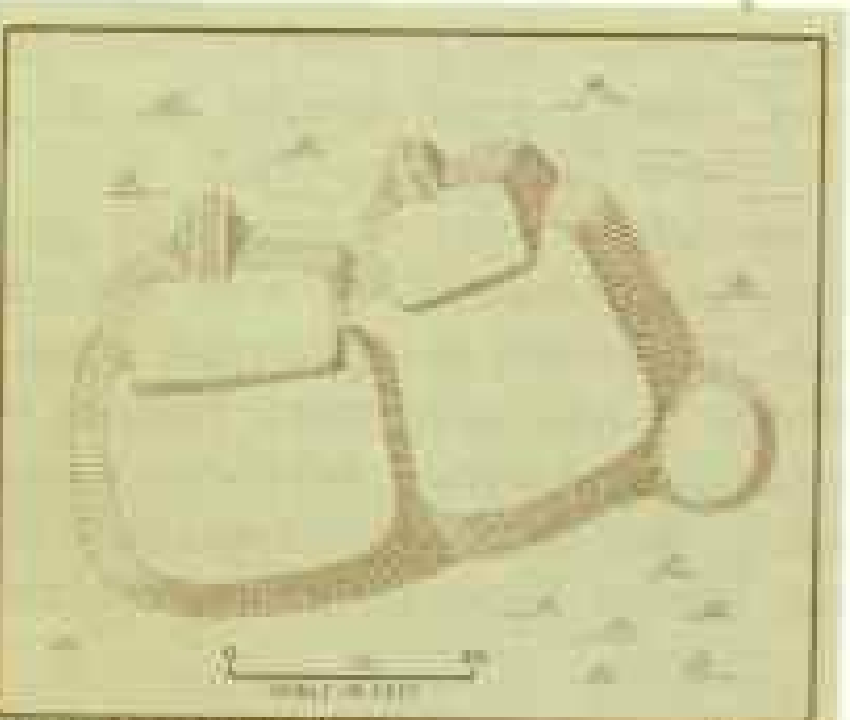


FIG ISLAND SHELL RING in South Carolina, built about 4,000 years ago, is among the oldest mounds in North America.



POVERTY POINT MOUND in Louisiana (left) overlooks a semicircle of earthen ridges—a complex at least 3,000 years old.



HIWASSEE ISLAND, Tennessee, now partly submerged, had temples on twin mounds.

Caribbean coast. It is a striking coincidence, but archeologists so far have been unable to corroborate the theory.

Around 1500 to 1000 B.C.—while Koster's Horizon 3 was growing—one of the earliest nonshell mound systems came into being. Recently the site, beside Louisiana's Bayou Maçon, was purchased by the State Parks Commission to assure its preservation.

Called Poverty Point today, its six low ridges form half an octagon three-quarters of a mile across. Centered on the outermost ridge is a 70-foot mound, and others loom to the north (map, page 791).

For me, Poverty Point stands large in the story of ancient North America in a way that belies its culture's relatively limited geographical range—the lower Mississippi Valley. For the site appears to have served as a depot of ideas that linked Middle America with eastern North America.

Excavations at the Louisiana site reveal that its artisans excelled at their crafts. They made ornaments of red jasper, hematite, and other hard stone imported from hundreds of miles away. Flint and chert were flaked into efficient points and cutting tools. But, most intriguing, some of the clay figurines found at Poverty Point have cleft heads similar to those on jade figures fashioned about the same time across the Gulf of Mexico by the Olmecs, who planned Middle America's first extensive ceremonial centers.

The Living Labor to Honor the Dead

One age was coming to an end while Poverty Point lived. It belonged to the Archaic Period of semisettled life and skilled craftsmanship. In the future lay an age when man would be tied more closely to the land. About the time Koster's Horizon 2 was laid down, advanced cultures would raise their burial mounds along the upper Ohio Valley.

From Indiana to West Virginia, hundreds of conical dirt heaps dot the Ohio Valley. The first culture of the Burial Mound Period existed from 1000 to 300 B.C., and takes its name from a great mound on the Adena estate, near Chillicothe, Ohio.

The Adena seem to have had an almost obsessive preoccupation with honoring the dead. Where did the obsession come from? Perhaps it was indigenous. Perhaps it came from Middle America. Whatever its source, it existed, for most Adena mounds contain many graves. Some structures reached truly



COPPER PLATE, 7 FOOT HIGH,
WASHINGTON UNIVERSITY GALLERY
OF ART, ST. LOUIS, 1916 (REPROD.)

Winged man, embossed on a copper plate, figured in ceremonies of the Southern Cult. Probably made in Oklahoma from Great Lakes copper, the piece was plowed up in a Missouri field and reflects the widespread cultural contacts of some 700 years ago.



TURTLE-SHELL COMB, 7 1/8 INCHES LONG,
OHIO HISTORICAL SOCIETY

Trumpeter-swan comb joined the deceased as a burial gift. Nearly twenty centuries ago, a master craftsman of Ohio's Hopewell Indians fashioned it from a turtle carapace.



Fragile talon, from a sheet of mica, was delicately cut by Hopewell Indians, who produced quantities of superbly designed objects, many for interment with their honored dead.

SHELL GORGET,
3 9/16 INCHES, MUSEUM OF
THE AMERICAN INDIAN, HEYNE FOUNDATION,
NEW YORK, CARWELL QUARDEN

Surrealistic bear and realistic eagle meet head on. The 500-year-old shell gorget, unearthed by a Texas road-construction crew, may have been worn as an amulet.



MICA TALON, 11 INCHES HIGH,
OHIO HISTORICAL SOCIETY, ROBERT S. OAKES

Fierce beak protrudes from a conch-shell fragment found at Oklahoma's Spiro site. Bird symbols played a major role in many early Indian cultures.



SHELL FRAGMENT, 6 1/2 INCHES LONG,
STEWART MUSEUM OF SCIENCE AND HISTORY,
UNIVERSITY OF OKLAHOMA, HERMAN, ROBERT S. OAKES

An archeologist's jigsaw puzzle

UTROH SWELL, 13 INCHES.
MUSEUM OF THE AMERICAN INDIAN,
WEVE FUNDATION, NEW YORK,
GARMELI GARDINGHO



SWELL FRAGMENT, 8 INCHES LONG.
OKLAHOMA HISTORICAL SOCIETY,
OKLAHOMA CITY; ROBERT S. CARLIS

monumental heights, such as the 70-foot Grave Creek Mound, now in downtown Moundsville, West Virginia.

It seems likely that impressive ceremonies accompanied the Adena elite to their log-lined tombs or clay crematory basins. An elk-antler headdress found at one of 54 burial sites in West Virginia's Cresap Mound evokes images of shamans presiding at a fireside rite atop the 15-foot hump.

By the second century B.C., a new culture—Hopewell—had appeared in the Ohio Valley. Drawing its art style, death cult, and mound-building practices from the Adena, it elaborated them into the cultural zenith of the Burial Mound Period.

Trade Spans Half a Continent

Just as many relics of the Adena culture have been obliterated, so has modern man erased much of the Hopewell era. Once a great octagonal earthwork at Newark, Ohio, formed part of the largest Hopewell ceremonial center in the state. A golf course now occupies 52 acres of the site, and building activity has destroyed much of the rest.

Through a giant trade network, the Hopewell burial cult maintained itself and

influenced most of eastern North America. Exchange routes laced the region, providing artisans with raw materials for the luxury items that filled the mound tombs.

Consider the extent of that trade. Obsidian, chipped into large ceremonial blades, has been traced to specific rock outcrops in Yellowstone National Park, more than a thousand miles away. Embossed breastplates, ear ornaments, and ritual weapons were hammered from copper nuggets from the northern Great Lakes. Mica sheets from the southern Appalachians were cut into silhouettes of hands, bird claws (page 793), animals, and headless men. And from the Gulf Coast came shells to be fashioned into ornaments.

This trade was undoubtedly reciprocal. The unmistakable stamp of the Hopewell death cult is seen in many developing cultures of the Southeast. The Marksville site in Louisiana greatly resembles those in Ohio. Its pottery imitates the incised Hopewell wares. From the Mandeville site in Georgia to Crystal River on the Gulf Coast of Florida, searchers have found Hopewell figurines or copper ornaments, along with implements chipped from southern Ohio flint.

The Hopewell culture declined after A.D.



SHELL FRAGMENT, 5 INCHES HIGH,
SMITHSONIAN INSTITUTION,
ROBERT S. BARRIS

BLOWING UP a burial mound, treasure hunters almost obliterated an important chapter of Indian prehistory at Spiro, Oklahoma, in 1935. Had archeologists opened the mound, they could have told much about the culture from the location and relationship of the pieces. The amateurs sold wheelbarrow loads of artifacts, including incised conch shells such as these. The fragments, now in museums 1,200 miles apart, show costumed men paddling a dugout. Archeologists at Harvard University's Peabody Museum determined the relationship of the two pieces, seen here joined together for the first time. Another Spiro conch, preserved intact, depicts a warrior in eagle costume.

500. Evidently those final centuries of the Burial Mound Period were troubled ones, for Ohio's ceremonial centers were abandoned for fortified hilltop sites. Against whom were they fortified? Archeologists do not know.

Other cultures rose to fill the vacuum. In Wisconsin and parts of Illinois, Iowa, and Minnesota, the mysterious Effigy Mound culture flared briefly and disappeared, leaving mound clusters shaped like men and animals.

Florida's Weeden Island culture—named for an island in Tampa Bay—adapted the vanishing Hopewell ways into something uniquely its own. Its effigy vessels no longer gave any pretense of being anything but ritualistic ornaments, for the bodies of the vessels contained decorative cutouts that made them useless as containers.

Essentially, though, the ways that replaced the Hopewell were unspectacular. Dr. Stephen Williams of Harvard University has characterized them as "the good gray cultures."

Metropolis Beside the Mississippi

But an Indian renaissance was on its way. Around A.D. 700—during Koster's Horizon 2 period—a vibrant, well-organized way of life arose. Named for the river valley where most

of its remains are clustered, Mississippian culture transformed the East during the 1,000-year-long Temple Mound Period.

The change in life-style was so extreme that archeologists suspect it was more than just a wave of new ideas reaching old settlements. There may well have been a new strain of corn, or new people coming in to build fortified farming communities in areas that before had been inhabited by simpler cultures.

Corn growing was the main fact of Mississippian life. Archeologists have found hundreds of flint hoes, their blades polished to an almost mirrorlike shine by hard use.

Quite often, elaborate fortifications turn up around Mississippian villages—for when livelihood depends upon a field of corn rather than on a forest or river, that territory must be defended.

Mississippian mounds were unlike the old Hopewell burial mounds. They were flat-topped bases for temples, arranged symmetrically around open plazas. And none are more impressive than the ones found in a valley 50 miles south of the Koster site. Excavations there in the past decade have revealed much about the Mississippian culture.

Near Alton, Illinois, the Mississippi River

Macabre congregation bespeaks ancient burial rites. People of the Blackduck culture often sprinkled iron oxide over grave areas. The photographer arranged these partly restored skulls from one of Canada's Rainy River mound sites—radio-carbon dated at A.D. 1200—on the grounds of the Royal Ontario Museum, Toronto. Eye sockets contain shell-bead irises set in clay.

completes an angular eastward trend, turns abruptly to meet the Missouri, and resumes its southward journey. Between the limestone escarpment and the riverbank opposite St. Louis lies an alluvial plain known as the American Bottoms—175 square miles of rich silt laced with creeks and remnants of the Mississippi's ancient meander loops.

"In a sense," says Dr. Melvin Fowler of the University of Wisconsin-Milwaukee, "the entire American Bottoms is one large Mississippian site. Practically every ridge of ground that extends above the floodplain contains indications of Mississippian occupation."

A town with 26 mounds once stood in what is now downtown St. Louis. Another community—perhaps larger—occupied land that is now part of East St. Louis, Illinois. And there were others. Even today, Monks Mound—the largest ancient structure in the United States—still dominates the landscape.

Human Hands Raise a Mighty Hill

Named for a Trappist colony that cultivated the earthwork in the early 1800's, Monks Mound covers 16 acres of Cahokia Mounds State Park, near East St. Louis. It rises in four terraces to a height of 100 feet.

I have climbed Monks Mound often. Each time I experience the feeling that possessed traveler Henry Brackenridge, who visited the site in 1811 and described it as a "stupendous monument of antiquity." Indeed, so stupendous that many observers have suggested it must be, at least partially, a natural hill.

Not so, according to tests carried out there in 1967 by Nelson Reed of Washington University in St. Louis, and others.

"We took 11 cores, all the way down to sterile soil," Mr. Reed told me. "Those demonstrated not only that Monks Mound is entirely man-made, but also that it was raised in at least 14 stages between A.D. 900 and 1100."

Once Monks Mound faced an Indian city of 100 to 120 artificial hills: flat-topped structures typical of the time; rounded humps



that may have been burial places, and ridge-topped affairs that apparently were boundary markers. The view from the summit is different today. A highway passes behind the mound, and another cuts close to its front slope. Two miles west, toward the hazy St. Louis skyline, a department store has replaced Powell Mound, which marked Cahokia's western edge. Eastward, densely packed stores and homes in nearby Collinsville have spread onto the site. Only the central portion is left, where 40 mounds have been preserved by the State of Illinois.

But when I stand atop Monks Mound, my mind gives me a different view. Thousands of thatched houses lie out there, a few of them built on platform mounds (pages 788-9). Between many of the houses lie garden plots of corn and beans. Sweating men swing their



ROBERT W. WAGNER

hafted flint hoes to cultivate the rich black soil. Nearby, potters mix cool river clay with crushed shell, then form the mass with skillful hands into pots and effigies. A file of men, straining under basketloads of earth, moves toward the rising mound.

Circles of Posts Add to Mystery

Continuing excavation has added new dimensions to Cahokia in the past few years. Archeologists have discovered "Woodhenges"—perfect circles where massive, evenly spaced posts once protruded from the flats. What was their purpose? Their precise orientation, in relation to a middle post that was slightly off center, suggests that they may have been used as astronomical observation stations.

When a member of Cahokia's nobility died, he did not go empty-handed into the world

beyond. In Burial Mound 72, a low hump on the major north-south axis of the site, archeologists have learned how elaborate the preparations could be.

The central figure there—perhaps a chief or a priest—was interred on a blanket made from 12,000 shell beads. There were many offerings—polished stones, bushels of uncut mica, caches of arrowheads, and the bodies of six retainers, who surely had been slain to accompany their master on his journey. Nearby lay more bodies—53 females—in a mass grave. This slaying of retainers shows that the central figure in Mound 72 must have been an important personage indeed.

Elaborate ceramics, fine stonework, and carefully embossed copper sheets found at Cahokia show that its artisans were specialists. So, at its height, the area possessed most of



WOOD HEAD, 19 1/2 INCHES HIGH,
THE UNIVERSITY MUSEUM, PHILADELPHIA.
ROBERT S. DAREY

GALLERY OF WOODLAND COMPANIONS, these superb sculptures show the artistic sophistication of prehistoric Indians.

Buried for more than 500 years in the salty mud bogs of Key Marco, Florida, specimens of wood sculpture remain remarkably preserved. Resembling the Egyptian cat goddess Bastet, a panther licking his chops (right) may have been a fetish. Yapping wolf (left) probably served as a ceremonial mask; strings inside could wiggle the ears.

Trio of imaginative figures, the stone pipes below reflect the skill of their creators more than 1,500 years ago. Discovery of many hundreds of finely carved pipes indicates the importance of smoking rituals. Perky bird—perhaps a falcon (left)—and beaver (below), with freshwater pearls for eyes, were smoked through their hollow platforms. The tail of the flying hawk (bottom), now missing, served as its stem.

WOOD BASTET, 4 INCHES HIGH,
UNIVERSITY MUSEUM, PHILADELPHIA



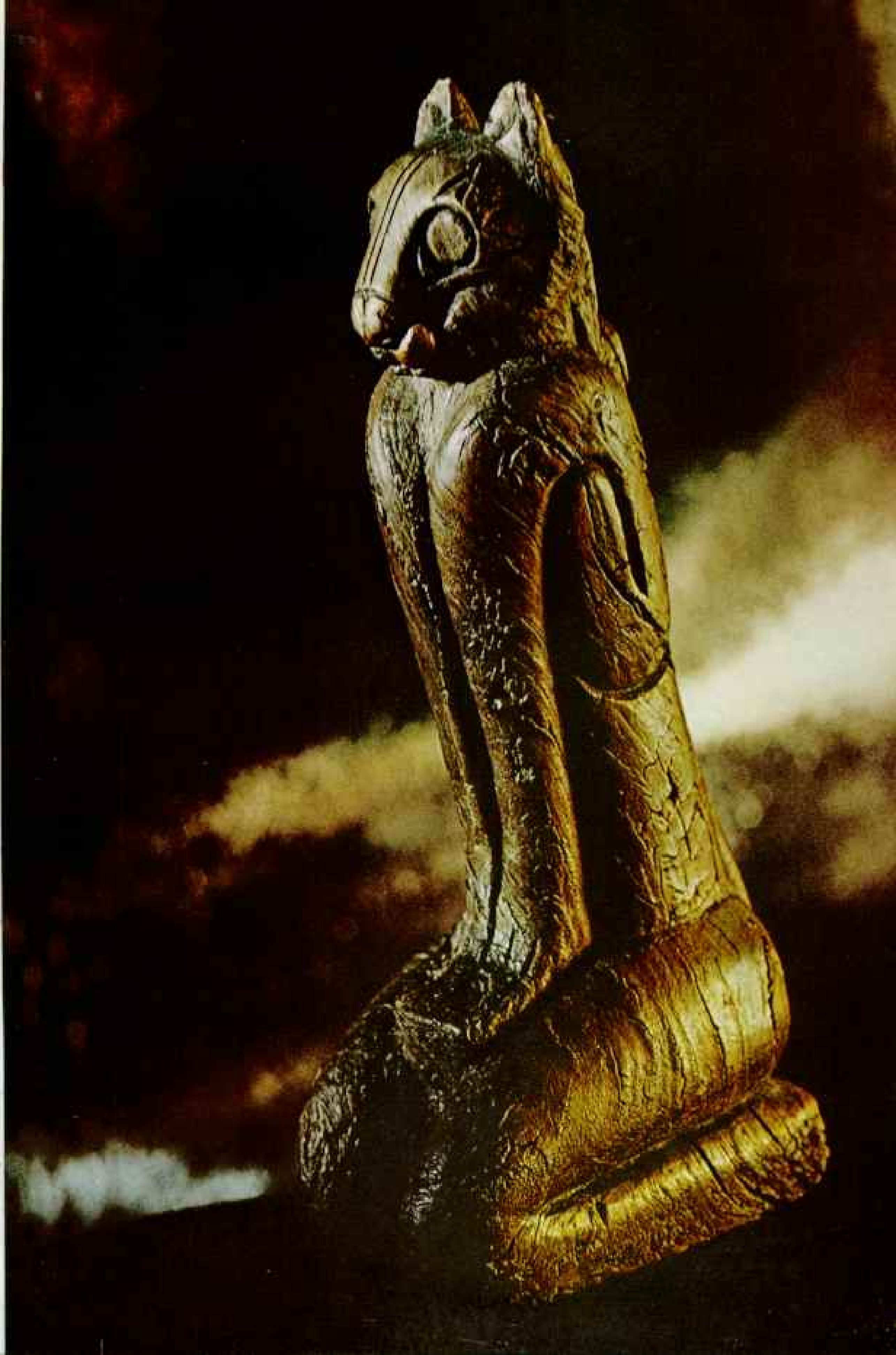
OHIO HISTORICAL SOCIETY, ROBERT S. DAREY

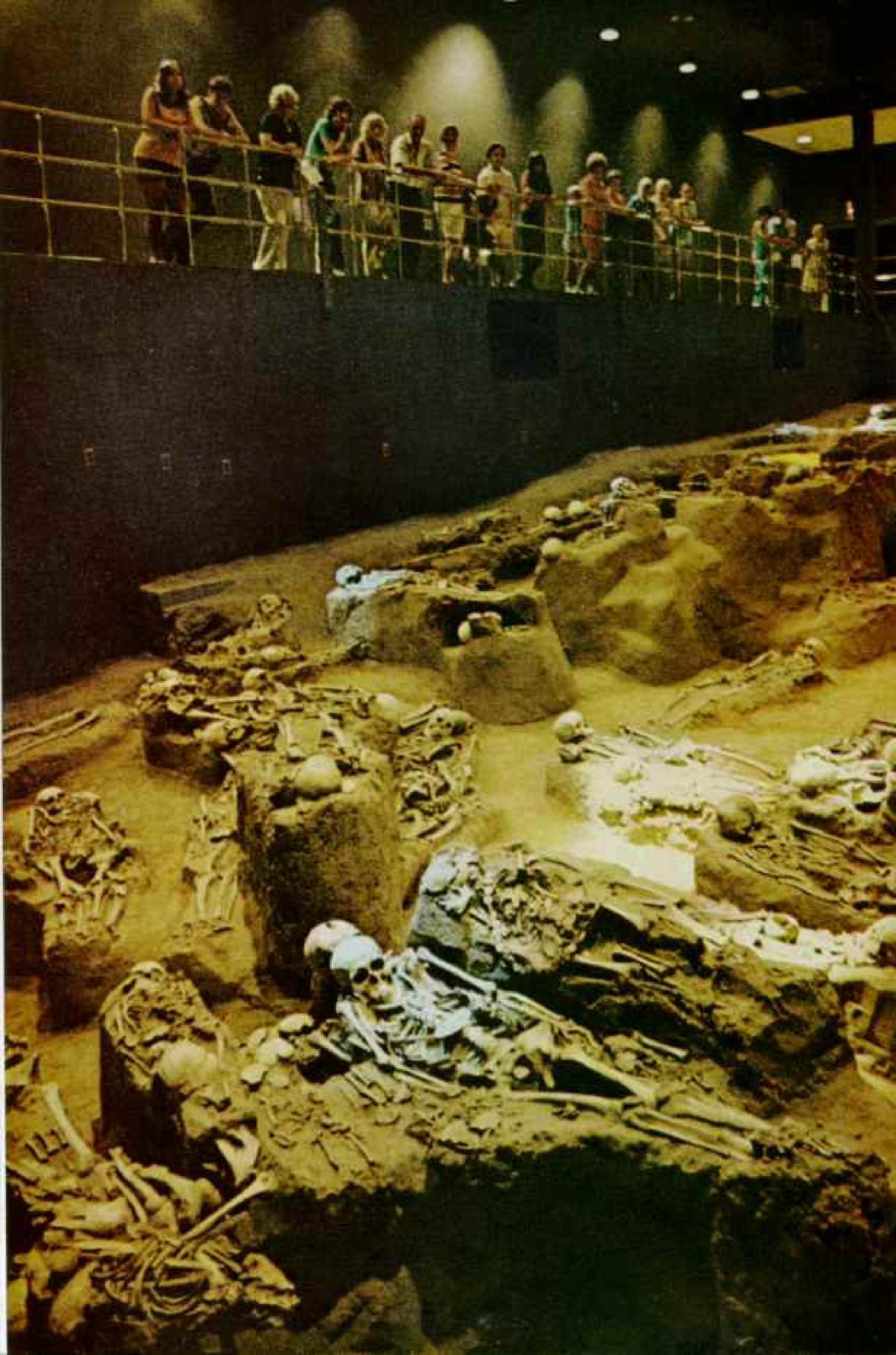


HILLMAN INSTITUTE OF AMERICAN HISTORY AND ART, TULSA, ROBERT S. DAREY



SMITHSONIAN NATIONAL MUSEUM, GEORGETOWN, 1970 (PHOTO)







the ingredients of a true urban center, such as clustered housing, specialists in arts, crafts, and probably science, and a rigidly stratified society.

North to central Wisconsin the Mississippian culture spread, and through the Ohio and Tennessee Valleys. Many of its elements reached into Georgia, Alabama, and North Carolina. Spiro, Oklahoma—whose Craig Mound was destroyed by treasure hunters—is a Mississippian Southern Cult site. So is Etowah, Georgia, where I helped unearth the marble statues in 1954, and Moundville, Alabama, where many ancient structures still survive.

The art at Spiro, Etowah, and Moundville—shells engraved with god-animals and birdmen, and ceremonial axes with handles and blades carved from a single stone—testify to Southern Cult artistry. Some symbols, particularly scalloped sun disks and crosses, occur again and again in shell, stone, and copper from Cahokia down into Florida.

Man Builds on What Has Gone Before

Mississippian culture began to dim by 1500. Early European explorers offer exasperatingly brief glimpses of Mississippian splendor. Garcilaso de la Vega, chronicler of the 1539-1542 DeSoto expedition, provided this description of a Savannah River temple:

“The ceiling . . . from the walls upward, was adorned like the roof outside with designs of shells interspersed with strands of pearls. . . . Among those decorations were great headdresses of different colors of feathers. . . . it was an agreeable sight to behold.”

That scene is far from the more prosaic image presented by Archaic Period artifacts found beneath Theodore Koster's North Field in Illinois. But together they point up an important fact: North America's ancient cultures cannot be considered episodes isolated in time or in area. The Archaic Period camp represented by Horizon 6 at Koster was one chapter in a way of life that developed along the eastern river valleys and set the stage for what DeSoto's men saw almost 40 centuries later.

Patiently, archeologists are piecing together that long, often-clouded saga. Postholes and potsherds, blackened seeds and microscopic bits of pollen help, as surely as do the spectacular marble images from Etowah. And perhaps, somewhere, lies another brush-covered “hill”—another Spiro Mound—with its burials untouched and intact. If so, let us hope that its discoverers are trained archeologists, who can extract from it the greatest treasure of all—one more chapter in the emerging story of North America's Indian past. □

Secrets keep silent among these bones. Visitors at Dickson Mounds Museum, Illinois, contemplate the exposed cemetery of an 800-year-old temple-mound community. Colored spotlights keyed to a recorded lecture point out 234 skeletons and accompanying grave goods. The remains are situated exactly as they were uncovered. Thus archeologists continue to reconstruct the story of these distant times, gradually filling in the details from objects left behind.

STYLING: JENNIFER





What's Black and White and Loved All Over?

By THEODORE H. REED, D.V.M.

DIRECTOR, NATIONAL ZOOLOGICAL PARK, SMITHSONIAN INSTITUTION

Photographs by DONNA K. GROSVENOR

WHenever I look at our young giant pandas, I think I can explain the animals' universal appeal. The trouble is, everyone else seems to be looking too, instead of listening.

Scientifically, it is simply a matter of adaptation. *Ailuropoda melanoleuca*, you see, is a carnivore-turned-vegetarian. The arch of the massive skull is highly developed to anchor powerful jaw muscles. This results in a round, moonlike face. A heavy body and turned-in paws impart an awkward rolling gait; neither predator nor prey, the panda needs little speed. The ability to fold each forepaw against a leathery pad at the base of an elongated wristbone permits unusual manual dexterity. The thick wiry fur is admirably suited to the tangled bamboo forests and cool highlands of western China . . .

Enough. Like any other panda-watcher, I am ready to believe that nature constructed this irresistible clown solely for the entertainment of the human race. Zoo director or not, I'm a pushover for a panda.

Standing before a moated enclosure at the Peking Zoo last April, I succumbed instantly to the shambling antics of Ling-Ling—at 18 months already a rotund 135 pounds. She was a striking sight, her black legs and shoulder band contrasting starkly with her snow-white fur. Abbreviated ears perched comically, like twin black beanies, on her round white head.

Idly, Ling-Ling picked up a culm of bamboo with a forepaw and rolled back onto her haunches to munch it. She peered quizzically through the coal-black eye patches that give giant pandas a perpetually

Hsing-Hsing browses in his new home, the National Zoological Park in Washington, D. C. The People's Republic of China gave the male giant panda and a female, Ling-Ling, to the American people following President Richard M. Nixon's historic visit in February 1972. The United States sparked the gift exchange by donating two musk-oxen—Milton and Matilda—to the Peking Zoo.





Beating the heat, a grinning Ling-Ling (left) and a cautious Hsing-Hsing take cooling dips on a July day. The older but more playful female plunged in with no hesitation, but Hsing-Hsing (top) dabbles his toe to test the water before climbing in. Refreshed after the brief bath, he lumbers out (above).



Packaged for departure to a new land, 18-month-old Ling-Ling peeks through the bars of her traveling home (below), here loaded on a truck bound for the Peking airport. The pandas journeyed the 11,800 miles to Washington in individual crates aboard a U.S. Air Force cargo plane (center).



PHOTOGRAPHS ON THIS PAGE BY THEODORE H. BEAN



In-flight dinner aboard a jet plane (above) includes a gruel of rice, cornmeal, powdered milk, sugar, and vitamins (right). Keeper Yang Cheng-fu, left, and zoologist Ma Yung of the Peking Zoo, along with two other Chinese, accompanied the animals to Washington to instruct keepers at the National Zoo in the care of giant pandas.

The author (far right) introduces his wife to Ling-Ling, who seems more interested in gnawing on American-grown bamboo.



bemused expression. Watching her, even our Chinese hosts could scarcely maintain their formal composure.

It was doubly difficult to suppress my own pleasure and excitement. For I was to escort Ling-Ling and a year-old male, Hsing-Hsing, to Washington, their new permanent home. The Chinese had some fifteen pandas in captivity, but outside the Orient there were only two other live specimens—an elderly lady named Chi-Chi in the London Zoo (she died several months later, at age 15) and

a big male named An-An in Moscow.

My mission completed a unique exchange of gifts between the People's Republic of China and the United States, which grew out of President Richard M. Nixon's unprecedented visit to Peking six weeks earlier. With Day O. Mount of the U.S. Department of State, I had just delivered a pair of shaggy North American musk-oxen named Milton and Matilda to the Peking Zoo.*

As we toured the zoo grounds with officials of the Peking Municipal Revolutionary Committee and my Chinese counterpart, Zoo Director Li Chang-teh, I admired a collection of animals seldom, if ever, seen in Western zoos: the wild Bactrian camel, white-lipped deer, the golden langur, a snub-nosed monkey, the Szechwan takin, a little-known goat-like creature.

At one stone-walled pen, however, I committed a diplomatic blunder. "That," I blurted, "is the most magnificent Manchurian tiger I have ever seen!"

The silence seemed to last for minutes. A Chinese interpreter finally corrected me. "It is a *North China* tiger," he said softly. "'Manchuria' is a word left over from capitalistic imperialist bandit days."

I recovered quickly enough to identify another big cat nearby as a "fine North China leopard." My hosts seemed pleased.

At Home, Frenzied Preparations

Our four-day visit to China ended too soon. Nevertheless I was grateful when Chinese workers loaded two beautifully lacquered, apple-green crates aboard our U.S. Air Force cargo jet. Happily, the Chinese Government had assigned an interpreter and three panda experts to join us on the return flight as advisers.

Back at our own zoo the staff was still preparing feverishly for the pandas. We had already relocated our African bongos and white rhinos and rebuilt their air-conditioned quarters into a Panda House. Pittsburgh Plate Glass Industries had rushed an emergency shipment of huge, sturdy viewing windows. (To us, the trademark "PPG" now stood for "Panda-Proof Glass.")

Zoologist Larry Collins, who was to be in direct charge of the animals, had flown to the London Zoo for a crash course in panda care from Chi-Chi's keeper. We assigned four

*John J. Teal, Jr., wrote "Domesticating the Wild and Woolly Musk Ox" for the June 1970 *GEOGRAPHIC*.





Relaxing in a favorite panda position, Hsing-Hsing nibbles tender bamboo. A fleshy pad covering an elongated wristbone gives



each forepaw the ability to grasp. By bending his paw to press pad to claws, Hsing-Hsing clutches the stalk and carries it to his mouth.



Good fences make good neighbors for pandas as well as people. In the wild the animals are basically solitary, so these two will remain separated until they mature. They can, however, visit through the mesh (above). The strong, playful animals quickly destroyed conventional playthings, so a toy manufacturer sent an all-but-indestructible plastic ring (right).



keepers to look after Ling-Ling and Hsing-Hsing. After four short weeks of frenetic activity we were ready—I hoped. But I never wanted to hear the pun about “pandamonium” again.

When Peking faded behind us, we rushed to the rear of the plane to see how our pandas were reacting. We needn't have worried. The thoroughgoing Chinese had previously taken them up for a trial flight.

En route to Guam, keeper Yang Cheng-fu prepared a gourmet panda meal: a gruel of rice, cornmeal, powdered milk, sugar, and vitamins. A second course of apples and carrots vanished between crunching molars. Finally the pandas nibbled on bamboo leaves. Ling-Ling fastidiously licked a few stray grains of rice from her stomach. Had it not been for the engine roar, I think we might have heard a contented Chinese belch.

New Arrivals Keep Their Cool

The pandas spent their first night on U. S. territory at the Guam airport, with an air conditioner hooked into the plane for comfort. Temperature will always be a problem in keeping pandas. They normally dwell at cool altitudes up to 12,000 feet. Both of ours had been captured in the high bamboo and rhododendron forests of Szechwan. “Very rough and rugged country,” zoologist Ma Yung told me. “Always wet and always cold.”

We used the Air Force communications system to report our arrival in Guam to the State Department, 8,000 miles away. Since the line was open, I asked the Washington operator to ring my home. Within moments my wife, Elizabeth, answered.

“I love you, Ted,” she said warmly, blending affection with practicality. “Who’s paying for this call?”

I returned to the airstrip next morning with a load of fresh Guamanian bamboo. Our Chinese guests seemed impressed that I had arisen at 5 a.m. to go out and cut it. They didn't know how much more sleep I had lost in the weeks leading up to this flight.

When we touched down in Hawaii, Jack Throp, director of the Honolulu Zoo, welcomed us with bundles of fresh-cut bamboo, rather than the traditional flower leis.

Ling-Ling and Hsing-Hsing slept contentedly for most of the last long leg of our journey. We landed at Andrews Air Force Base near Washington at 5:45 a.m. An air-conditioned van, escorted by police, carried

our priceless, furry cargo directly to the zoo.

Now I was concerned. Would the pandas suffer from “jet lag”—the upset of the biological clock familiar to human air travelers? Confronted with new faces and uniforms, new voices and surroundings, would they undergo a kind of cultural shock?

Ling-Ling ambled out of her crate, sniffed tentatively, roamed about her new apartment, and seemed satisfied. Hsing-Hsing, less of an extrovert, promptly retreated to the dark alcove that would serve as his den.

Larry Collins and I, along with keepers “Tex” Rowe, Mike Johnson, Curley Harper, and David Bryan, watched attentively as Ma Yung gave us a lesson in cooking for pandas.

Hsing-Hsing ate cautiously—but he ate. Ling-Ling devoured her gruel, demolished her apples and carrots, pulled down a stalk of bamboo for dessert, and finished by solemnly placing her pan on top of her head.

I smiled. Ma Yung smiled. Larry and keeper Yang Cheng-fu smiled.

I felt relieved—and very, very tired.

We gave our pandas three more days to rest before holding a welcoming ceremony in which Mrs. Richard Nixon officially thanked Mr. Ting Hung, a Peking official who accompanied the pandas, for this magnificent gift from the Chinese people. Then we opened the doors of our “Panda Palace” to the public.

We have since been swamped; in the first three months zoo attendance shot up 63 percent. Visitors waited in line more than an hour, many of them settling for a glimpse of two sleeping pandas.

Few Toys Survive Panda Power

Relatively little is known of panda behavior in the wild, but ours seem most active and playful during morning and evening hours. A favorite game seems to be destroying the bamboo we are constantly replanting in wooden tubs in their quarters.

To help keep the animals alert and mentally stimulated, we gave each of them a toy, a heavy rubber basketball. Joyful Ling-Ling pounced on hers like a cat and managed with her powerful teeth to tear it apart in a matter of hours. Hsing-Hsing's ball lasted a couple of days.

Happily, a neighborhood tavern keeper provided a pair of aluminum beer kegs, and we later acquired tougher balls and other near-indestructible plastic playthings.

Pandas are solitary animals, except during



Furry trenchermen, both Hsing-Hsing and Ling-Ling dig in with relish when their keepers bring on the chow at 10 a.m. and 4 p.m. Shy Hsing-Hsing (left), jumping the gun on breakfast, plays peek-a-boo with his bamboo before stripping off the leaves—a favorite snack—and then munching the stalk. The meal, mixed in a special kitchen adjacent to the panda cages, includes rice gruel fortified with vitamins, a portion of meat prepared for zoo cats, and a generous supply of apples, carrots, sweet potatoes, and kale. The keepers carefully regulate the quantity because the pandas suffer from stomachaches when they overeat.

Ling-Ling finishes off her main course with a good-to-the-last-drop lick (lower left), devours a carrot for dessert (below), and ends with a lip-smacking look of satisfaction (right).





mating season; thus we built separate quarters. Hsing-Hsing and Ling-Ling see each other constantly when outdoors, however, through chain-link fencing in their paddock walls. We hope this will keep them from becoming too human-oriented and facilitate breeding when they reach sexual maturity in three or four years.

One morning keeper Tex Rowe reported that he had seen Hsing-Hsing standing on his forepaws to rub his backside against the walls, glass, and log platform of his enclosure—a typical panda performance of “marking” with the anal scent glands. We were delighted. Hsing-Hsing, accepting his new home, was staking out his territory. Larry Collins added the incident to a sheaf of notes that will grow into a behavioral study.

The giant panda came to world attention only in 1869, and zoologists still disagree over its classification. Some think it is related to the bears, others to the raccoon family. Our own Smithsonian Institution scientists have

concluded that the giant panda and the raccoonlike lesser panda (below) merit a separate family altogether. Chinese zoologists hold the same opinion.

Ling-Ling soon demonstrated a panda's intelligence. To avoid being shut off behind the door of her den during cleaning of her larger room, she quickly learned to sit squarely in the middle of the doorway.

Our keepers seldom enter an enclosure with either animal, for despite the cuddly, guileless appearance, even a young panda can be dangerous. Some pandas in other zoos have savaged their keepers, and Ling-Ling has already taken a couple of unsuccessful swipes at Tex Rowe and Mike Johnson.

I kept this in mind one unforgettable day when Ling-Ling nearly escaped. During reconstruction, by a fluke (promptly remedied!) a stretch of climbable stone wall was left exposed in the alleyway between the indoor and outdoor quarters. Alerted by the zoo police, I rushed to the Panda Palace to find

Toy bonanza floods the zoo's gift shop as “pandamonium” strikes again; the pun was coined in 1936 when the United States acquired its first live giant panda. Panda dolls, caps, buttons, key chains, T-shirts, and other souvenirs enchant young visitors who have already purchased hats (below). One young man, after viewing the real thing, gives his stuffed panda a loving bear hug (right).



Raccoon? Ring-tailed relative of Hsing-Hsing and Ling-Ling, the lesser panda also comes from the East. Its appearance lends support to those who place pandas in the raccoon family.

Ling-Ling ambling along the parapet on top of her seven-foot wooden fence.

I stared up at her; she stared down at me. Would she choose the full freedom of the zoo on my side of the fence, or all that lovely bamboo and grass in her own yard?

Ling-Ling's Games Fluster Keepers

Ominously, she slid her forepaws down on my side, preparing to jump. That was too much. I picked up a push broom and batted her gently but firmly on the nose. She swatted back, playing a brand-new game called *Bat the Broom*. I, meanwhile, played *Push the Panda Back*. Then she caught the head of the broom and pulled it off its handle. Now Ling-Ling had a new toy.

From inside the enclosure Tex Rowe coaxed, whistled, and taunted her. Oh joy . . . another game, called *Chase Tex!*

Down into the alleyway she went. Tex scrambled up a movable wooden staircase and the other keepers quickly shoved it away

from the wall, isolating Ling-Ling inside the compound again.

End of game. Score: Keepers 1, Panda 0.

After the first giant panda (a male cub named Su-Lin) arrived in the United States in 1936, pandas enchanted millions of Americans in Chicago, New York, and St. Louis zoos, until the last U.S. specimen died in 1953. The arrival of Ling-Ling and Hsing-Hsing has revived a national panda craze. Our zoo shop can barely keep up with the demand for panda dolls, panda T-shirts, panda jewelry, and panda puppets.

It's understandable. Who could resist this roly-poly acrobat, wearing the garb of a *Pagliaccio* and the cheeky leer of a W.C. Fields, as it sits slumped against a wall crunching a stalk of bamboo held in its paw?

Of course, as I started to explain, the forepaw pads and long wristbones that enable the panda to grasp food and bring it to its mouth in an approximately human fashion. . . .

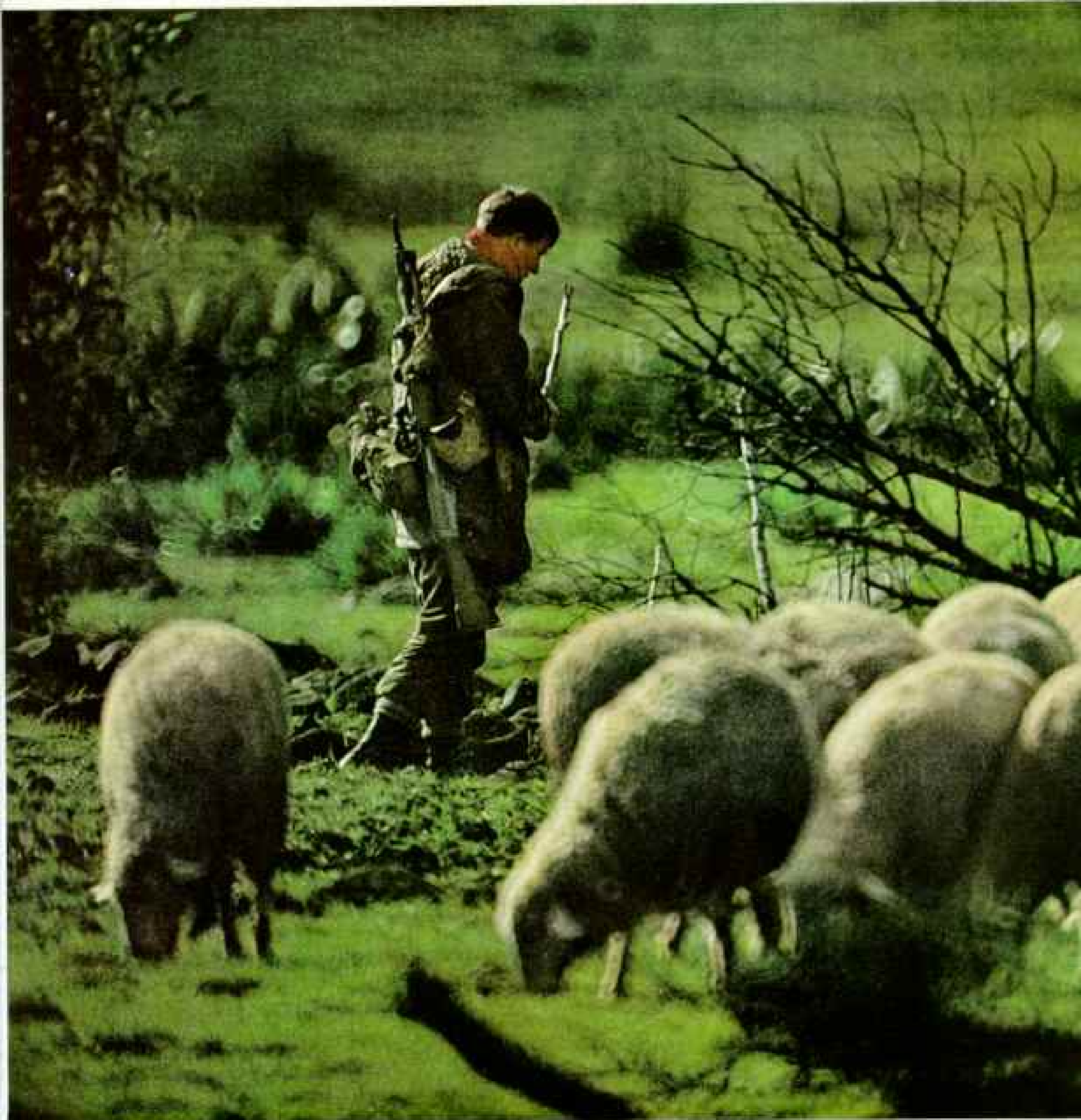
But you're not listening, are you. □



Or bear? Hsing-Hsing's stance hints at why some zoologists place him in the bear family. Peking and Washington zoo officials believe lesser and giant pandas represent a separate family of their own. Oblivious of the dissension, Hsing-Hsing and Ling-Ling flourish in their new home. Perhaps by 1976 the pair will present the Nation with a 200th-birthday present: a baby panda.

Israel -

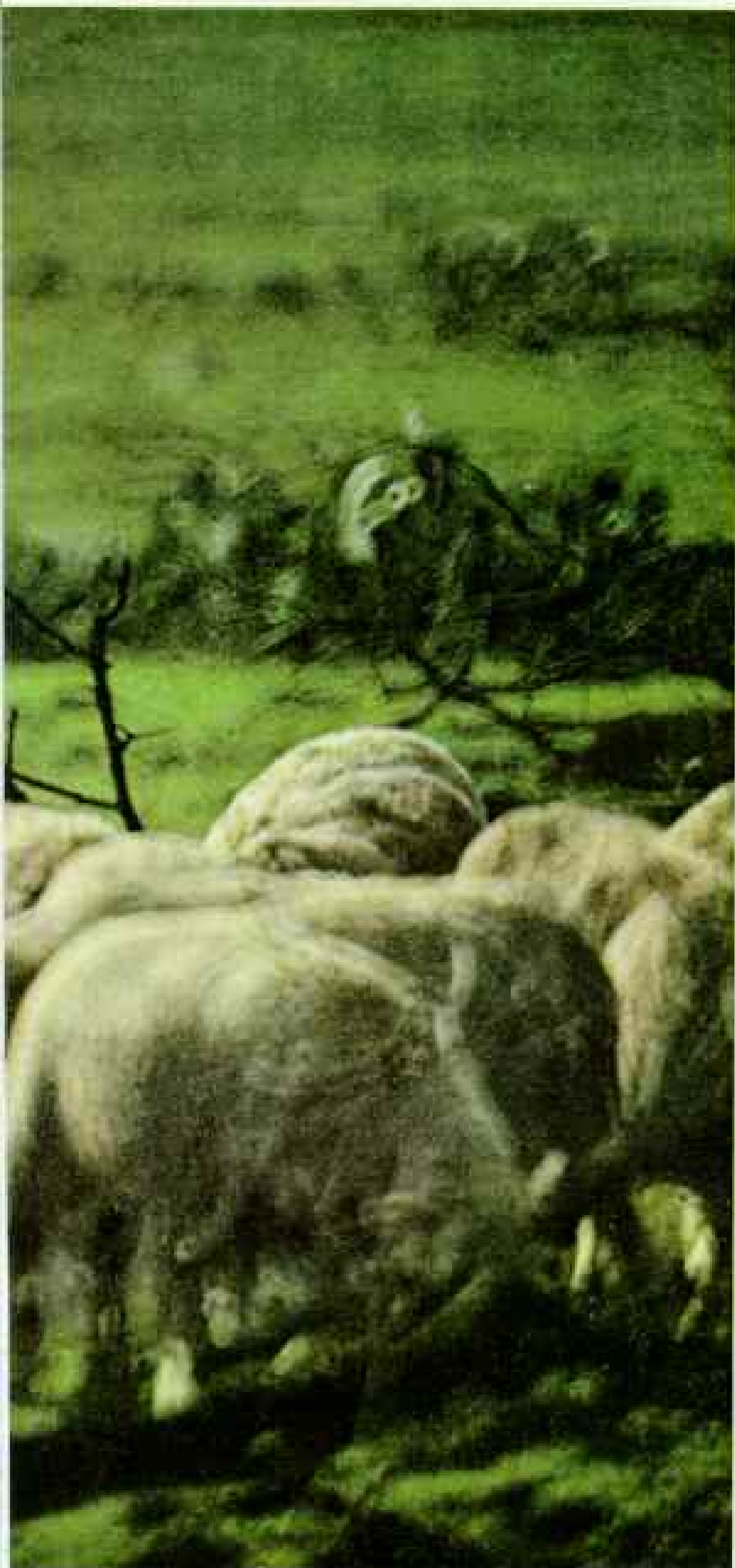
By JOSEPH JUDGE Photographs by GORDON W. GAHAN



Sentry as well as shepherd, an Israeli soldier guards his flock on the occupied Golan

The Seventh Day

JOHN PATRICK GEORGRAPHIC STAFF



Heights, a rifle shot away from Syrian snipers.

“THE SIX-DAY WAR has been over for a long time. Now we are living in the seventh day, but there is no rest, no peace. It is, in many ways, the most difficult yet for Israel.”

My escort was a *segen*, a lieutenant in the Israeli army, named Alex. We stood on the brow of a strongpoint dug into the sands along the Suez Canal and rimmed with barbed wire so thick it looked like gauze. Below, the historic waterway lay still and blue in the sun. A lone Egyptian soldier patrolled the opposite bank.

Like others at the strongpoint, Alex was on extended active duty. He stared thoughtfully at the sentry posts and broken houses across the water. But I had been in Israel long enough to know that he was concerned as well with the unfinished business of a young country that has clung tenaciously to its own being, has survived and succeeded.

“How far is it to Cairo?” I asked.

“I don’t care,” Alex said. “I don’t want anything in Cairo. We have things to do at home.”

Struggle Transforms a People

We ate with the troops in a deep bunker. Its walls were covered with posters, and a large peace symbol. Like soldiers anywhere, the young men joked; they spoke in Hebrew, in the accents of Germany, England, Yemen.

“The old people, from Europe, say that if you don’t speak Yiddish, you’re not a Jew,” Alex said. “But what is a Jew? If you ask these men, they will tell you—we are Israelis. The old man clutches his Torah. The young man clutches his pride and his machine gun. Not only has the desert been transformed, but the people who broke the desert.”

That evening we began the long drive to Jerusalem by way of El Arish, a picture-book oasis of palms herding themselves in groves as if to drink from the sea. The road was black and straight across the sand, the way marked by the burned-out hulks of trucks and Soviet-made tanks with their gun muzzles raised as if scenting the desert air.

It was one of a hundred roads I traveled

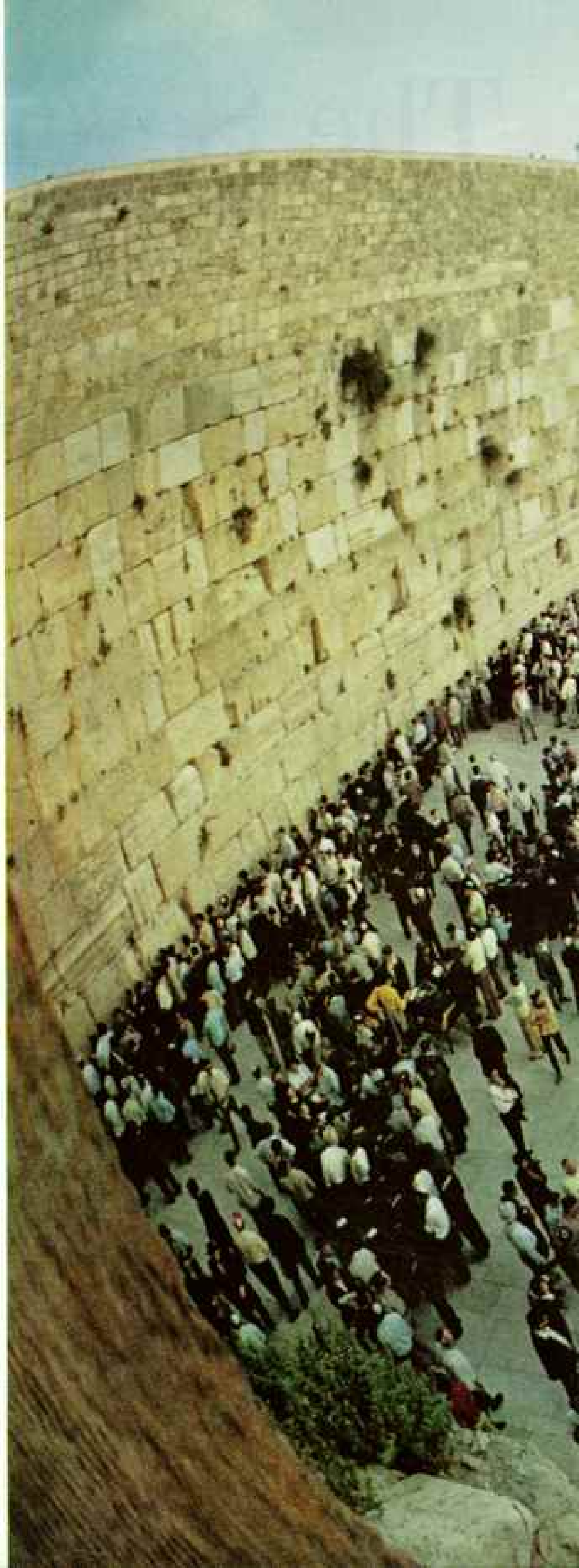


"And I will rejoice in Jerusalem...."

ON THE FIFTH ANNIVERSARY of the capture of the Old City during the six-day war of 1967, jubilant Israelis gather at the Western, or Wailing, Wall, sole remnant of the Temple, the lodestone of Judaism. Amid the hum of prayer and the stir of song from men dancing the hora, a supplicant presses a bit of paper into a crevice (above). It bears a prayer of petition or perhaps the name of a loved one lost in the flames of World War II.

Built by Solomon and destroyed by Nebuchadnezzar, restored by Herod and razed by the Romans, the Temple once contained the Tablets of the Law, the Commandments given to Moses. In the shadow of its wall, Jews discover the rapture of return after two millenniums of dispersion and persecution.

Yet modern Israel turns from its celebration of the past to confront the tensions of the present. Discord grows between Western and "Oriental" Jews—those of North African and Middle Eastern origin. Other Israeli concerns include one of the highest income taxes in the world, a drifting away from traditional religion, and, most troublesome of all, the elusive search for peace with neighboring Arab nations.





earlier this year in the Biblical boundaries of the Promised Land, from Dan to Beersheba, and far beyond—from the Golan Heights of Syria to the rubble of El Qantara on the canal, and south for many miles across the wilderness of Sinai.

I found much of what I had expected to find in that 35,000 square miles—the contagious vitality of a young nation still in the making, the determination and abounding pride of the people making it, the deep-rooted feeling that whatever must be done will be done because *ein breira*—"there is no choice."

But I also found much that surprised me—a growing estrangement between Western Jew and Oriental Jew, a friction between state and religion, a murmuring of doves in a nation of hawks, and a new breed of young Israelis forsaking the frontier for the city.

"Yes, that's all true," said Alex. "I suppose it means that we have made it as a country. We can now afford to have our social and religious and economic paradoxes, like a real country instead of an armed refugee camp."

When I reached Jerusalem late the next day, it was growing dark on Friday evening, the beginning of Sabbath. In the Orthodox

section of Mea Shearim, boys wearing the *peot*, the long earlocks under broadbrimmed hats, put barriers across the streets and gathered piles of stones to hurl at any motorist so unmindful of the Lord's will as to operate a machine on the holy day (page 844).

The light faded under a silver-gray sky that seemed all of one cloud, and a thin rain polished the stones of the Old City's congested lanes. As I neared the Jewish Quarter, an Arab boy emerged with palms outstretched.

"Show you the way to the Wall!" he pleaded of a thin man walking near us.

"I know the way," said the man. "I have known the way for 2,000 years."

Not a Land, But *the* Land

For every Jew, the approach to the Western Wall, that colossal fragment of Herod's Temple long known as the Wailing Wall, symbolizes the end of a 20-century journey through time and space, a way stained by persecution and torment and ghetto.

The dispersal of the Jews throughout the world—that grievous scattering known as the Diaspora—began when Nebuchadnezzar destroyed Solomon's Temple in 586 B.C., and



DAVID ROBINER, FLICK 1149

Mourning slain Olympic athletes, Israelis meet planes bearing home the victims of last summer's terrorist killings in Munich. Seventeen died, including 11 members of Israel's team. The clandestine Black September group of Palestinian guerrillas claimed responsibility for the deed.

ISRAEL

BIRTHPLACE of Judaism and Christianity, battleground for Roman, Turk, Crusader, and caliph, the ancient land of Palestine contains the modern state of Israel. On May 14, 1948, independence was proclaimed at Tel Aviv, and for the first time in 19 centuries, Jews had a homeland—a nation implacably opposed by the Arabs, the centuries-long residents of Palestine.

Within hours Egypt, Jordan, Syria, Iraq, and Lebanon attacked. Israelis defended their new state successfully, and although armistice came, years of sporadic clashes ensued.

Tensions erupted into war again in 1967. Late that May, Egypt moved troops across the Sinai and blockaded the Gulf of Aqaba. Israel countered by thrusting into Sinai, and soon engaged Jordanian and Syrian forces as well. In six swift days in June, Israeli forces swept west to the Suez Canal, east to the Jordan River, north over the Golan Heights, and into one of the bitterest stalemates of the 20th century.

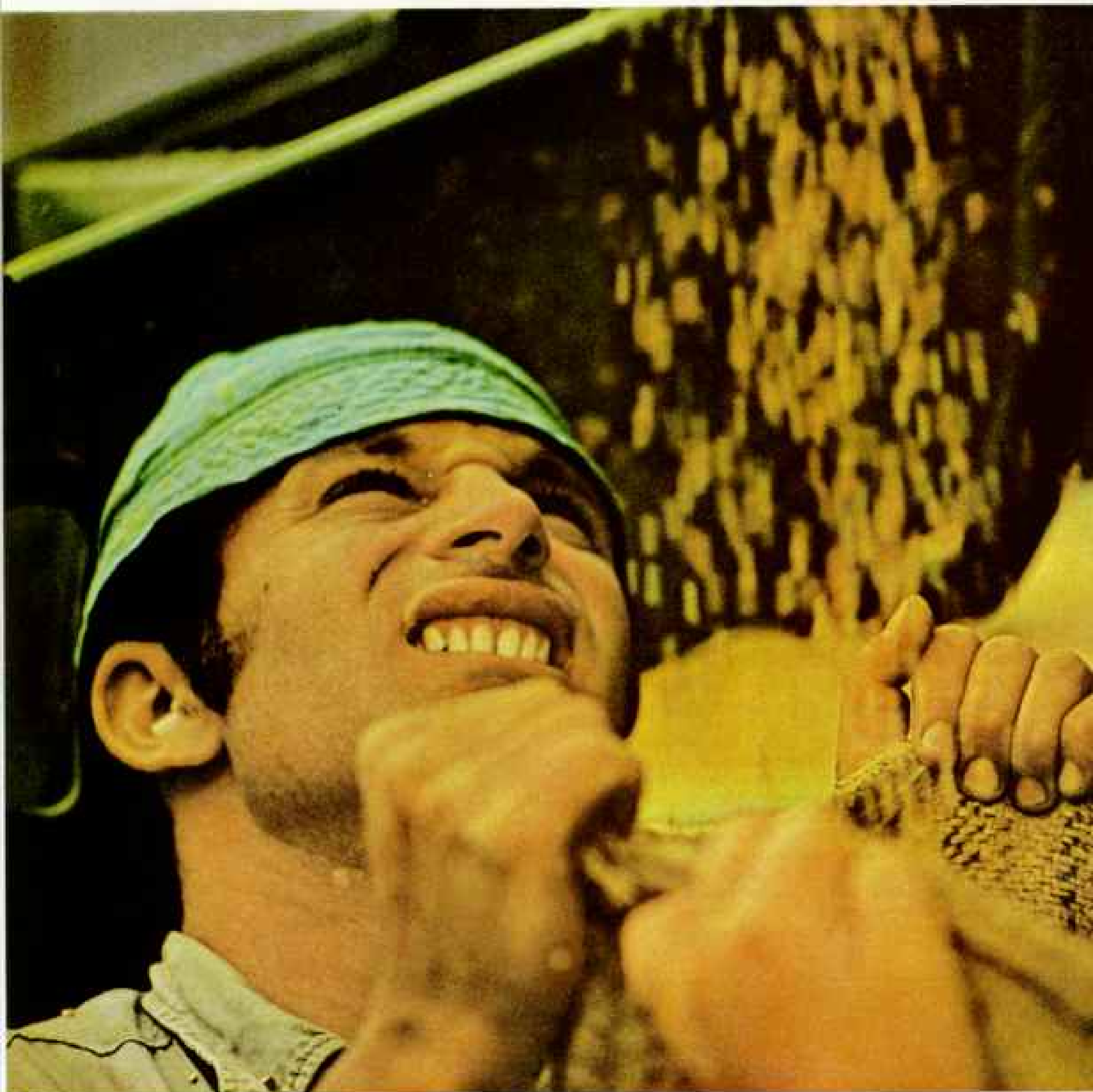
AREA: 7,992 square miles, plus 26,500 square miles of occupied territory. **POPULATION:** 3,000,000, preponderantly Jewish. **LANGUAGES:** Hebrew, Arabic. Also English, Yiddish. **RELIGION:** Judaism 85.4%, Islam 10.9%, Christian 2.5%, Druze 1.2%. **ECONOMY:** Mostly industrial—foods, textiles, transport equipment, chemicals and oil refining. Major export industry: cut diamonds. Agriculture: citrus, vegetables, cotton, grains. **MAJOR CITIES:** Tel Aviv-Yafo (pop. 400,000), commerce, industry; Haifa, port, oil refining; Jerusalem, capital.



Diagonal red lines indicate areas of Egypt, Jordan, and Syria occupied by Israel following the six-day war of June 1967.

Red names indicate historical regions.

100 STATUTE MILES
 100 KILOMETERS
 MAP BY G. H. R. COOPER



accelerated when the Romans destroyed Herod's Temple in A.D. 70. Though David's kingdom was gone, the priesthood annihilated, and Israel lost to conquerors, the people of the Diaspora did not forget; through a hundred generations they remembered the psalmist:

"If I forget thee, O Jerusalem, let my right hand forget her cunning." And, in a dozen countries, for 1,900 years, the concluding prayer of the Passover Seder ceremony remained, "Next year in Jerusalem!"

"We think of Israel not as a land, but as *the* land," my friend Rachel Mann had told me.

"For us, next year has finally come, and we are here. Only a Jew can understand in his heart what that means."

The Wall is the centerpiece of Israel's diverse and often contradictory national life. The first time I saw those huge, carefully trimmed blocks of stone, I was deeply moved by the passion of the people praying there, and by the excitement of students dancing a frantic hora with arms linked and voices raised in song (pages 818-19).

But on this evening, as the cold rain fell, only one stood there. He wept as he prayed.



Then he folded a small piece of paper, lodged it in a crevice in the wall, and walked away.

I asked a friend what was on the paper.

"Probably names he wishes God to remember," she said. "Names from Auschwitz. Or Russia. A father, a mother. Perhaps the name of our whole people."

Jerusalem has changed in many particulars at the hands of Arab, Crusader, Turk, Briton, and now Jew, but her aspect has remained the same—that of a low, tawny stone city riding a tide of hills, her cypress trees brushing the sky. One still sees the massive walls that



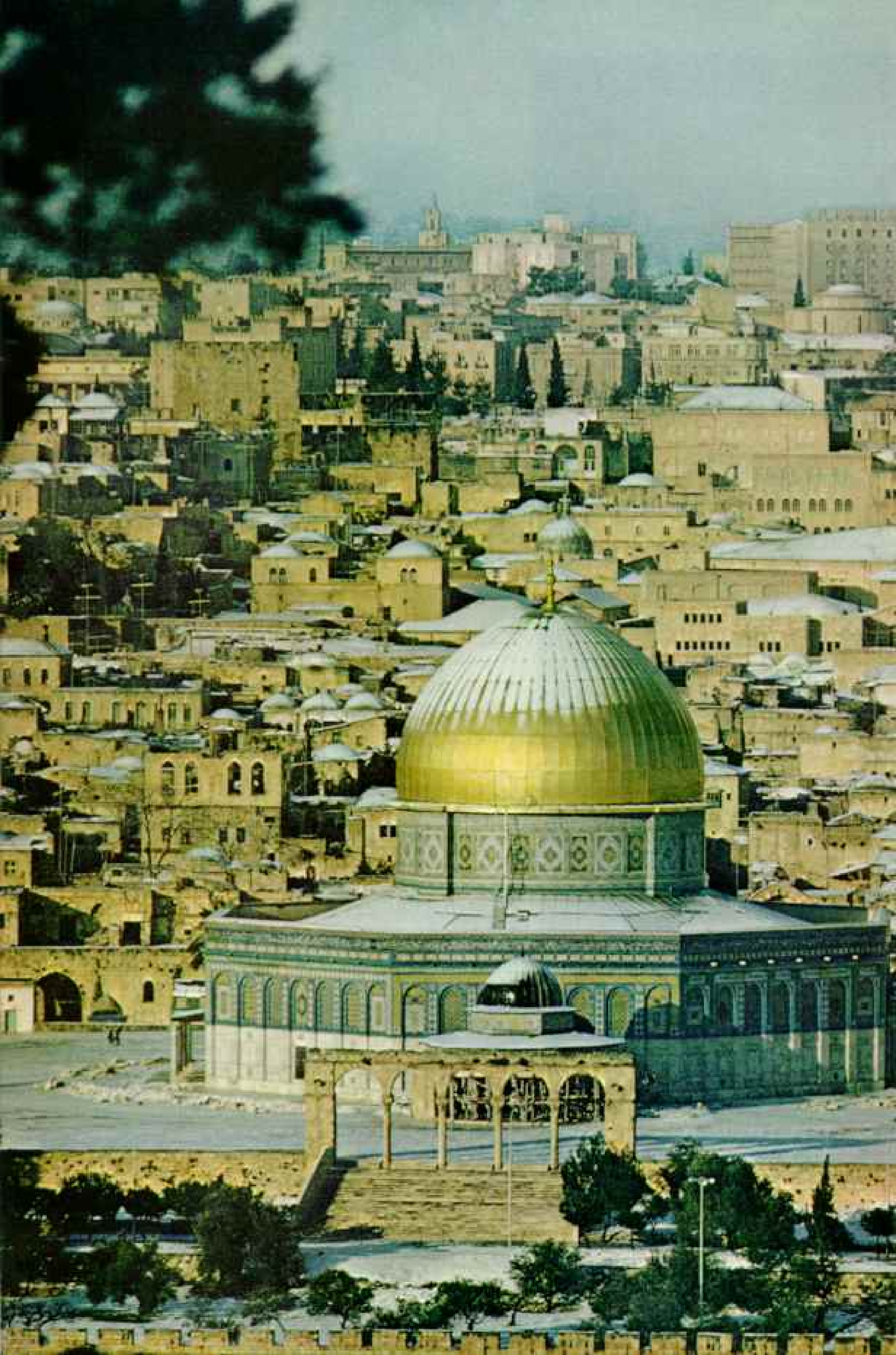
Sawing a diamond in half, a worker catches one piece of the 30-carat stone while the machine still holds the other. Thus begins a cutting process that will yield two gems of about 8 carats each. Diamond cutting and polishing, the leading export industry, centers in Tel Aviv and its suburbs.

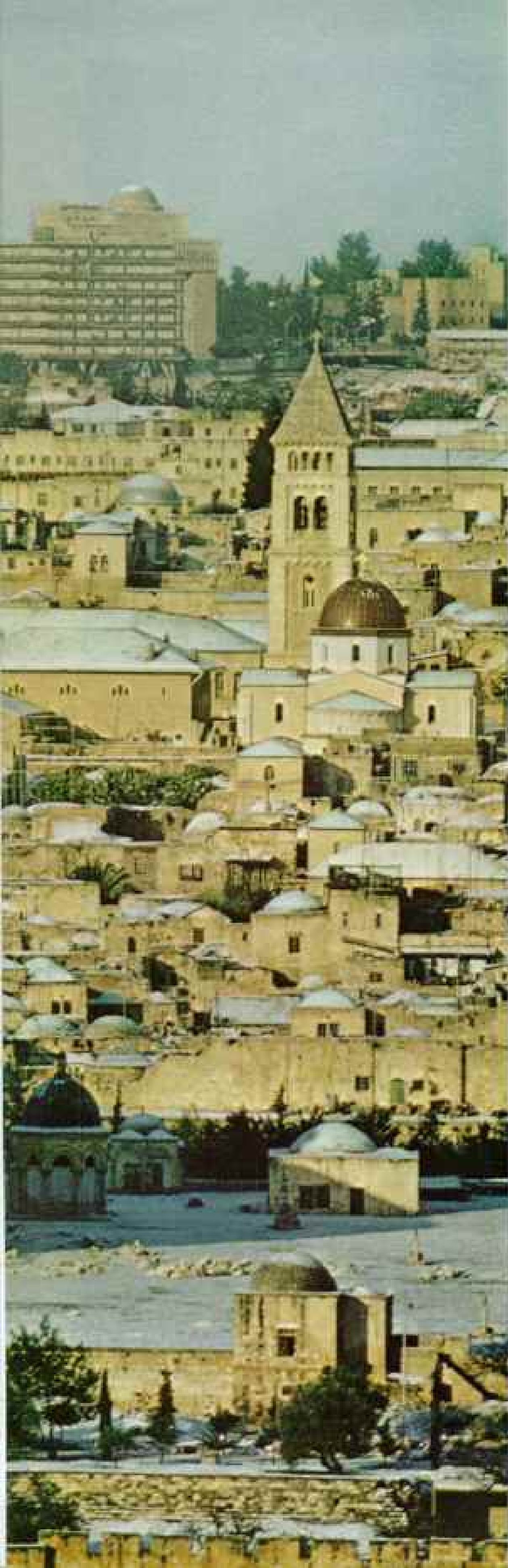
Gleaning every grain, harvest workers bag a shower of wheat kernels leaking from a damaged threshing machine. A victim of farm shortages in its early years, Israel now exports strawberries, tomatoes, melons, and famed Jaffa oranges.

encircled the Old City, and the valleys, the orchards, and hillsides where David ruled and Christ walked.*

Now that aspect is undergoing controversial change. Jerusalem had acquired a lopsided look in the years since 1948, when the fighting stopped and left it split between Israel and Jordan. To the west, the area in which Jews already had a foothold has filled

*GEOGRAPHIC articles on the Holy City include Howard La Fay's December 1967 description of Jesus' days there, John Scofield's story of war-divided Jerusalem in April 1959, and Kenneth MacLeish's visit to the reunited city in the December 1968 issue.





rapidly with immigrants and apartments. By 1967 almost 200,000 Jews lived in a city of widened streets, hotels, hospitals, a growing modern campus at the Hebrew University, a new Israel Museum, and a building to house the Knesset, the Israeli parliament. This new metropolis looked across a no-man's-land to Jordan's part of Jerusalem, where 65,000 Arabs lived in the Old City and on the surrounding hills.

Following the six-day war, west Jerusalem reached east for more living space. Like the brooms of the Sorcerer's Apprentice, apartments marched toward Nebi Samuel, the Hill of Joy, and laid siege to Mount Scopus.

When I called on Mike Turner, an English-born architect and a member of a planning unit that watchdogs city growth, he had the wary look of city planners everywhere.

"The demand for housing," he said, "is extraordinary. One apartment may sell for 120,000 Israeli pounds—\$29,000. Now we are fighting to preserve the city's character."

Herod's City Takes Form Anew

There is no doubt that the Israelis regard Jerusalem as their city, to have and to hold. The state is rebuilding, stone by stone, the Jewish Quarter of the Old City, all but destroyed in the intense fighting of 1948. A vigorous young construction director, David Zifroni, showed me around the building site where donkeys threaded a labyrinth of trails.

"Our bulldozers," he said, slapping an animal on the rump. "This work must be done by careful men and careful beasts."

We made our way through a maze of lanes, passing the facade of a 13th-century synagogue pocked by bullets.

"The new quarter will contain 600 apartments and 200 shops," David said, "about 10 *yeshivot*—religious study schools—housing 1,500 students, and 10 synagogues, all based on the layout of the city as it was in Herod's time. There will be two hotels and a tunnel under the city wall, all near Zion Gate, leading to underground parking for 600 cars."

Rare winter snow dusts Jerusalem and the Dome of the Rock, a site holy to three faiths. Jews and Christians honor it as the place where Abraham offered to sacrifice Isaac, and Moslems revere it as the spot where Mohammed ascended to heaven. Distant hotels and apartments loom beyond the Old City in this telescopic view.



Guiding Israel's government since 1969, Prime Minister Golda Meir (left) presides at an informal cabinet session. Diverse political parties unite in backing her goal of peace through direct negotiation with the Arab nations.

At odds with the establishment, Charley Biton fights discrimination against Oriental Jews. One of a group calling themselves Black Panthers, he has taken to the streets in demonstrations that usually have landed him in jail.



I soon discovered the antidote for Jerusalem's chill winter weather—a steaming mug of David Rothschild's goulash in his small but comfortable establishment called Fink's, where one can find nostalgic enjoyment in listening to "The White Cliffs of Dover" played on a sturdy old 78-rpm machine.

"I'm not a deeply religious man," said Mr. Rothschild. "When I was young in Vienna, every time there was a holiday my father would tell me about the Jews being killed on this day, or being driven out, or being massacred. Every holiday was the celebration of a tragedy. I said to myself, 'This religion is a dangerous business!' Now we have a little pleasure. Not much, but a little."

But even in Fink's, Israel's preoccupation with survival is evident when the news comes on the radio: A hush falls, and men with tumblers poised in the air listen intently. There follows much talk of politics; there is, in fact, almost continuous talk of politics everywhere in Israel.

"My dear friend," said Mr. Rothschild, "when you have two Jews together, you have three opinions."

Voice of Dissent Stirs a Furor

In Israel's parliamentary democracy, three million Jews make up an even dozen political parties, largely socialist but including every persuasion from Communist to free-enterprise capitalist. Three small religious parties exert such influence that some Israelis refer to their government as a theocracy.

In such a wide spectrum, it is not unusual to find dissent, but one voice, at least, sounds close to treason to most Israelis. It is addressed to the gap in education, opportunity, and political *protezzia*, or pull, between the European Jew and the late-coming Oriental Jew from North Africa and the Middle East.

One group of young Oriental Jews chose a lightning-rod name—the Black Panthers—and their activities to better their conditions have caused violent reactions.

One Panther leader, Charley Biton, lives in a symbolic place—a ramshackle house on the edge of the city's former no-man's-land. I sat in Charley's room, adorned only by a blowup from a Monopoly board, showing a fat policeman and bearing the legend "Go To Jail."

"I've been there," he said. "More than once." A thin, intense young man with wide, questioning eyes, Charley has the look of a man who knows trouble.

"The problem of the Oriental Jew," he said, "is our ignorance. In elementary schools we are 60 percent of the beginning class, but only 14 percent of those graduating from high school. They say about us, 'What can you expect, they grew up in caves and wear their pajamas in the streets!'"

"The Panthers are against war with the Arabs, because we think our nation's resources are needed to achieve social ends at home. When young, we were part of the Zionist dream. But I have nothing now against the Arabs."

Later we adjourned to a house where Charley's wife lay on a sofa, huddled under a blanket to keep warm. Their infant daughter sat quietly in a baby seat (facing page).

"They can arrest me forever," said Charley, "but what are they going to do about her?"

"Soul of Israel" Lives in the Kibbutz

From Jerusalem a new road descends the brown waste beyond Bethany to Jericho and turns along the west bank of the Dead Sea, through some of the most haunting scenery on the planet. Across the waters the hills of Moab in Jordan rise sheer, glowing golden in the sun, the stuff of fantasy. On the Israeli side the desiccated cliffs step back, waterless and crumbling, except for an island of green riding a high plateau—the prosperous kibbutz of En Gedi, an oasis of tree-shaded walks and fields.

A handsome girl, known only as Leah (in a kibbutz the first name suffices), waved to me.

"You're in luck," she said. "There's a wedding here tonight."

German-born Leah, whose early childhood was spent in Israel, moved as a teen-ager to America and lived in Ohio.

"I came back because I believe in the theory," she said. "I like the communal life, the sharing. The soul of Israel is still to be found in the kibbutz."

The kibbutz has indeed been so closely identified with contemporary Israel that it was surprising to find only 3½ percent of the population living on kibbutzim. The first one, Deganya in Galilee, was founded 63 years ago. One of its members, philosopher A. D. Gordon, propounded the kibbutz theories of physical work and harmony with nature, sustained by collective ownership, cooperative labor, and complete equality.*

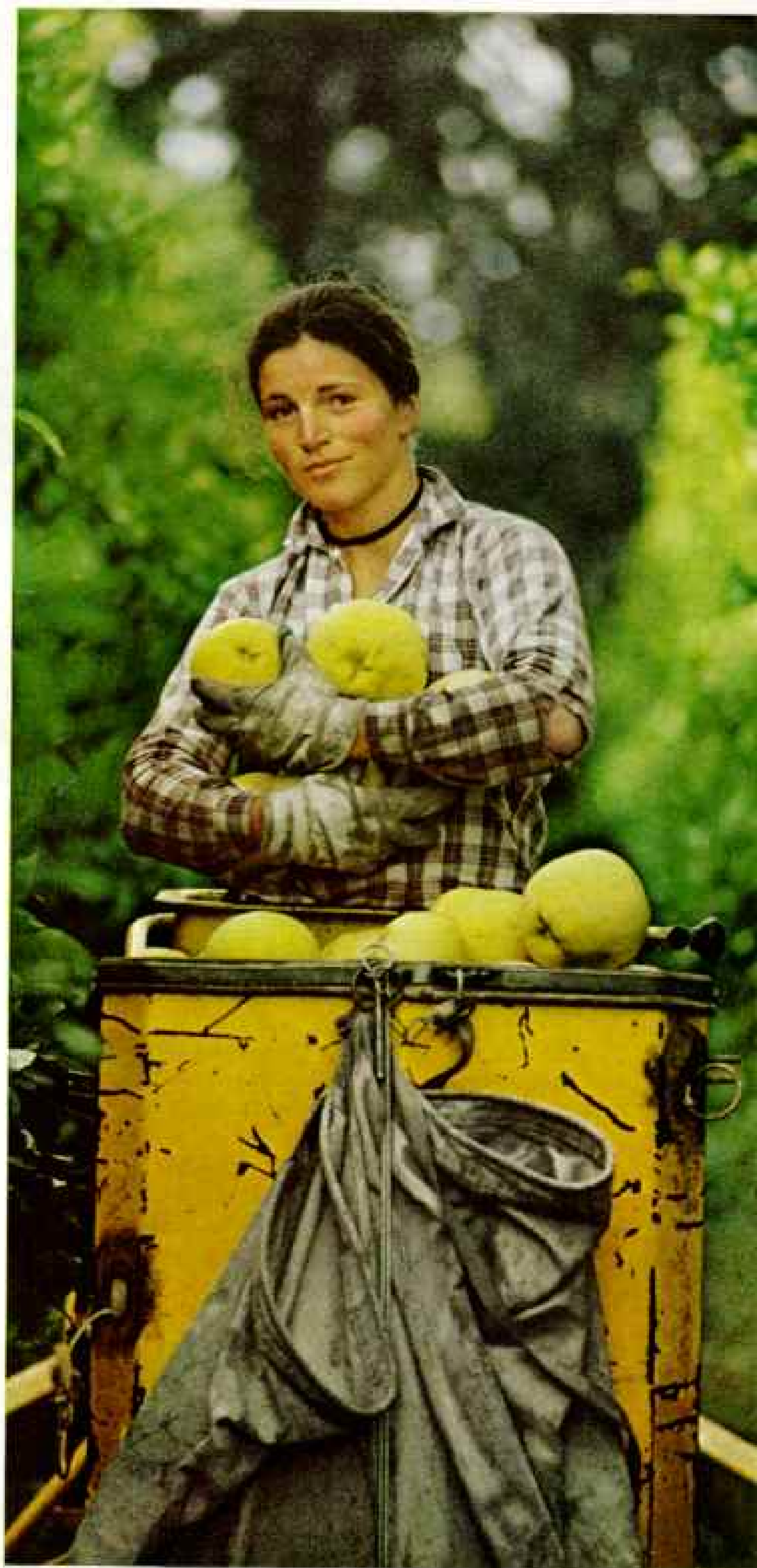
*Carol and Al Abrams wrote of kibbutz living in the September 1970 *GEOGRAPHIC*.



Growing up together on the land, boys and girls of kibbutz Shamir share Spartan rooms in the Children's House (left) until the age of 14. The youngsters study, play, and learn farm responsibilities by tending their own chickens (below).

They visit parents only in the evenings and on weekends, so that mothers can devote working days to the kibbutz. The first of these ventures in communal farming was founded in 1909. Today nearly 250 green the land. Many have added profitable industries that turn out such diverse products as plastics and plywood.

Young volunteers from other countries come to work on kibbutzim, eagerly performing most of the manual labor. A Swiss secretary (right) spends her vacation picking grapefruit.



The movement is no longer entirely agrarian. Many kibbutzim have developed burgeoning industries; Naan, for example, with 600 members, exported a million dollars' worth of irrigation equipment last year.

Leah took me to the home of Danny, one of the elected leaders of En Gedi. His handsome new apartment was as crisply modern as any in Israel.

"The kibbutzim," Danny said, "have an influence far beyond the numbers of people who live in them. Even in the glory days we were never more than 5 percent of the population, yet a fourth of our war casualties were kibbutzniks. Many officers in the air corps and the commandos—the elite of the armed services—are kibbutzniks. Many of the top government leaders are from kibbutzim. Our main problem is finding and keeping the right people. Too many today prefer Tel Aviv."

Lively Dance Beside the Dead Sea

Varda and Cookie were married that night beside the kibbutz swimming pool. They stood under a blue-silk canopy supported by two pitchforks and two Soviet-made semi-automatic rifles captured in the Sinai. As the voice of the rabbi rose in ancient chant, red and green flares burst into sudden suns overhead, casting a dazzling light along the cliffs and canyons of the Dead Sea shore.

Afterward, the large party assembled in the packing plant, where En Gedi's fresh vegetables and dates are boxed for shipment. Soon the music of the hora echoed across the Dead Sea.

At the party I spoke with two American girls from New York. They had come with 120 other volunteers for three months, and they were happy to be leaving.

"Picking vegetables is hard enough," said one named Gail. "But the real problem is that the people who have lived here for years have their own thing going, and we are not a part of it. We are strictly transient labor."

For those with a dream of Eden, Israel offers hard mattresses and harder labor. Those seeking a spiritual atmosphere find it a tough secular society. Those seeking freedom from old superstition are led to its holy places. It is as though Israel carefully guards the truth about itself.

South of En Gedi looms the massive butte crowned with a fortress named Masada, where a heroic moment in Jewish history occurred in the first century (page 836).

Southward still, the Dead Sea narrows and finally evaporates in a wasteland of brown salt, eroded into fantastic shapes. A brimstone odor hangs in the air, calling to mind the destruction of Sodom and Gomorrah.

Yet here, in the inferno heat of earth's lowest place, the Israelis extract riches. The Dead Sea Works each year takes a million tons of clean potash and bromine from the turbid waters of the dying sea.

Israel is also attempting to draw wealth—phosphate and natural gas—from the Negev to the south. The nation's development efforts have earned sympathetic international support—3 billion dollars from the United States Government alone in 20 years, and 1.7 billion from individual bond purchases abroad.

Still, the economic demands of the military machine, immigration, and domestic growth weigh the Israelis down under a crushing income tax, with one of the world's highest average rates, and the largest per capita foreign debt as well. An automobile that sells for \$4,000 in the United States would cost \$12,000 in Tel Aviv.

Beersheba Still Stands for a Promise

South of the Dead Sea, an old road winds west where Abraham wandered 4,000 years ago, as he moved his herds out of the land later to be called Judaea. He dug a well where Abimelech lived, and made a covenant with that chieftain, sealed with the exchange of seven ewe lambs. The place has since been known as Beersheba, the well of the pledge.*

Today the old encampment represents a different kind of covenant. Israel exists for the "ingathering of the exiles." Under the Law of Return, every Jew has the right—denied only for security reasons—to become a citizen upon arrival. Since 1900 almost two million Jews have returned to their ancient homeland in waves of immigration known as *aliyahs*—"ascents to Jerusalem." The process continues with the influx of Russian Jews, 27,000 of whom have reached the beckoning ancestral shore. Many are sent to Beersheba, now a thoroughgoing Jewish city where advancing ranks of apartments seem intent on swallowing the surrounding desert.

One afternoon I wandered, block after block, in the maze of high-rise buildings. I stopped to chat with a group of men and women who were standing in winter's weak

*Kenneth MacLeish followed Abraham's wanderings in the December 1966 GEOGRAPHIC.

sunlight, trying to absorb a bit of warmth.

Did I speak Russian? No, unfortunately. Rumanian, then? No. But surely Yiddish! Finally we made up a chain of languages, and I learned that for this group, at least, the Promised Land had been oversold.

"We feel lost at sea here," said a woman. She swept her hand toward the desert. "No one speaks our language. We have been here 40 days, and robbed once. I made the graves of three sons in Russia. I did not eat for many days to save enough to pay the tax and get permission to come to Israel. I listened to the propaganda, but here I am in a wasteland."

A serious young man joined us. He had a different view, and excellent English.

"The problem," he said, "is that these people are used to a state telling them what to do. Still, most will become adjusted. They simply have not seen a competitive society, and it shakes them up."

Sabras Reflect a Fierce, Free Spirit

South of Beersheba a new road threads the Wilderness of Zin, a parched brown desert, then comes suddenly upon the clear, blue waters of the Gulf of Aqaba. The old Arab town of Aqaba long commanded the head of the gulf, sheltering pilgrims on their way to Mecca. For two decades Israel has been building a modern port and resort, Elat, just west of Aqaba. The cities maintain a cold coexistence, watching each other's lights by night. I registered at a new hotel sprouting at the water's edge in Elat and hobnobbed with tourists who had poured off one of the daily flights from Tel Aviv to snorkel in the gulf.

But the real wealth and importance of Elat is not in sight: a 42-inch oil pipeline to the Mediterranean at Ashqelon. Huge tankers chartered by government-controlled firms shuttle between Elat and oil-producing Iran. Pipeline and tankers bypass the Suez Canal.

One evening I looked up one of the pioneer citizens of Elat, Dr. Reginald Morris, a former Briton famous in Israel as a medical missionary to the Bedouin of the Sinai. I found his home full of people—most of them native-born Israelis, or *sabras*.

"It's Arabic for the fruit of the cactus," Dr. Morris told me. "Prickly on the outside but sweet within. Sabras are a distinct breed—tough, realistic, even irreverent. Immigrants find their own circle of friends with other immigrants, almost never with sabras. There is an Israeli anecdote about two children talking,



After squirming under barbed wire, an Israeli girl cleans sand from feet and boots. The defense forces draft single women from 18 to 26, deferring students in such critical fields as medicine and engineering, and exempting religious objectors. A female instructor corps teaches the draftees to shoot, but their assignments do not include combat. After serving 20 months as clerks, cooks, or drivers, the young women—even though they marry—remain in the reserves until they are 34 or pregnant.

one the son of a sabra woman and a man who had been in Israel for 22 years. 'I did something for an immigrant today,' said the boy. 'I was nice to my father.'

"Sabras," he added, "will examine a map of Israel for the best military position; the holy sites are not their first concern."

One of Dr. Morris's sabra guests, an attractive woman with fair hair and Nordic features, explained it this way:

"When the refugees began to come in 1948 and 1949," she said, "they came bent over, and their morale was like that. You must be strong and free and proud to be Israeli, not bent over. The fact is, we *are* the chosen people. It's no great honor, but it's a fact."

The place where the ancient Jews received the Commandments, a place of covenant with the Lord, is now within the ceasefire

lines—majestic Mount Sinai, inhabited forever by the ghost of Moses.

I arranged with a veteran of the Sinai wars of 1956 and 1967, Abraham Zakai, to "see what was inside," as he put it—inside those walls of dry, brown mountains that block off the Sinai desert. In a command car, we jostled and bumped for a week through the many-chambered wilderness, strewn with more stones than were present at the creation.

Yet the Sinai offers the sudden, verdant surprise, such as the Place of the Small Spring, or Kazab's Well, an oasis of Bedouin tents, palm trees, and water holes in a blistering canyon. There we sat on the ground with the Bedouin men and accepted coffee scented with pungent cardamom, and sweet tea. The man named Omir smiled and said:

"We serve the coffee first, and then the tea,



Her longing to return fulfilled, a newly arrived Soviet Jew and her child (facing page) await the gift of citizenship guaranteed to every Jewish immigrant. Only security reasons—sedition, a criminal past, or perils to public health—bar Jews from entrance visas. Since independence more than 1,300,000 have come from dozens of countries, more than tripling Israel's population. For some the adjustment to a new life and language is difficult. At Beersheba (above), jobless immigrants from Soviet Georgia endure a dust storm. Eventually they may find work in nearby chemical plants or at the Dead Sea potash works.





To redeem their arid land, Israelis use 90 percent of its water for irrigation, the highest rate in the world. At a reservoir near the Sea of Galilee (facing page), technicians sample water destined for the country's life-line, the 140-mile conduit that snakes through fertile coastal plains and into the northern Negev desert.

Weeding with a hoe, a farmer on an agricultural cooperative by the Sea of

Galilee (above) cultivates the earth around a fruit tree fed by a high-pressure spray containing fertilizer.

Deep in the Negev (below), diked catchments funnel scanty rainfall to the low corner of each square, granting the sip of survival to a single almond tree, a North African technique. Agronomists also employ irrigation methods of the ancient Nabataeans, who were farming here in the time of Christ.







because life is mostly bitter, a little sweet."

Did he find life under the Jews more bitter or more sweet?

"It is better," he said. "Tourist money, and jobs, and rides in cars and buses."

We came upon Saint Catherine's in late-afternoon light. The celebrated monastery, built in the sixth century by the Emperor Justinian, resembled a walled fortress below vertical cliffs that swept up to the majestic, 7,500-foot height of Moses' Mountain, or Gebel Musa, as Arabs call Sinai.*

Brother Superior Dionysius, a sturdy sparrow of a man, told us there were plenty of guest rooms. The monastery, with its hundreds of rooms, its priceless icons and books, was tended by fewer than a dozen Greek Orthodox monks (pages 840-41).

"I've been here for only 12 years," Brother Dionysius said, "and out twice, both times to Cairo for medical attention. Since 1967, not at all. It used to be an eight-day camel ride to Suez. In those days it was more peaceful."

Sons of Moses Again Wander Sinai

Before dawn we turned out to meet a band of Bedouin with a troop of camels to take us up the lower slopes of Sinai. It was an hour of unusual beauty—immense stars forming Scorpio lay directly ahead as the beasts plodded softly through the darkness, climbing ever higher and leaving behind the jagged valley, like a vase filled with other brightly burning stars. The musical Arabic of the drivers urged the camels upward until, to the east, the edge of the sun split the broken horizon with intense red light, spreading emptiness and desolation to the edge of sight.

We dismounted on a wide ledge and continued on foot, a breathtaking climb up 3,000 steps roughly cut in the rocks. Finally, at the top, we stood in the full sun of morning—wondering how Moses had ever made it.

"They say God was here," Zakai said. "The Bedouin think it was a different mountain, over there somewhere." He shielded his eyes

*See "Island of Faith in the Sinai Wilderness," by George H. Forsyth, *GEOGRAPHIC*, January 1964.

against the sun and gazed out like a military scout. "I wonder if Moses knew then that the sons of his own sons would wander here again, still contending with Pharaoh."

Not far from the captured oil fields at Abu Rudeis, we camped near a small settlement. In the evening we walked over to a cinder-block building where soldiers and civilian oil-field workers gathered for dinner. At the large washbasin near the door I fell into conversation with a small leather-tough man with a bristling moustache.

"I would like to have been a Latvian," he said. "In 1927 I was a Latvian Boy Scout. My friends were all Latvian boys. But they soon educated me that I was a Jew. Here, I fought with Haganah, the Jewish underground, and I was in British prisons, exiled to Africa.

"I came to Israel with just my two hands. I don't know what the new immigrants want. The ones with broken dreams will leave, but the best ones will stay. And they will raise sons like mine. Once I gave him a toy. He said to me: 'It is a beautiful toy, Daddy! Where is the safety catch?' He is not afraid."

Tel Aviv Feeds Zest for Humor and Fun

After a week in the stony, cold desert, Tel Aviv looked good (pages 846-7). Even Tel Aviv, the butt of many an Israeli joke.

"Return territory to the Arabs?" says the Jerusalemite. "Sure, Tel Aviv!"

"It's a place," commented a woman more tartly, "for people to go who can't find a place to live in Israel."

Even though Tel Aviv sprang from a beach without planning, and 400,000 of Israel's 3,000,000 people are jammed into the area, and even though its drab apartments, gray-ing in the sun, wear peeling skins and fluttering wash, Tel Aviv is where the action is: theaters, concerts, sidewalk cafés. Here frontier life relaxes for a bit of glamour and pleasure.

And, in keeping with that character, diamonds are the girl's best friend. The mainstay of Israel's export trade, the buying, selling, cutting, and polishing of diamonds has put a

(Continued on page 844)

Hill of heroes, the first-century fortress of Masada bears witness to a towering moment of Jewish valor. For months some 10,000 Romans besieged the bastion, living in eight flanking camps like the one on the near cliff. With defeat imminent, citadel commander Eleazar ben Yair exhorted his followers to choose death rather than slavery. Each man killed his own family, then the defenders slew each other by drawing lots. The entering Romans found 960 corpses amid "a terrible solitude," a "perfect silence." The Jews called themselves Zealots, adding a word to the dictionary for fanatics with a cause.



Wearing her husband's wealth on her veil, a Bedouin of the Sinai swathes her child in the folds of her *abaya*, a loose cloak that protects a woman's modesty and conserves body moisture. For centuries her people have roamed the desert with their small flocks of camels, goats, and sheep, coaxed a little barley from the earth, and considered themselves the only true Arabs.

Many now yield to modern ways. The young men increasingly accept farm work, and a few even commute by bus to jobs as welders or plumbers. Nomads who grew old on the desert leave their goat-hair tents for houses and watch TV. In the Sinai, Israelis employ Bedouin to build roads and help run the captured oil fields at Abu Rudels. The government builds schools, digs wells, and dispatches mobile medical units to tribal centers.

Hands joined in a cordial clasp, an Israeli army lieutenant and a sheik (below) reflect the growing amity between Jews and the Sinai Arabs.





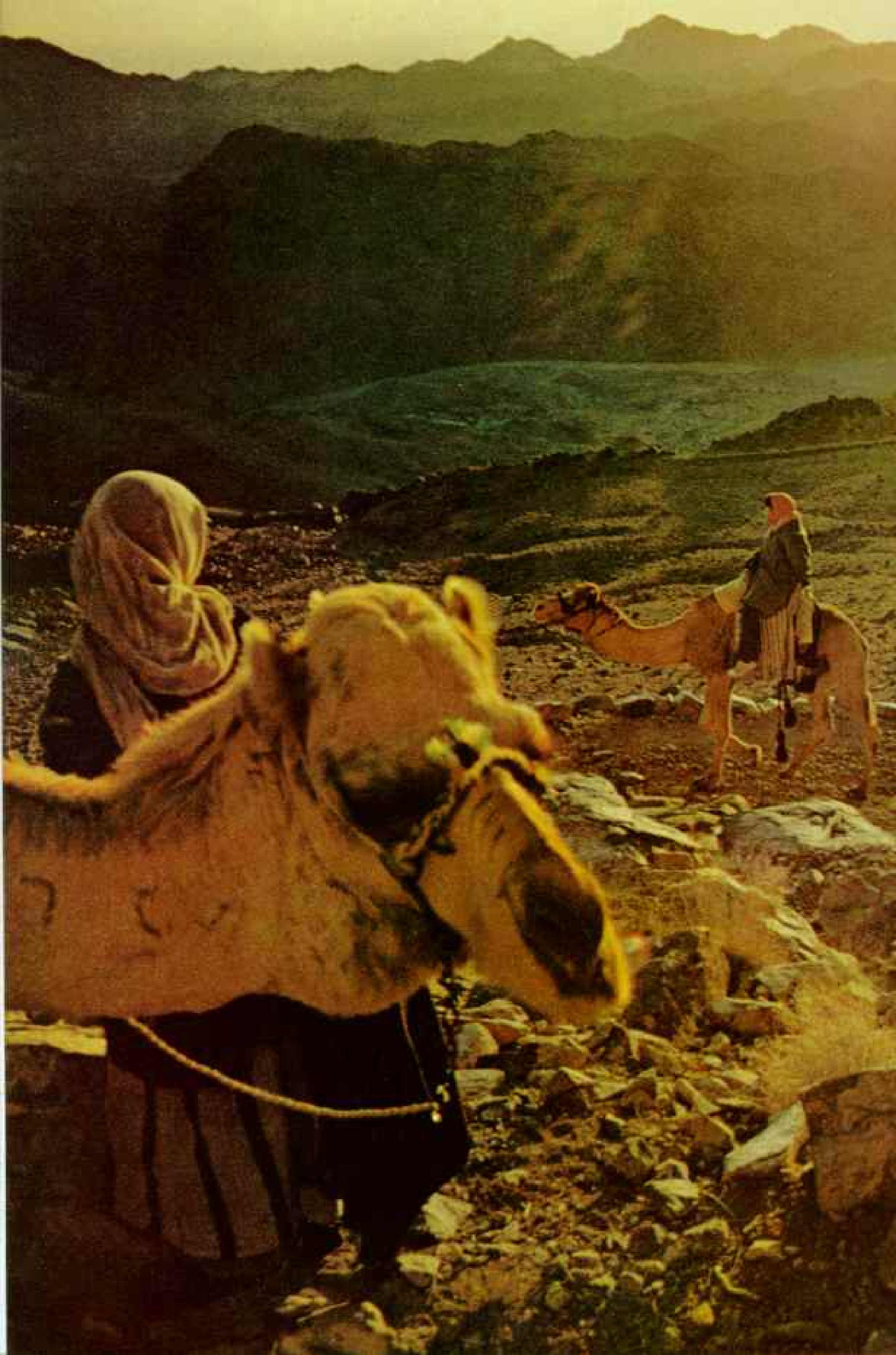
Reliquary of Byzantium, the Monastery of St. Catherine awaits afternoon's lengthening shadows on Mount Sinai at the spot where, tradition tells, God spoke to Moses from the burning bush. Justinian built the shrine in the sixth century, adding walls to keep out raiders who preyed upon hermits tending the hallowed site.

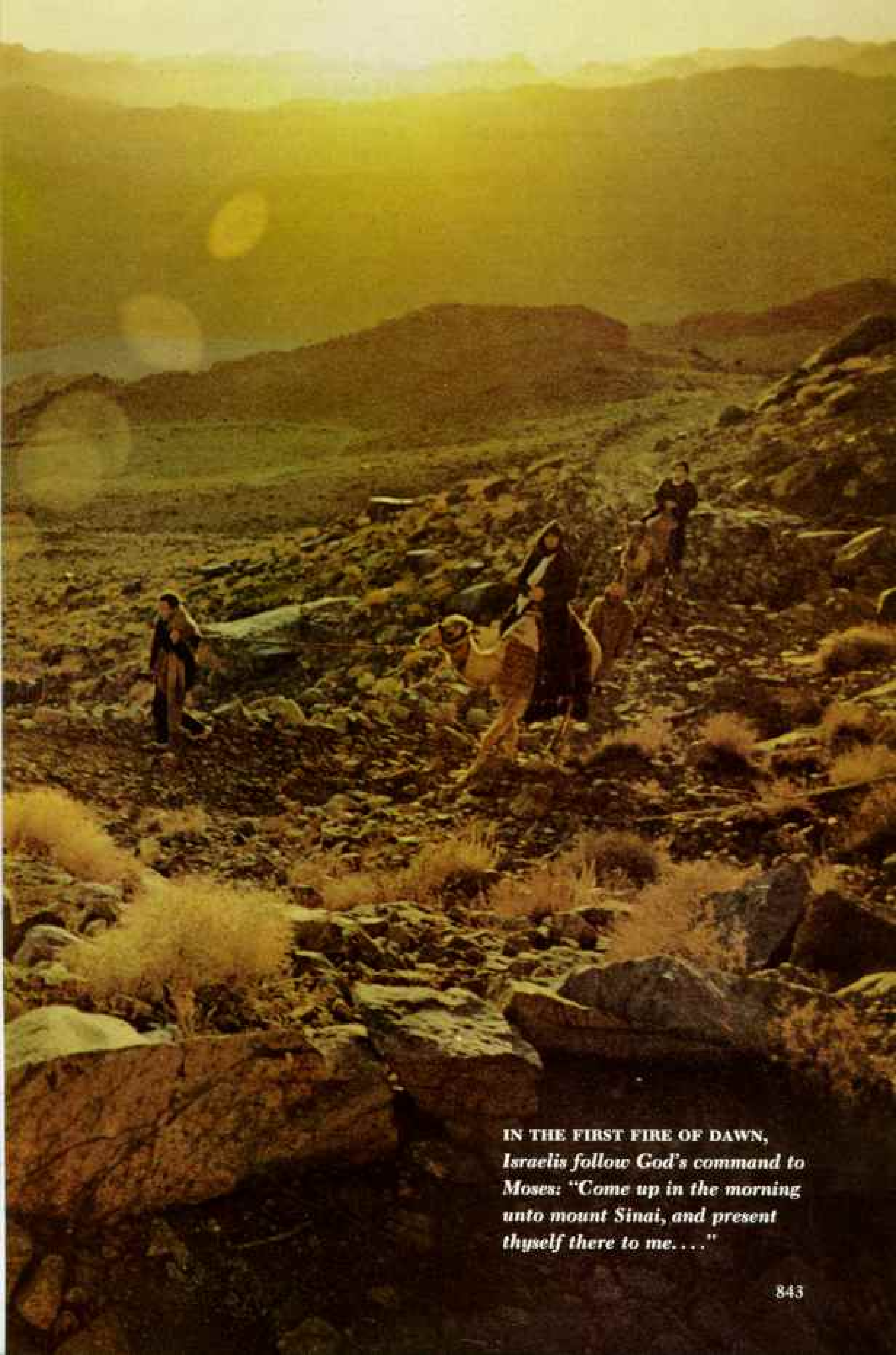
Cut off from Constantinople during the surge of Moslem conquest, the monastery and its works of art escaped the wrath of the Iconoclasts, an eighth-century cult that viewed the veneration of images as idolatry. Byzantine emperors, siding with the Iconoclasts in a controversy that flared for decades, ordered the destruction of icons. Deep in the Sinai, St. Catherine's monks chose to ignore the decrees and thereby preserved what is now the world's finest collection of this art form.

Brother Superior Dionysius (above) holds a prized example, the sixth-century Christ Pantocrator—Christ the Omnipotent.









IN THE FIRST FIRE OF DAWN,
*Israelis follow God's command to
Moses: "Come up in the morning
unto mount Sinai, and present
thyselb there to me. . . ."*

new landmark on the Tel Aviv horizon, the skyscraping Diamond Exchange Building, housing 350 firms. Each day, about a million dollars in diamonds is traded on the floor of the exchange.

I joined the hullabaloo and sat next to Joseph Nadel, a diamond merchant for 37 years and one of the pioneers in bringing the business to Israel from Belgium. He was concluding a purchase from a man with a tiny sackful of glittering stones. They finally agreed on the price and shook hands.

"Is that all there is to it?" I asked.

He nodded. "This multimillion-dollar business is all conducted on the basis of trust. There is no contract. We say *mazal tov*, good luck, and that seals the bargain."

On any evening in Tel Aviv, the finest entertainment in town is free—a stroll down tree-shaded Dizengoff Street. Select a café like Kassit, a rendezvous for artists and intellectuals, take a seat and a coffee, as I did one evening, and you will soon find that the city's fame for its chic beauties is deserved.

"A few years ago," a man in a beard said, "everyone on the street wore khakis or shorts. Now it's more settled, more fashionable."

Among the topics discussed that evening at Kassit was a raffle for 70 apartments erected for Orthodox couples. There were 400 applicants. The National Religious Party insisted on testing the winners to be certain they were truly religious.

"How can you look into a man's heart?" said an old man to a group at his table. A teacher explained his view to me:

"We are becoming less and less a theocracy. The army, where the young people first find freedom from the home, is a secular institution in spite of its kosher food and rabbis. Many people are pressing for civil marriage and divorce. Most kibbutzim are agnostic. Frankly, many Israelis, trying to build a modern state, are becoming more nationalistic than religious."

Jews Again Live in the Patriarchs' City

Snow was falling heavily the day I came down to Hebron, an ancient city cupped in the Judaean Hills. Under Jordan's flag until 1967, Hebron is sacred to Arab and Jew. There, in the Machpelah cave, rest the Patriarchs and their wives—Abraham and Sarah, Isaac and Rebecca, Jacob and Leah, and, some say, Adam and Eve.

In the main square near a mosque, a

crowd of Arab men looked uncomfortably cold in long drab overcoats.

"Where do the Jews live?" I asked.

"Over there, on the hill."

I asked a young man with fair hair to show me the way. We climbed out of the town and along a muddy road to a checkpoint, passed through an army camp, and came to the top of the hill where new apartment buildings were rising from the mud. They are extremely controversial symbols of the Jewish occupation of Arab territory.

As is so often the case in the Middle East, the more sacred the shrine, the greater the



To bar motorists, Orthodox residents block streets in Jerusalem's Mea Shearim district on the Sabbath. Here live the ultraconservative Neturei Karta (Guardians of the City), who do not recognize the State of Israel because it was created by secular, not divine, authority.

bitterness and bloodshed that have stained it. Jews lived side by side with Arabs in Hebron from the time of destruction of the second Temple in A.D. 70 until 1929. In that year a war of annihilation was declared by Moslem leadership against the Jews of Palestine. In a single morning of atrocity and murder, scores of Hebron's Jews perished, as one historian phrased it, "in blood and fire."

With that bitter history in mind, the government of Israel—despite its 1967 victory—was not eager to encourage a renewed attempt at Jewish settlement in the Hebron hills. In 1968, however, a dozen determined families

came to live among the city's 38,000 Arabs. They are still there, and a once-reluctant government is now building new apartments to house them and other Jews who followed.

In one such flat I found a family of recent immigrants from the United States—Chaim Mageni, his wife, Shoshana, their children, and her grandmother.

"Who is this fellow?" Chaim asked, as my guide followed me to the door.

"A boy from the town."

"I'm sorry, but he can't stay here. Give him some money and ask him to leave."

When I told him we had come through the



First haircut for an Orthodox boy takes place during the annual festival at Safad, traditional center of Jewish mysticism. The *peot*, or earlocks, are spared, in accord with the Biblical command, "Ye shall not round the corners of your heads. . ."

military checkpoints, he grew apoplectic.

"You brought an Arab through the army camp?" he exploded. "What incredible laxity!"

After the boy had gone, Mr. Mageni told me how the new settlers of Hebron were making plans for a permanent Jewish enclave, with light industries to support it.

"This is not an Arab city," he said. "It was the capital of David before he conquered Jerusalem. There has always been a Jewish presence here, until 1929. The government at first didn't want us here. We had to help the government to walk in the right path. We are convinced that God is on our side."

"We Want Peace in Our Country"

As I reached Bethlehem, I met a band of shepherds, wrapped in blankets against the wind, driving a flock of sheep. They followed the road toward Beit Sahur, where Arab families have lived for as long as anyone can remember.

The Arabs west of the Jordan River feel that they are a stateless people. Many are Christians, with strong ties to the West, but most are Moslems who have lived for centuries in crowded towns such as Nablus, Janin, and Hebron.

"First it was the Turks," said Farah Gjbarib, a Christian school principal. We walked over the fields where the shepherds watched by night on the first Christmas. "My father, who is now 85, was in the Turkish Army. He left the army and walked the whole way from Istanbul to Beit Sahur.

"Then it was the British. Then it was the Jordanians. Now the Israelis. Tell me, why should we pay for the sins of Europe? We want peace in our country. We want the followers of the three religions to live in peace in the Holy Land."

Weeks later I drove the coast road south, past miles of orange groves that give an allure of richness and fertility to the warm region. For 25 miles behind them, though, stretch the dunes and sandy wastes of the Gaza Strip, only half of which is arable. About 415,000 people live there—most of them exiles.

When Palestine was partitioned by the United Nations in 1947, the strip of coast centering on Gaza was designated as part of a proposed Arab state. In the war that followed, Egyptian troops moved into the Gaza Strip and held it, joined by hundreds of thousands of refugees streaming from Israeli-held areas. Israel seized the strip in the



Hub of commerce, culture, and congestion, Tel Aviv turns on its lights at dusk. Founded on beach sands by Zionist settlers in 1909, the city boasts the tallest building in Israel, the 34-story Migdal Shalom Tower, center, and apartments, condominiums, and houses sheltering more than 400,000 residents. Beside the Mediterranean rises the new Kaler Center, a shopping and tourist complex that will contain theaters, nightclubs, restaurants, and two hotels.

Absorbed in a book, an army corporal is oblivious of the rush-hour bustle and blare of Dizengoff Street, Tel Aviv's cosmopolitan main street. The soldier wears a *kippa*, the skullcap that characterizes Orthodox Jews.



1956 hostilities, but was forced by the U.N. to withdraw. For almost a dozen years U.N. forces patrolled Gaza's borders. When Egyptians brushed them aside in 1967, Israeli armor cut the strip in two and took control.

"Gaza is a knife pointing at Tel Aviv," an Israeli officer told me. "We would be fools to permit an enemy border to exist again within an hour's drive of the city."

Through it all, the refugees have been there, more than 170,000 of them living in eight camps, in poverty and misery of soul. They live off world charity and the UNRWA, the United Nations Relief and Works Agency for Palestine Refugees in the Near East.

An UNRWA official who has worked in Gaza since the beginning took me in his white carryall through the crowded, sprawling town to the sea. There, in cement-block shelters for miles along the beach, were the castaways of war, a vast and awful anthill.

What is life like at Beach Camp? I don't know. I can only tell you what one stare was like. We stopped by a "supplementary feeding station" to watch as children received bread, vegetables, and meat, scooping the food out of white bowls at bare wooden tables. I sat by a little girl, about 4, and she stared at me the whole time, without anger, without curiosity, without innocence, a haunting of the eyes I will never forget.

Life Mellows in a Historic Port

How different is Haifa!

"Ah, Haifa," says every Israeli, "our San Francisco. Even Solomon sang of the beauty of Mount Carmel, and is it not true?"

It is, indeed, a most beautiful landscape, a white city on a hill overlooking a curve of blue harbor, across to the old Crusader capital of Acre, north to the hills of Lebanon, and eastward along the wide, fertile Plain of Esdraelon. I enjoyed that splendid prospect one evening with Jules Kahn, a sabra, who works at the Technion, where Israel's young scientists are trained.

"You see the harbor there," said Jules, "and, just beyond, the fort? That is where the illegal immigrants came ashore before 1948, where the *Patria* went down with the loss of some 250 lives, where the British kept their

militant Jewish prisoners and executed many. But now an evening in Haifa is so peaceful that there is a saying: 'The British left 20 years ago; why is the curfew still on?'"

The modern buildings of the Technion spread over a slope of Carmel, breaking the soft sea of leaves.

"Almost all Israel's architects and engineers are trained there," Jules said. "The government pays most of the tuition. When you are a small country with few natural resources, the human resources become important. We have rocks and brains. We make cement from the rocks, and from the brains we hope to make a future."

"A Man Cannot Hate Forever"

A road winds over the highest ridge of the Carmel range toward Isfiya and Daliyat el Karmil, villages inhabited by Druzes, an Arab people of a distinct and secret faith. Although their belief has not changed in centuries, their way of life has.

"Now we are part of Israel, a modern state," said Kamal Mansour, a young leader of the Druzes. "Before, we had to postpone a trip to Haifa for a week if it rained. Now we worry if the bus is ten minutes late. We have roads, tractors, telephones, even medical clinics."

Unlike most of Israel's Arabs, the sons of Druzes serve in the Israeli army.

"Our lot is with Israel," said Mr. Mansour. "At some point a man must say to himself that he cannot hate forever."

The wide plain below Carmel reached eastward, greening in the sun, but as I followed it, the day darkened until a pounding rain enfolded me. I fell in behind a flatbed truck, inching its way toward Safad with a huge military tank aboard.

A friend in Tel Aviv had told me: "Safad? See Sarah. Sarah Pearl, the Mother of Galilee. She'll take care of you."

For generations Sarah's family has run a comfortable old hotel in the shadow of centuries-old olive trees. The instant she saw me enter—wet and cold—she raised her hands.

"Soup!" she cried. "Bring this man soup!"

As we sat near a small heater, she told me tales of her beloved town.

"This was the city of the great Jewish

Exile from a land she never knew, a Palestinian Arab child spoons a refugee's meal at a United Nations feeding station in the Gaza Strip. There 170,000 Arabs huddle in camps, having fled ancestral homes in other parts of Palestine during the 1948 conflict. Their destiny—repatriation or resettlement elsewhere—hinges on an Egyptian-Israeli peace treaty.





mystics," she said, "the rabbis who understood the Kabbala, the Secret Wisdom—men like Joseph Caro, who compiled the great code of laws that still rules Orthodox Jews throughout the world."

The next morning, before dawn, I walked through the lanes and down the many steps to the old synagogue where Joseph Caro worshiped and wrote. Its stark white walls are trimmed in blue, its dome ornamented with paintings of palm trees. Inside, eight men were waiting for two others to arrive so they would have the necessary ten to begin the traditional predawn prayers. They were old men, wrapped in worn shawls.

"The story is told," one said to me, "that in this very synagogue there were eight men waiting, just as we are. Two strangers came to the door, and the ten prayed. Afterward, the Lord made it known that the strangers were Moses and Elisha."

It was the kind of tale not impossible to believe in Safad, where the wind whispers on the mountain and a moon sails trimmed in cloud. This mystical quality has attracted to the town some of Israel's best artists, and others who deal in kitsch—mediocre, fast-selling canvases of the Wailing Wall, a dancing rabbi, a venerable Jew with a wrinkled face. They live in the old Arab section, a maze of lanes and attractive stone houses.

Child of Dachau Remembers His Mother

"Most artists live there in the quarter," said Sarah, "except Arie Eckstein. He's different. He spent too long in a concentration camp. You never know how he feels in the morning. Let's find out."

We followed a rocky path to a poorer section of the city and knocked on a blue door. A sleepy man invited us in, leading us past a portrait of King Hussein of Jordan. How come, I wondered.

"A souvenir from the war," Arie said. "Whenever I dug my foxhole, I used to put it up facing the enemy."

In his upstairs studio and bedroom, we looked through stacks of canvases until his hand stopped at one, a brown portrait that glowed like an icon: a shrunken woman in a black dress looking out with a face of

unutterable sadness and wisdom, her body foreshortened, like a powerful and terrible and beautiful caricature.

"My mother," he said. "She went to the gas chamber at Dachau. Afterward, I found I had no picture of her. So I painted this, as I remembered her."

Picture Windows in a Wall of Steel

On a gray, windswept morning I finished my Sarah-supervised breakfast and followed the lofty road north along the Lebanese border. A double fence paralleled the road much of the way, cut occasionally by a military road and marked by border signs. Nothing moved in the quiet fields of Lebanon, stretching away into the mist—the haunt of Palestinian commandos who were then lobbing Russian-made Katyusha rockets across the border almost nightly.

In the town of Metulla, Israel's northernmost settlement, a young girl showed me the way to the mayor's house, a pleasant cottage with an unusual adornment: a wall of steel plates enclosing the side toward Lebanon.

"Sniper fire, from the hill over there," said Mayor Assaf Fraenkel. "You see those squares cut in the steel? My wife insisted on them, for the view. I told her that in four or five years she might enjoy the view without being shot, and she told me that in four or five years she might not be alive anyway. So we made the windows."

Later we walked in a slight drizzle along the border, two paved roads separated by a fence (pages 854-5). On the other side, an occasional patrol car filled with Arabs roared by at high speed.

"This has been a frontier town since Jews settled it 75 years ago," Mayor Fraenkel said. "The land was ruled by the Turks then. After the first World War it became part of Palestine, then, in 1948, of Israel."

On the Lebanese side, two girls came out of a house to watch us. The mayor waved.

"Many families over there used to work in Metulla," he said. "They lost their jobs, and we lost our best fields when the fence went up. When things are normal, we chat together."

"When are things normal in Metulla?" I asked.

Guardians of an unchanging faith, a Druze elder and his grandson perpetuate beliefs that forbid converts or marriage beyond the sect. Only a few *uqqals*, or "sages," have full knowledge of its scriptures, which draw on several Mid-East religions. A tradition of heeding prevailing authority permits the Arabic-speaking Druzes, some 36,000 strong in Israel, to serve in the Israeli army.



"There are occasional outbreaks of peace," he said wryly.

Below Metulla, the Hula Valley's velvet fields spread a vision of peace. Once a broad swamp, the valley was drained by the Israelis to create some of the most fertile farmland in the Middle East, much of it now occupied by flourishing kibbutzim framed in glistening fishponds. To the east abruptly rise the Golan Heights, a platform of volcanic rock bordering 40 miles of upper Galilee.

For years these 1,000-foot heights were a shooting gallery for Syrian troops target-practicing on Israeli farmers below. In two days of bloody combat in 1967, the Israeli army mounted and cleared the heights as far as El Quneitra, 35 miles from Damascus.

I was escorted up the steep road by an earnest young lieutenant named Orit.

"That means 'Radiance,'" she said. "The

Americans don't give their girls such names."

I admitted that all of the Prudences, Charitys, and Patiences I had known did not quite equal a Radiance. I also felt a little odd, as grizzled old US 25043516, to be led up into a wide valley of death by an officer named Radiance.

Military trucks lumbered toward Nahal Golan, a small border post manned by a group of enthusiastic young people. Automatic rifles bristled from its perimeters, and a patrol coming in after a long night's walk looked square-jawed, impassive, beat. Yet the corrugated iron walls that shielded every barracks were festively painted with flowers.

Each Nahal—an acronym for Pioneering Fighting Youth—is a paramilitary unit manned by "seed groups" called *garin*, young people trained in warfare and agriculture.

The commander of Nahal Golan, a burly



With a lighthearted sendoff from their messmates, soldiers at Nahal Golan leave to patrol their fortified farm on the Golan Heights. Members of the Pioneering Fighting Youth, or Nahal, fulfill their military obligation by setting up agricultural communities in areas too dangerous for civilians. In the kitchen (above) an immigrant-soldier cooks potatoes and meat.

Formerly vulnerable to Arab snipers, fields and fishponds of the Hula Valley (left, upper) slumber at sunset, seen from a Syrian bunker destroyed when Israeli troops stormed the heights during the waning hours of the six-day war.



redhead named Avie, invited us to have a look at the sheep. We went out, looking for the flock—"Not that way," said Radiance, "that way is mined"—and found them wandering among ancient rocks tended by two khaki-clad shepherds in combat gear.

"Being a shepherd gives a man time to think," the one named Moishe said. He sat on a rock, unslung his UZI, an Israeli-made sub-machine gun, and balanced it on his knee.

"That's an odd staff for a shepherd," I remarked. He shrugged.

"I suppose you saw in the papers last week. The terrorists grabbed a civilian who was driving along the road over there. They cut his head off and took it back to Syria."

"You came to see the spirit of Israel," said

a red-haired girl who had accompanied us. "This is where it is—not in town."

"For most young Israelis," Moishe added, "the old pioneering dream is fading. They want to be part of the modern country, not the pioneer country. But we are *garin*. When our service is over, we will seek out places to settle in the desert, in the hard country."

In the chill evening I came down from the Golan Heights and passed through Dan. Near a small village I found in my road a company of soldiers carrying automatic weapons and plenty of ammunition. I didn't ask where they were going, but at the fall of night they moved out northward and disappeared into the melting landscape.

There was one certainty. If there was a



casualty, a telephone would ring that night in the home of Prime Minister Golda Meir. By her own order, she is notified of every Israeli casualty, dead or wounded, as soon as it happens, at any hour. I wondered how many times her sleep has been broken—and what would happen if every head of government issued that order.

Some days later Mrs. Meir received me in her simply appointed office. We talked about the Arab-Israeli conflict.

"There should never have been wars here," she said. "There are so many things in the Middle East that could be done with cooperative development. We would gladly cross borders, not with tanks, but with tractors.

"But one side cannot make peace. As soon

Cordon between countries, a barbed-wire fence lines the border between Israel and Lebanon. In the calm of day, Arab motorists pass Israeli strollers. But under the shroud of night, shots may ring out between the jittery patrols of both nations.

as the 1967 war ended, we said to our Arab neighbors, 'We must sit down together and talk peace, meeting as equals around a table, and reach an agreement on secure, recognized, and agreed borders.' But thus far, there has been no answer."

We drank sweet tea and Mrs. Meir spoke to me about Israel and its meaning to her.

"History taught us well that we could not be choosers. We found here bare hills and rocks and wastes. They are matched with the people who came to us—those who came from the Moslem countries after the '48 War of Independence, those who came from the Nazi concentration camps, broken in body and spirit. There was not enough to eat. Sick and in rags, no skills, facing the hard land. Now they are excellent farmers. Their children walk with dignity. In wastes like the Negev, the second-class citizens from the ghettos of the world, an unwanted people, met an unwanted land, and they both bloomed."

Mantle of White Cloaks Ancient Walls

Now spring was coming again to this land called Israel. The people of the kibbutzim were mounting their armored tractors to turn the rich earth of the great valleys. On the hillsides of Samaria and Judaea, almonds would soon be scattering white blossoms and the pale olive would be turning its leaf with the wet wind. In the Arab towns, shepherds in loose robes would drive flocks to pasture where rusting tank tracks curled like spent skins. In Gaza, the children would gather in the only world they knew, spooning porridge and staring at the newest tall, pale stranger. In the Sinai the heat would warp the red mountains and the Bedouin would gather as ever in the shade of the palms, immune to history.

But in Jerusalem, one last storm of the dying winter came silently by night, and the snow breathed against the old stone houses. In the morning I awoke and looked out upon a city vanished in flakes, and heard from the Mount of Olives the sound of bells muffled, and gave thanks for one moment that men might call peace. □

Apollo 16 Brings Us Visions From Space

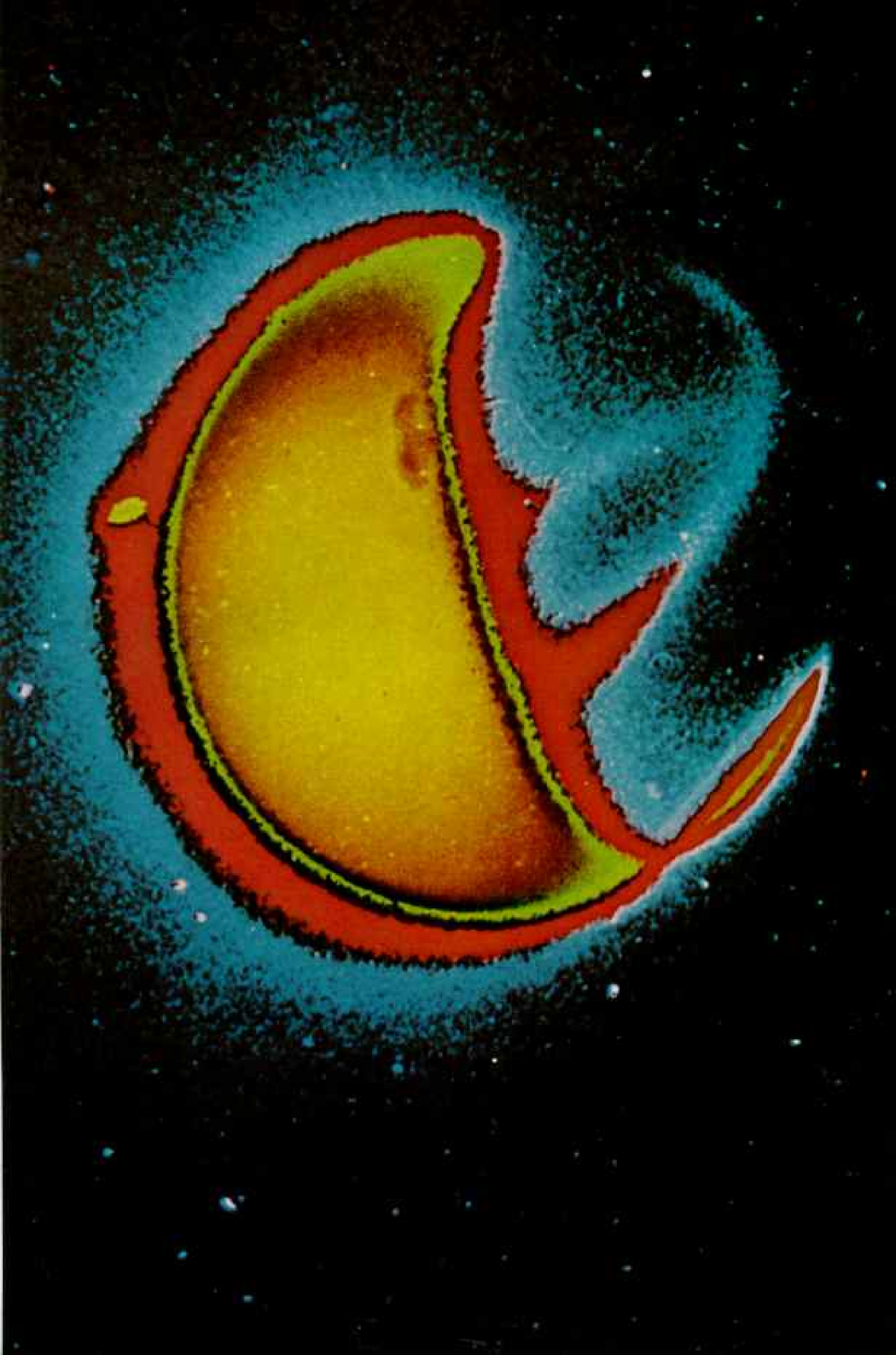
IN THE VASTNESS of the heavens lies beauty in abundance. Man has honed his skills as a space traveler, and each lunar voyage now returns with aesthetic as well as scientific cargo. A record haul from the April flight of Apollo 16 produced this unearthly portrait of our planet glowing like a psychedelic vision in a color-enhanced ultraviolet photograph made from the moon. Sensitive to radiation unseen by the human eye, the camera recorded oxygen levels surrounding the earth at various altitudes—a new look at the upper atmosphere that could benefit communications and help measure long-term effects of air pollution.

Scientists added color to black-and-white photographs to enhance differences in the brightness of the oxygen glow. Reacting to the sun's ultraviolet radiation, oxygen atoms fluoresce, appearing here as a cloak of gold closest to the earth's surface, where the life-sustaining gas lies heaviest. As it thins with altitude, oxygen appears green, red, and finally blue. On earth's night side the gas shows blue in two intersecting arcs over the Equator—a phenomenon scientists do not yet fully understand.

An aurora shimmers over the south magnetic pole, extreme right. Stars dot the film; one appears as a bright yellow lump on earth's left side.

855









EARTH'S CORONA, a halo of hydrogen, flares some 16,000 miles into space in a 15-second ultraviolet photograph made through a lithium fluoride filter. Blue, red, green, and gold represent increasing concentrations of the gas. Longer exposures show that the geocorona extends to 100,000 miles. Breakdown of water vapor from the oceans sends hydrogen drifting far above the planet, while heavier oxygen remains closer to the surface. Many scientists now believe that the separation of water vapor into its two elements, rather than photosynthesis in plants, may be the major source of the earth's oxygen.

Dr. George R. Carruthers of the Naval Research Laboratory in Washington, D. C., developed the electronic camera that registers only ultraviolet light. Here it rests in the shadow of the lunar module (below), safe from damaging heat. Astronaut Charles M. Duke, Jr., stands between the module and the lunar Rover. In 180 exposures the camera recorded not only earth's atmosphere, but also distant stars, the solar wind, and possibly intergalactic hydrogen, whose presence, some scientists believe, would increase the known mass of the universe tenfold.



JOHN W. YOUNG (APRIL 11, 1968)





GNATLIKE at 70 miles above the pocked moonscape, the lunar module rises to rendezvous with the command ship to begin the long journey home for Apollo 16 (preceding pages). Blunted crater edges on these highlands west of Mare Smythii date the area as one of the oldest exposed lunar surfaces. Some four billion years ago, a meteorite blasted out 22-mile-wide crater Schubert B, appearing beneath the module. A "fresh" excavation, the bright splash at upper right, took place millions of years ago.

Alone in orbit for three days as his companions explored the moon's Descartes highlands, Thomas K. Mattingly II described his scanning of the intriguing lunar surface as a time of "sheer exhilaration."

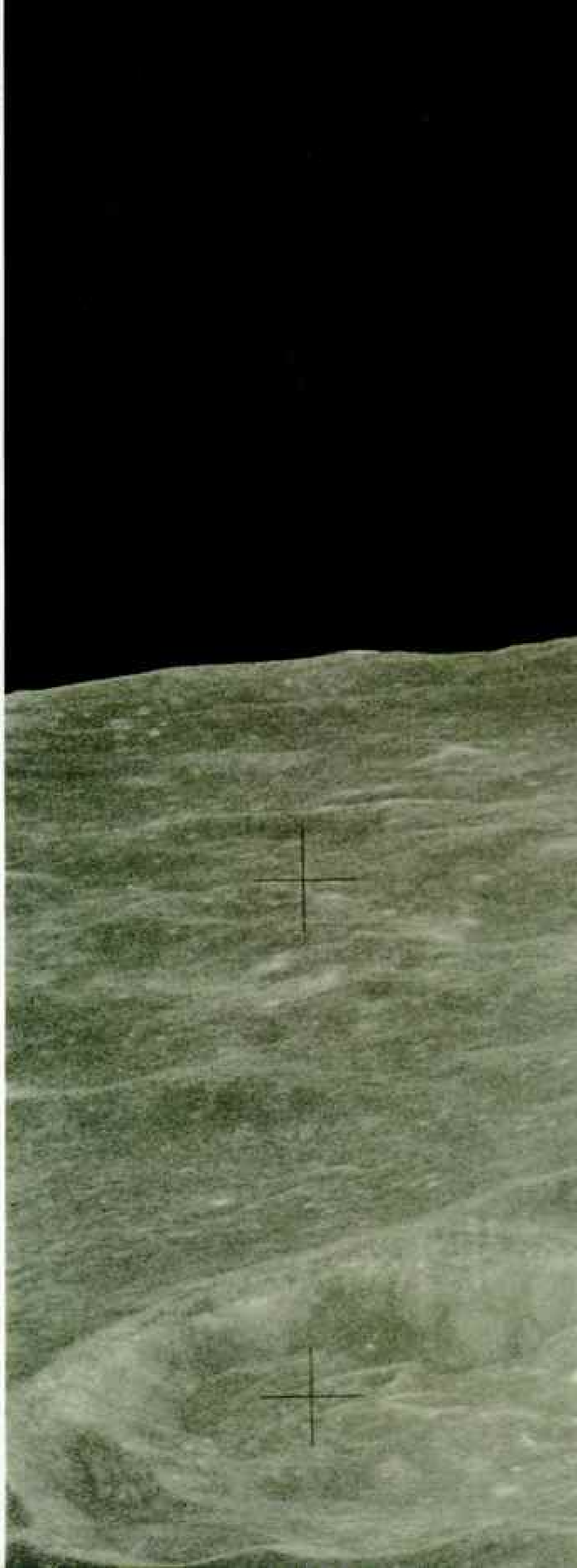
THOMAS K. MATTINGLY II

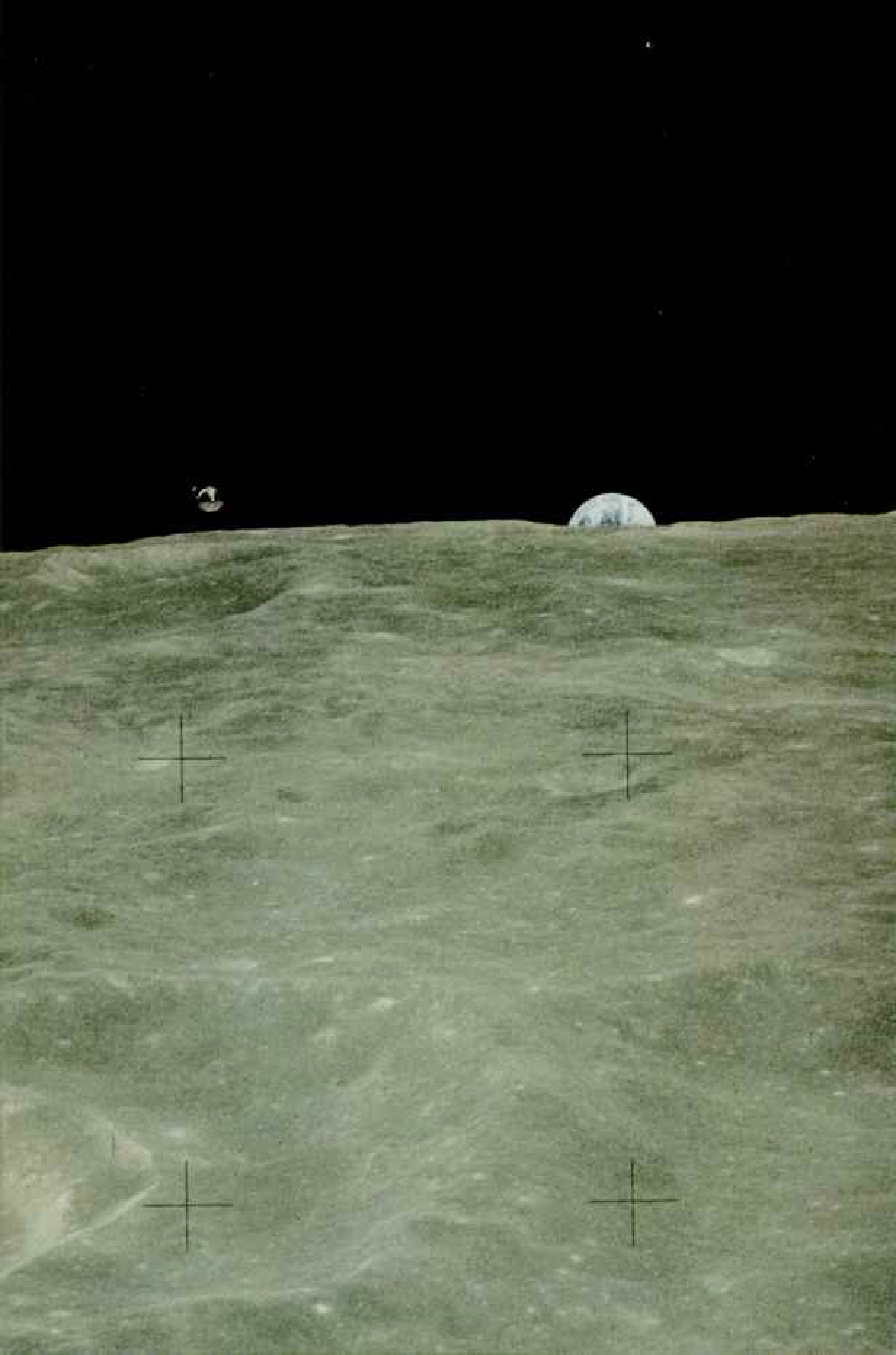
EARTHRISE LIFTS a marblelike orb over the moon's scarred highlands east of Mare Smythii. Photographed from the lunar module as it prepared for its landing, the command ship gleams as it drifts toward the horizon. On billowing terrain in the foreground, a meteorite perhaps a quarter of a mile in diameter has gouged a 12-mile-wide crater into the rim left by an earlier impact.

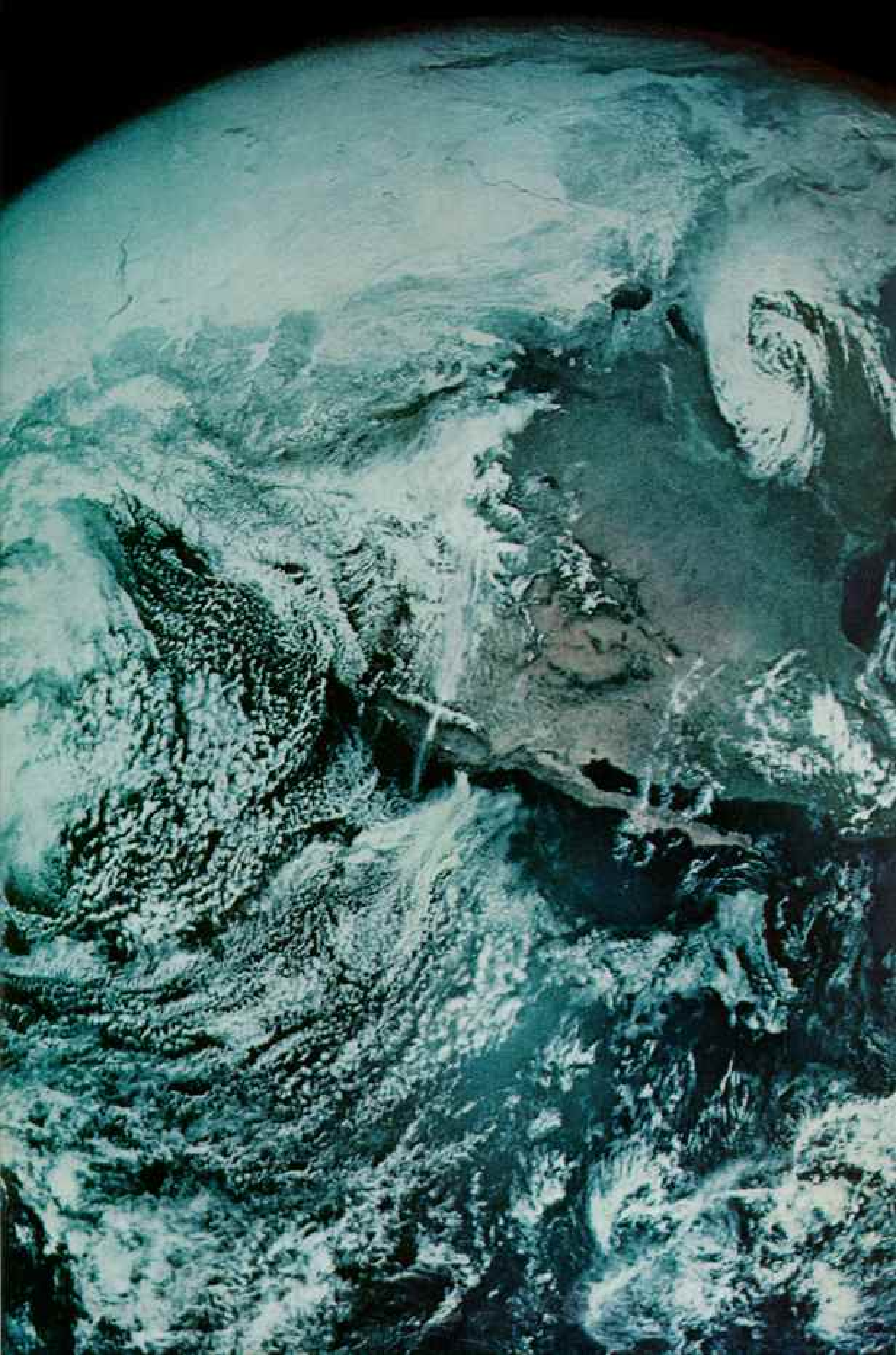
The scientific treasure hunt in the Descartes highlands brought surprises to Astronauts Duke and John W. Young. They had expected to find volcanic rocks in the material known as Cayley fill that overlies many highland depressions. Lava samples would have supported arguments that molten rock once seethed in the lunar interior, spewing occasionally to the surface early in the moon's history. Instead, the ninth and tenth men on the moon found breccias—fused rock fragments—suggesting that ejecta from massive meteorite impacts formed the Cayley fill.

"Each mission not only yields an enormous amount of information about the moon's history, but also poses new questions," says lunar geologist James Head.

JAMES H. HEAD









CLOUD CURTAINS PART for a rare unveiling of North America, photographed from 10,000 miles.

"The earth is the most beautiful sight in space, with all its colors of land, seas, and clouds," said Astronaut Duke. "Looking at it against the blackness of space was almost a religious experience for me."

"There's not a scene on the moon that carries the emotional impact of watching your earth shrink to a little ball," added Mattingly.

On this unusually clear day most of the United States and Mexico can be seen, from Florida to Baja California. Shallow seas around Cuba and the Bahamas shine light blue against the darker, deeper water. The Mississippi River Valley traces a pale line through southern woodlands toward the huge delta bulging into the Gulf of Mexico.

North of the Great Lakes, scattered cloud cover gradually merges into solid-white polar ice. Spring thaws have rent cracks several miles wide in ice at the east shore of Hudson Bay and along the west edge of the Queen Elizabeth Islands in Canada's north.

Erosion has left little visible evidence of the earth's early development, a reminder that the moon's less-abraded face may hold the keys to our own planet's history. □

THOMAS H. MATTINGLY II





FROM THE BAHAMAS
TO BELIZE

Probing the Deep Reefs' Hidden Realm

Article and photographs by
WALTER A. STARCK II, Ph.D.
and JO D. STARCK

ABOVE US HANGS the vast, crumpled mirror of the ocean's surface. Below, shadowy depths cloak both beauty and danger. In scuba gear we begin our descent to explore the waters near Cozumel Island, off Mexico's Yucatán Peninsula.

We soon spy a foraging shrimp (left). On stickpin legs it picks its way around an anemone's trunklike tentacles, finding both shelter and food. In return, it may help free the polyp of parasites and debris.

Supported by National Geographic Society grants, we are investigating life-forms on the outer edges of clifflike Atlantic reefs, where sheer coraled faces can plummet from the shallows down thousands of feet to the sea floor. On these deep reefs, a murky world between day and night, rocky maws fanged with corals harbor a fairyland of colorful, varied, and tightly interrelated animals.

Deeper, deeper we plunge, ever aware of our increasing peril. Divers rarely venture below 200 feet; we are bound for twice that depth, where water pressure magnifies the danger of nitrogen narcosis and the painful, sometimes fatal, bends. To minimize our risks, we use new electronically controlled gear and a nitrogen-free breathing mixture. Will our equipment, tested in shallower water, hold up in the deepening gloom?

Gauges now confirm our confidence—350 feet down, and not a trace of trouble.

SHRIMP, THEIR AMBIENT IS LESS THAN 6% O₂ AND
ANYMORE, UNOXYGENATED





CONY, *COPALOPHILUS FULVA*, 10 INCHES LONG; DAVID BOURLET
 REDDIE GOURON, *SPONGOPHILUS SYMPHYLIS*, 2 TO 2 1/2 FEET LONG; BATES LITTLEHALL



SCARLET WEDGE between a pair of sponges, a coney sits out our intrusion into its home waters, 200 feet down off Andros Island in the Bahamas. Changing with age, this juvenile will pass into female and then male stages. Occasionally found in waters as deep as 500 feet, it dines mainly on crustaceans.

Its relative, a Nassau grouper, fins above my wife, Jo, as I—wearing a football helmet for a light mount—take a picture (above). Beneath Jo, growths of lettuce coral bespeak nature's intricacies. Algae living in the coral tissues give off life-sustaining oxygen in return for the carbon dioxide they need in photosynthesis. This extra oxygen, added to that already present in the water, spurs rapid growth of the coral and thus makes possible the formation of ever-enlarging reefs.



Again and again we plumb coral bastions from Andros to Cozumel to Lighthouse Reef (map). Everywhere we find subtle interrelationships, creating a symphony of life, orchestrated to nature's beat.

LIKE ANCIENT POTS spilled from a drowned ship, tube sponges bulge eerily on Andros Island reefs. We learn that these natural casks are sea creatures' homesites. A brittle

star and a spider crab share one host's cavity (upper left), while snails and sharknose gobies find security in a funnel sponge (lower left). A similar snail-sponge relationship has been found in

SPONGES, VERMUDA, BELOW AND RIGHT, ABOUT 6 INCHES ACROSS



FUNNEL SPONGE, ABOUT 6 FEET DEEP, UNIDENTIFIED



fossils formed 200 million years ago.

Crusty-looking colony (below) attracts another sharknose goby, lower right. Sedentary animals, sponges cement loose, dead parts of the reef

together, thus providing protection against rapid decay. A sponge filters out microscopic food by drawing water through tiny pores in the body wall and expelling it through the top opening.

DAVID DOBROLET







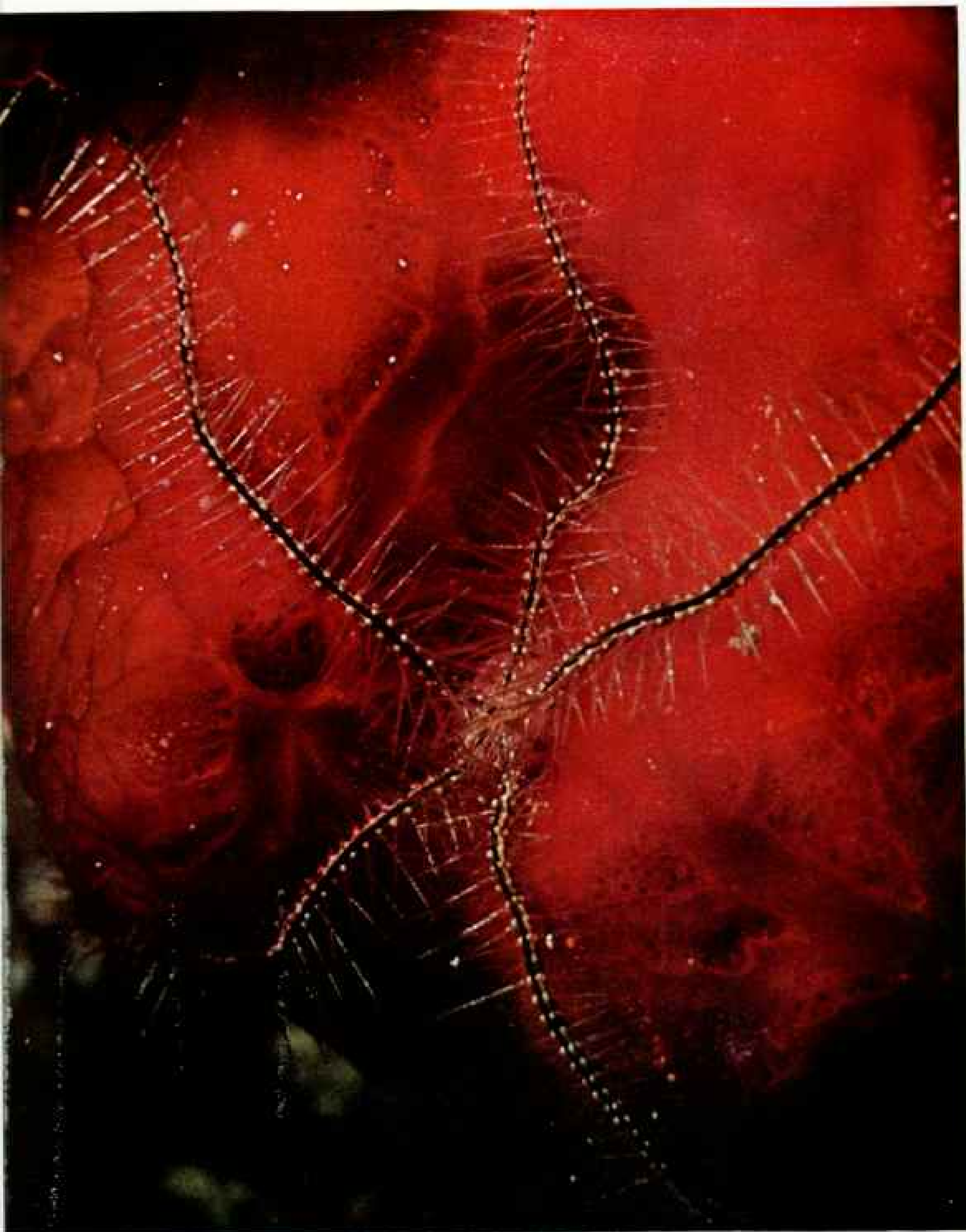
MINIATURE SIGNALMEN, cleaner shrimp rely on gestures to get their daily bread (left).

Perched on an anemone at Andros, they are unharmed by its globular-stinging batteries, which protect them from predators. Thus poised, the shrimp rock from side to side, long white antennae waving like semaphores. Soon we see reef fishes flock toward them, not to feed but to be freed of parasites.

Bunched up for service much like drivers at a car wash, the fish are rapidly boarded by their tiny benefactors. A red hind calmly watches one ten-legged forager at work only an eyeball away (below). After stripping the gill cover of pests, the shrimp may even venture within the fish's mouth to pick at its teeth. Fish with wounds or open sores receive a particularly thorough cleaning, and may heal faster as a result. When sated, each shrimp returns to the anemone, leaving uncleaned fish to seek another shrimp station.



SHRIMP, *PERICLIMÈNES PEDERSONI*, NOT MORE THAN 1 1/2 INCHES LONG;
RED HIND, *SPHINXPHILUS SUTTERI*, TO 14 INCHES;
BOTH PHOTOGRAPHS BY DAVID DOUBLET

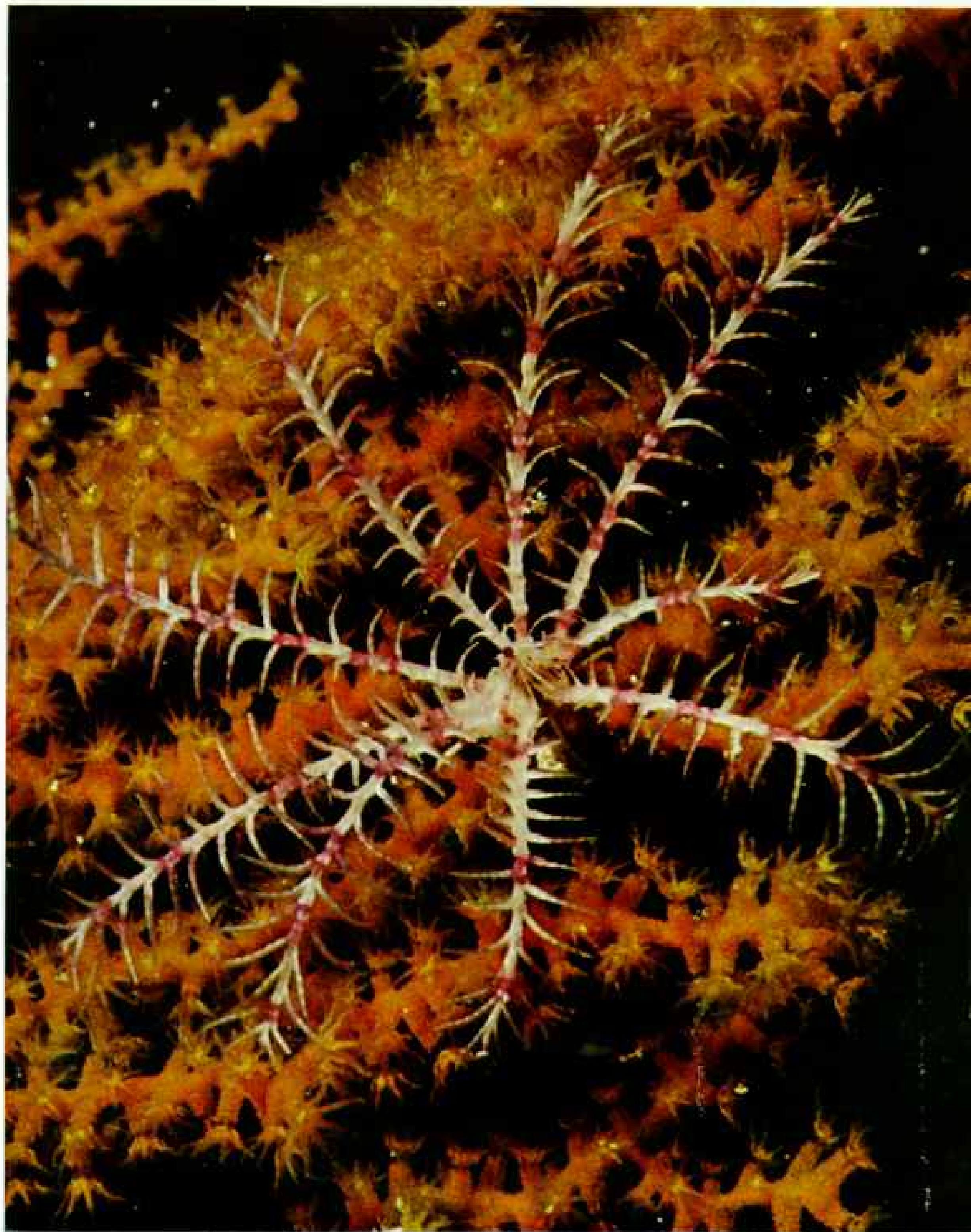


BRITTLE STAR, *OPHOURETTA SUENNINGI*, 4 TO 5 INCHES ACROSS

GALAXIES of echinoderms gleam throughout the reefs. At Cozumel a spine-laden brittle star (left) lazes atop a brilliant sponge. Jellylike mucus on each of the starfish's arms traps food, and delicate

tube feet transport it to the centrally located mouth on its underside.

A Bahamas feather star (right) has lost one of its ten barber-pole appendages. Unlike most of its kin, the plankton-eater has its



VERTICAL STAR, *BRACHIDONMETER BRACHATA*, ABOUT 2 INCHES ACROSS, SEA FAN, *WILKINSONIA WILKINSONI*

mouth situated atop the hub. Related to stalked "sea lilies," life-forms that attach themselves to the ocean floor, the mobile creature can slowly creep over rocks or swim by waving its arms. This one, however, has

snagged onto a sea fan. Thus anchored among its host's stinging tentacles, it leads a settled life. The flexible fan has a skeleton formed of hard, tiny particles imbedded in its soft, richly pigmented tissue.



SPIDER CRAB, WALLAG, 1/2 INCH ACROSS



PURPLE CRAB, PORCELLANA

NEEDING FRIENDS to survive, a small spider crab of the Bahamas finds camouflage in a red canopy of living sponges it harvested and fixed to itself (**left**). It scavenges bits of plankton that cling to its feather-like host, a black coral. Highly polished trunks and branches of similar black corals in Hawaii have long been prized for jewelry.

A porcelain crab shuns disguises for the protection of a larger hermit crab, partly visible (**below**). They share a shell off Cozumel. The polka-dotted

pygmy, found only in the west Atlantic, dines on its big buddy's leftovers.

Nearby we watch an ebony-and-blue sea snail (**below**) glide over shallow reefs as it searches for food. Far deeper, 300 feet and below, lives a more primitive type (**bottom**), whose rare shell may bring as much as \$500 from a collector. We found several of this species near Andros Island, and believe that this specimen was the first ever taken alive by divers. It survives from a generally extinct group of snails at least 200 million years old.



BAHAMA, UP TO AN INCH IN DIAMETER. HERMIT-CRAB, PETROCHIRUS BODÉNÉUS



SEA-SNAIL, COYNA MACULOSA, ABOUT 1/2 INCHES IN DIAMETER



SEA-SNAIL, PLEUROBRANCHIUS SPANDESMANUS, 1/2 INCHES IN DIAMETER





HEART OF ANY REEF, corals provide a firm base and hiding places for kaleidoscopic life-forms. Hard corals are the sea's masons, ever building a skeleton that becomes the reef and supports other growths. Some corals, however, leave no lasting structure when they die. Such is the delicate, lacy soft coral we see off Andros Island (**left**), whose branches harbor crabs, shrimp, and small fish. As far as we could determine, this deepwater species had never before been photographed in its natural state.

Also in abundance here is brain coral (**below**), its deeply furrowed skeleton sheathed in thin tissue. We see another deep-reef variety, a single giant polyp (**bottom**). Hairlike cilia covering the upper surface urge food particles into its barely visible, slitlike central mouth.

SOFT CORAL, *SIPHONALICES BRANCHI*, ABOUT 1 FT. DIA.



BRAIN CORAL, *MEANDRINA MEANDRITES*, ABOUT 4 INCHES IN DIAMETER



GIANT POLYP, *BOULYRIA*, TO 4 INCHES IN DIAMETER



FAIRY BASSLET, SHARMA LORETO, TO ABOUT 3 INCHES LONG

BLAZE OF RAINBOW HUES and brilliant patterns splashes most reef fish, from shoreline swimmers to those at the ocean bottom. The fairy basslet (above) and blackcap basslet (right) are but two of the many small, lustrous relatives of groupers. Both feed on plankton.

Common throughout the West Indies, the fairy basslet thrives in shallows or in deep water down to 200 feet, where it swims with its belly toward the nearest wall or overhanging ledge, and thus is often seen upside down.

Only slightly larger, the blackcap uses bulbous eyes to navigate and select food near Cozumel. This magenta beauty occurs most commonly below 100 feet, prowling the plankton-rich waters at the reef's outer drop-off. Here, too, sharks and razor-toothed barracudas lurk. Luckily, they ignore us and we feel accepted, as if we ourselves are a part of the reef.





BLACKCAP BASSETT, *SPHAERAMIA ORBICULARIS*, TO ABOUT 6 INCHES LONG

PULSING like miniature hearts, vase-like tunicates (below) draw water through a large fringed opening and expel it from the side. A natural net within each animal filters both planktonic food and oxygen from the water. The translucent sea squirts shrink from my touch with startling speed, expelling water in twin jets as they



contract their bodies to close both apertures.

Tunicates span the gap between vertebrates and invertebrates. They are more highly evolved than corals, sponges, or even crabs. In their free-swimming tadpolelike larval stage, each has a notochord, a primitive precursor of a backbone. This feature brands the animal a member of the Chordata, a group

including man, fish, and all other vertebrates. Some tunicates remain free-swimming throughout life, but most become sedentary as they mature, sprouting rootlike runners with which they anchor to any firm support. Some species aggregate in dense clusters (below), attaching to each other as well as to mangrove roots or sponges.

TUNICATE, CLAVELINE (LEFT); THREE LIFE-SIZES, UNIDENTIFIED (BELOW), LIFE-SIZE





ANIMALS that resemble plants, hydroids and gorgonians rely on branched networks of polyps to filter plankton from the sea.

A hydroid found in Andros Island waters (**right**) splays branches loaded with white pin-shaped polyps. When the animal dies, only the horny branches are left. Scientists have known of such remains for centuries, but only recently began collecting live specimens to study their true appearance.

A gorgonian's eight-tentacled polyps provide camouflaging shelter for a slender file-fish (**above**) as it waits for passing prey. Named for the rasplike dorsal spine behind its head, this Bahamian shallows swimmer feeds mainly on tiny crustaceans and other minute invertebrates.







YELLOWFACE PIKEBLENNY, CHASMIPIS LIMBICHINI, TO 3 1/2 INCHES LONG

LEANING TOWER OF SAND sheathes a yellowface pikeblenny near Cozumel. This finned carnivore commandeered the mucus-cemented tube from its builder, a segmented marine worm. The camouflaged fish darts out to snare passing larvae, crustaceans, or small fish. Its reclusive habits remind us that nature yields its secrets only grudgingly, and that many deep-reef puzzles remain. But this twilight undersea realm is no longer totally unknown to man. We have made a beginning. □



Many happy returns this Christmas.

That's what you'll be giving with KODAK Prepaid Processing Mailers. They're an easy way of getting color processing by Kodak.

Just slip the exposed Kodak color film in the mailer envelope. And mail it. Kodak will process the film. And return the color prints, slides, or movies by mail.

So wish someone many happy returns this Christmas. With some Prepaid Processing Mailers from Kodak.

Kodak makes your pictures count.



**No one in Spruce City
can tell Mrs. Johnson from
her 18 year old daughter.**



That's because they play together every night—you should see them. Mother Johnson plays a Broadway hit, and daughter Betsy plays audience. Then, they reverse. Betsy plays a Beatles song, and Mrs. Johnson plays music critic.

Betsy presses a button, and she sounds just like a funky bass guitar. Mrs. Johnson presses a button, and she sounds just like a mellow Dorsey solo. Then, they reverse.

Mother presses another button, and electronic mambo rhythms back her up. Betsy hits another button, and electronic rock effects give her a beat. Sometimes, you can't even tell who's playing what. But you should hear them.

There's a Yamaha Electone Organ for every family. And whatever generation you're from, it's incredibly a lot of music for an inspired little price. See your nearest Yamaha dealer. Even if you don't live in Spruce City.



YAMAHA

International Corporation, Torrance, Calif. 90501



Ask about the Yamaha Music School, a uniquely rich educational experience for children four to eight.

**THIS CAMERA WILL DO THINGS
THAT UP TO NOW YOU'VE ONLY SEEN
AT THE BIJOU.**

Because it has a
long-range
10-1 zoom lens.

Because it fades-in
and fades-out scenes
at the push of a button.



Because it
has three filming
speeds, including
slow motion.

Because it has virtually all
the features you'd expect to find
in a big, professional camera.
Except one thing. The big, pro-
fessional price.

gaf[®]

We put 130 years of photographic experience into everything we make.



Everyday Life in **BIBLE TIMES**

Relive the thrilling days of Abraham, Moses, David and Solomon, Jesus and Paul. Watch Sumerians, Egyptians, Hebrews, Assyrians at work, at war, and at play. This highly popular volume brings you a clear new perspective of the great civilizations of Bible times... a deeper understanding of the Bible itself! 448 pages, 528 illustrations (412 in brilliant color), and a large wall map that shows the Bible lands both as they were and as they are today.

\$9.95, plus postage and handling.

Order from **NATIONAL GEOGRAPHIC SOCIETY**
Dept. 60, Washington, D. C. 20036

This adventure classic is not for everyone

But if you happen to be one of the vanguard who blaze a wide trail to the summit of life, read on.

Only a few are willing to reach out and grab all that life can promise. The exhilaration of competition. The excitement of travel. Doing a thousand things others never even dream of. Doing them because they are there to do. Making an adventure out of business and a business of adventure. Negotiating a contract and a cascading river on the same trip. Celebrating a sale by stalking big game on the high slopes.

It takes a special kind of man to put this all together. And a few years ago, Beech Aircraft introduced the airplane designed for this man. To help him put it all together. A classic airplane for the classic American entrepreneur. The magnificent Beechcraft Duke.

A Duke is much like the man it appeals to. At first glance, you'd think it was born and raised in a metropolitan terminal. But it roams the wild country like a native. Rugged and ready for unimproved fields, mountain strips, and over-water, over-weather activities that are not meant for less hardy types. It's a pilot's airplane for a man's man. Penthouse sophistication in a rugged frame. Tireless energy to roam the continent. And the most handsome profile in the sky.

If adventure turns you on, try turning on twin engines and let 760 horsepower lift you to new heights in pressurized, air conditioned comfort. If you get a charge out of being in control, get your hands on the controls of a Beechcraft Duke. Almost 60% of all Dukes are owner-flown by business and professional men. Men who expect more out of life. And get it.



See your Beechcraft Dealer now. Tell him the Duke sounds like it might be your kind of airplane. But you want proof. Make him show you why it is truly an adventure classic. One of the vanguard.

If you can't get to your Beechcraft Dealer right now, you can at least take the first step by sending for the free Beechcraft Adventure Kit we have for you. Just use the un-coupon below.

THIS IS NOT A COUPON!

It's sort of an un-coupon. If it isn't a crime to cut up a page in National Geographic, it ought to be!

However, we have a dandy gift for you, and we'd like you to send for it. Now!

SEND FOR YOUR FREE ADVENTURE KIT. You'll get one of the most fascinating maps of the U.S.A. you've ever seen. Anywhere. Really a fun and adventure chart to set you free from the dull routine. A special calculator in the kit shows you how close each adventure is in pleasant hours of Beechcraft flight. Everything you want to know (almost) about flying is answered in this interesting gift kit exclusively for readers of National Geographic. **WRITE ON YOUR LETTERHEAD TO: Beech Aircraft Corporation, 9721 E. Central, Wichita, Kansas 67201. Ask for the Beechcraft Adventure Kit. Give us your name, address, occupation. Pilot? Aircraft owner? Thank you!**



**One winter
33 years ago people
in Phoenix
actually saw snow.**



It was one of those rare winter days when it was too nippy for swimming and golfers had to put on a sweater.

But then, we're spoiled here in Phoenix.

When it's slushy in the East, we're basking under the warmest, driest, sunniest skies in the United States.

Take this month, December. You can expect every day to be sunny and the temperature absolutely delightful.

The last time we had measurable snow in December? Never in recorded history.

Will we be seeing you this winter?

Write now for your free copy of "Phoenix — Everything Under the Sun."

phoenix
IT HAS EVERYTHING UNDER THE SUN

Phoenix Metropolitan Chamber of Commerce
805 N. Second Street, Dept. 140, Phoenix, Arizona 85004.

In the Nation's Capital

VISIT EXPLORERS HALL



SEE THE GIANT STONE HEAD of the lost Olmec civilization . . . two globes crafted by America's first globemaker . . . the tattered U. S. flag that accompanied Peary on his Polar expedition . . . the balloon gondola that held a record manned-flight altitude for 21 years . . . the largest unmounted globe in the world, and other fascinating exhibits of National Geographic researches and explorations. Explorers Hall is open every day but Christmas at the NATIONAL GEOGRAPHIC SOCIETY, 17th & M Streets N.W., Washington, D. C.

In the image of Nikon...

Photograph by Joel F. Zilber



There can be no mistake, it is a Nikon image. The distinctive imprint is there. The emotional impact, the memorable composition, the sheer optical superiority. Wherever there are great photographs, there are Nikon images. For Nikon images are synonymous with great photographs. Even when made with other fine cameras. For such is the significance of this surpassing camera. It has literally reshaped the face of photography in the past decade. Its technical superiority is established. The variety and size of its optical system is unsurpassed. But, most of all, it is the one camera which has transcended the optical-mechanical mechanism and become an integral part of the photographer's eye. Nikon Inc., Garden City, N.Y. 11530.  Subsidiary of Ehrenreich Photo-Optical Industries, Inc. (In Canada: Anglophoto Ltd., P.Q.)



The easy-to-use fine camera. For Niagara Falls, Grand Canyon, Chinatown



and Sesame Street.

A Minolta SR-T 101 makes it easy to get a little creative between vacations.

To set shutter speed and lens opening, simply align two indicators in the viewfinder. You frame, focus, and adjust exposure so fast, your subject will never know when the camera monster strikes.

For details, write to Minolta Corp., 200 Park Avenue South, New York, N.Y. 10003. In Canada: Anglophoto Ltd., P.O.

Minolta



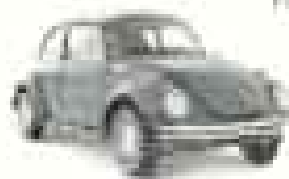
When identified by a factory-sealed "M" tag, Minolta Japan reflex cameras are warranted by Minolta Corporation against defects in workmanship and materials for two years from date of purchase, excluding user-inflicted damage. The camera will be serviced at no charge provided it is returned within the warranty period, postpaid, securely packaged and including \$100 for mailing, handling and insurance.

© VOLKSWAGEN OF AMERICA, INC.

Land in a plane. Take off in a car.



The Euro-Drive Tour. Touch down in Germany aboard a Lufthansa 707 or 747. Pick out the VW of your choice at the factory. And then take off for an unforgettable tour of four to eight countries. And all of this comes to you for one low price. Volkswagen. It's the only way to fly.



For details, fill in the blanks below.

Volkswagen of America, Tourist Delivery
Dept. N-3, Englewood Cliffs, N.J. 07632
Please send me your illustrated brochure and a price list.

Name _____

Address _____

City _____

State _____

Zip _____

Statement of ownership, management, and monthly circulation of the

NATIONAL GEOGRAPHIC

OWNER AND PUBLISHER: National Geographic Society
EDITOR AND MANAGING EDITOR: Gilbert M. Grosvenor
HEADQUARTERS OF PUBLISHER AND PUBLICATION:
1145 Seventeenth Street, N.W., Washington, D. C. 20036
STOCKHOLDERS: BONDHOLDERS: MORTGAGE: OTHER
SECURITY HOLDERS: None

Average no. copies each issue during preceding 12 mos. ▼ Single issue nearest to filing date

A. TOTAL COPIES PRINTED (Net Press Run)	July '71-June '72	June 1972
	7,387,080	7,773,000
B. PAID CIRCULATION		
1. Single Copy Sales	2,438	817
2. Mail Subscriptions	7,401,103	7,020,810
C. TOTAL PAID CIRCULATION	7,403,541	7,021,627
D. FREE DISTRIBUTION (incl. samples by mail, or other means, (No News Agents)	100,000	112,000
E. TOTAL DISTRIBUTION (Sum of C and D)	7,503,541	7,133,627
F. OFFICE USE, LEFT-OVER, ETC.	17,780	41,344
G. TOTAL (Sum of E & F)	7,521,321	7,174,971

CHANGE OF ADDRESS?

ATTACH YOUR NATIONAL GEOGRAPHIC LABEL HERE, print new address below, clip and mail to National Geographic Society, Washington, D.C. 20036. (Have a question about your magazine? Attach label to this form, and clip to your letter.)

NAME _____

NEW ADDRESS _____

CITY _____

STATE _____

ZIP CODE _____



Windows to keep warm by.

Outside, it's freezing cold. And getting colder. The wind is howling at the windows. But inside, it's warm as toast.

That's the beauty of living in a house with Andersen Windows.

They keep you warm because they're made of wood . . . nature's best insulator.

Not only do they seal out winter weather, they resist frosting and condensation, too. And because they're so tightly constructed, they save you up to 15% on annual heating costs. (A nice warm dividend for the man who pays the bills.)

What about storm windows? You won't need to bother with them if you order your Andersen Windows with Xi™ welded insulating glass.

For more information about Andersen wood windows or our new Perma-Shield® Windows (with vinyl clad exteriors that don't need painting), see your local lumber dealer. He's in the Yellow Pages. Or send for our free 24-page booklet, "How to Get Good Windows."

Please send me your free window booklet. 40-122

Mail to: Andersen Corporation, Biggert, Minn. 55005

I plan to build I plan to remodel a:

Name _____

Address _____

City _____

State _____ Zip _____

Andersen Windowalls 



Ohio Art Toys Give Happiness

Through hour after hour after hour of play. Naturally, a parent wonders why this is so and we'd like to tell you. Ohio Art toys

are designed to involve the child. Each has a built-in challenge with a reward in direct ratio to active participation. Each is appropriate within the range of ability. This makes a happy experience

of play-time after time. Isn't that what you want from toys for your children? And that's what the eight shown here do! Self contained Etch A Sketch (top) offers unlimited creative challenges to draw, design, doodle. Bizzy Buzz Buzz's variable squiggly lines turn a child's mind pictures into his own works of art. And Ohio Art's Musical Color TV is just right for little mimics. Happy responses to simple winding.

For true educational toys select either Dial-to-Learn/ Spell which helps children learn the alphabet and spell basic words or Dial-to-Learn/ Math which helps children learn simple mathematics. Cubee helps children count, recognize colors and associate pictures and numbers.

Screwee Zoo nudges tender young imaginations. Colorful plastic nuts and bolts of various sizes combine for creative visual play. Mod art is the immediate result from dripping water soluble non-toxic paint onto a spinning Twirl-O-Paint card. Look for Ohio Art's world of toys, at toy counters everywhere.



WRITE IN FOR YOUR FREE "WORLD OF TOYS" BOOKLET



THE OHIO ART COMPANY
BRYAN, OHIO 43002



THEY TELL IT LIKE IT IS.

After you've been lied to, cheated on and humiliated enough times, you finally face the truth. Your watch is a hopeless case.

And there's only one thing to do about it.

Forget the past. Form a new, meaningful attachment with an Accutron® watch.

It has a tuning fork movement

guaranteed to tell the truth to within a minute a month.*

It'll remain faithful, month after month, without any winding.

And with every look at its honest face, the bitter memory of your former watch's deceit will slowly fade away.

Time heals all wounds.

ACCUTRON® BY BULOVA

Left to right: Accutron Astronaut Mark II "H". Tells time in two time zones. All stainless steel. \$195. Accutron "261". Stainless steel case. Black calf strap. \$150. Accutron Date/Day "A". 14K solid gold case and band. Gold applied numerals and markers. Date resets instantly. \$790. Accutron Date/Day "AU". Stainless steel case. Black turtle strap. Date resets instantly. \$175. 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.



Smart little lady, your wife.
But it's not fresh-perked coffee
she's making. It's Taster's Choice®
Freeze-Dried Coffee. The one that
looks, smells, and crunches like
ground roast. And tastes like the
kind you thought she made.
But you thought wrong.

**GET UP A LITTLE EARLY TOMORROW
MORNING AND SEE HOW YOUR WIFE
IS MAKING YOU THAT GREAT
"FRESH PERKED" COFFEE.**