VOL. 125, NO. 1 JANUARY, 1964

NATIONAL GEOGRAPHIC

$8.00 A YEAR $1.00 A COPY

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

NATIONAL GEOGRAPHIC SOCIETY

WASHINGTON, D. C.

75TH ANNIVERSARY
1888–1963

Organized "for the increase and diffusion of geographic knowledge"

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 more than 200 explorations and research projects, adding immeasurably to man's knowledge of earth, sea, and sky. It diffuses this knowledge through its journal, NATIONAL GEOGRAPHIC; more than 24 million maps distributed each year; its books, globes, and atlases; 30 School Bulletins a year in color; information services to press, radio, and television; and the publication of technical monographs.

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

MELVILLE BELL GROSVENOR, President and Editor
MELVIN M. PAYNE, Executive Vice President and Secretary
ROBERT V. FLEMING, Vice President and Treasurer
FREDERICK G. VOSBURGH, Vice President and Associate Editor
ROBERT E. DOYLE, Vice President and Associate Secretary
THOMAS M. BEERS, Vice President and Associate Secretary
VERNON H. BREWSTER, WM. T. BELL, HERBERT T. HENDERSON, C. VERNON SANDERS, Associate Secretaries

ARTHUR B. HANSON, General Counsel

COMMITTEE FOR RESEARCH AND EXPLORATION

LEONARD CARMICHAEL, Chairman

ALEXANDER WETMORE
Vice Chairman

Rear Adm. L. O. COLBERT

HUGH L. DRYDEN

A. REMINGTON KELLOGG
Research Associate
Smithsonian Institution

Vice Adm. EMORY S. LAND

T. DALE STEWART
Director, Museum of Natural History
Smithsonian Institution

MATTHEW W. STIRLING
Research Associate
Smithsonian Institution

CONRAD L. WIRTH

WILLIAM E. WRATHER

and the Senior Officers of the Society

BOARD OF TRUSTEES

GILBERT GROSVENOR, Chairman of the Board, formerly President, National Geographic Society, and Editor of its magazine (1899–1954)

THOMAS W. McKNEW, Vice Chairman of the Board, formerly Executive Vice President and Secretary (1953–1962)

LEONARD CARMICHAEL
Secretary, Smithsonian Institution

LEO OTIS COLBERT
Rear Admiral, U. S. Coast and Geodetic Survey, Retired

HUGH L. DRYDEN
Deputy Administrator, National Aeronautics & Space Administration

ROBERT V. FLEMING
Advisory Chairman of the Board and Chairman, Executive Committee, Riggs National Bank

CRAWFORD H. GREENEWALT
Chairman of the Board, E. I. du Pont de Nemours & Company

MELVILLE BELL GROSVENOR
Editor, National Geographic

EMORY S. LAND
Vice Admiral, U. S. Navy, Retired, formerly President Air Transport Association

CURTIS E. LeMAY
Chief of Staff, U. S. Air Force

H. RANDOLPH MADDOX
Vice President, American Telephone & Telegraph Company (Ret.)

BENJAMIN M. McKELWAY
Editorial Chairman, Washington Star

WALTER K. MYERS, M.D.
Physician

MELVIN M. PAYNE
Executive Vice President
National Geographic Society

LAURANCE S. ROCKEFELLER
Chairman of the Board, Rockefeller Brothers, Inc., and President Jackson Hole Preserve

JUAN T. TRIPPE
President, Pan American World Airways

FREDERICK G. VOSBURGH
Assoc. Editor, National Geographic

JAMES H. WAKELIN, JR.
Assistant Secretary of the Navy for Research and Development

EARL WARREN
Chief Justice of the United States

ALEXANDER WETMORE
Research Associate
Smithsonian Institution

LLOYD B. WILSON
Honorary Board Chairman, Chesapeake & Potomac Telephone Co.

CONRAD L. WIRTH
Director, National Park Service
U. S. Department of the Interior

WILLIAM E. WRATHER
Director, U. S. Geological Survey, Retired

Asst. Secretaries: HERMAN J. A. C. ARENS, CHARLES P. BIXEL, OWEN R. ANDERSON, Asst. Secretary and Asst. Treasurer; HILLEARY F. HOSKINSON, Asst. Treasurer; WM. H. McCAULEY

HERMAN J. A. C. ARENS, Executive Assistant; LEONARD J. GRANT, Editorial Assistant; and Gail H. Carroll, Secretary to the President and Editor; Sibyl Peck, Assistant to the Chairman of the Board; Louise W. Kessler, Secretary to the Vice Chairman of the Board

◀ **COVER:** Floodlit United States Capitol thrusts its gleaming dome into Washington's evening sky (page 5).

NATIONAL GEOGRAPHIC MAGAZINE

MELVILLE BELL GROSVENOR, *Editor*
MELVIN M. PAYNE, *Executive Vice President*
FREDERICK G. VOSBURGH, *Associate Editor*
FRANC SHOR, *Senior Assistant Editor*

EDITORIAL STAFF

Assistant Editors: James Cerruti, Robert L. Conly, Allan C. Fisher, Jr., Kenneth MacLeish, John Scofield, Mason Sutherland
Senior Staff: Lonnelle Aikman, Jules B. Billard, Andrew H. Brown, Gilbert M. Grosvenor, Nathaniel T. Kenney, Howard La Fay, Edward J. Linehan, Luis Marden, Samuel W. Matthews, Carolyn Bennett Patterson, Howell Walker, Kenneth F. Weaver, Paul A. Zahl (Natural Sciences)
Foreign Staff: W. Robert Moore (Chief); Thomas J. Abercrombie, Barry C. Bishop, David S. Boyer, Kip Ross, Volkmar Wentzel
Senior Editor: Howe Findley
Editorial Staff: Edward Cornish, William P. T. Graves, John R. Hoopes, Werner Janner, Jay Johnston, Stuart E. Jones, Robert P. Jordan, Bart McDowell, Frank Sartwell, Peter T. White, Joanne M. Hess, Winifred M. Myers, Betty T. Sanborne (Assts.); Dorothy M. Corson (Indexes); Rosalie K. Milford (Files); Arnold Nygaard (Chief Translator); Mary Webster Parkhurst

Editorial Layout: Howard E. Paine (Chief); Charles C. Uhl
Book Service: Merle Severy (Chief); Wayne Barrett, Ross Bennett, Seymour L. Fishbein, Mary Swain Hoover, Anne Dirkes Kobor, Patricia Coyle Nicholson, Edwards Park, John J. Putman
School Service: Ralph Gray (Chief); Arthur P. Miller, Jr., Lea Ridgley, Charles H. Sloan
News Service: Windsor P. Booth (Chief); Louis de la Haba, Mary C. McDade, Sabin Robbins, Paul G. Sampson; Isabel Clarke (Asst.)
Television Service: Robert C. Doyle (Chief)
Photography: Robert C. Ellis, Jr. (Chief); John McConnell (Asst. Chief); Elizabeth L. Donley
Editorial Research: Margaret G. Bledsoe (Chief); Ann K. Wendt (Asst. Chief), Mary Ann Harrell, Levenia Loder, Patricia Middleton, Patricia Rosenberg
Geographic Research: George Crossette (Chief); Newton V. Blakeslee (Asst. Chief), Leon J. Canova, Virginia A. LeVasseur, Jean B. McConville, Edward C. Schulz
Library: Esther Ann Manion (Librarian); Virginia Carter Hills (Asst. Librarian), Vera Cassilly, Katharine P. O'Donnell
Editorial Administration: Patricia M. Watkins

ILLUSTRATIONS STAFF

Illustrations Editor: Herbert S. Wilburn, Jr.
Art Editor: Andrew Poggenpohl
Asst. Illust. Editors: Robert L. Breeden, W. E. Garrett, Mary S. Griswold, Thomas R. Smith, Charles Allmon (Incoming Photographs)
Director of Photography: Robert E. Gilka. *Asst. Director:* Joseph Bayloe Roberts
Photographers: B. Anthony Stewart (Chief); James P. Blair, Dean Conger, John E. Fletcher, Otis Imboden, Bates Littlehales, George F. Mobley, Albert Moldvay, Thomas Nebbia, Winfield Parks, Robert F. Sisson
Picture Editors: Lee E. Battaglia, Donald J. Crump, Charlene E. Murphy, Robert S. Patton, Arthur A. Terry; Geraldine Linder (Asst.). *Librarian:* Carolyn Stillwell
Photo Lab: Edwin L. Wisherd (Chief); Richard H. Stewart (Asst. Chief), Milton A. Feed, Donald McBain, Robert S. Oakes, Carl M. Shrader, Guy W. Starling
Pictorial Research: Walter Meayers Edwards (Chief)
Artists: Walter A. Weber (Naturalist), Peter V. Bianchi
Engraving & Printing: Dee J. Andella (Chief); Joe M. Barlett, Frank S. Oliverio, William W. Smith

CARTOGRAPHIC STAFF

Chief Cartographer: James M. Darley
Asst. Chief Cartographer: Newman Bumstead, Ralph E. McAleer
Cartographic Engineer: Wellman Chamberlin. *Base Maps:* Charles L. Stern (Supervisor); John F. Dorr, Harry C. Siddeley. *Photography:* John J. Brelsford, Robert W. Northrop. *Orthography:* Apphia E. Holdstock, David W. Cook. *Transparencies:* Douglas A. Strobel (Supervisor). *Map Drawing:* William T. Peele (Supervisor). *Geographic Names:* Richard J. Darley (Supervisor); Russel G. Fritz, Donald A. Jaeger, George E. Stuart. *Map Editing:* Athos D. Graziani (Supervisor); Carol J. Cunningham, Ted Dachtera, Richard K. Rogers. *Administrative Assistant:* Catherine M. Hart
Geographic Art: Newman Bumstead (Chief). *Artists:* Irvin E. Allaman, Joseph E. Barrett, Gilbert H. Emerson, Victor J. Kelley, John W. Lathers, Robert C. Magis, Robert W. Nicholson, William Palmstrom. *Research:* George W. Beatty, Eugene M. Scheel

SECRETARY'S STAFF

Administrative: Edwin W. Snider, Raymond T. McElligott, Jr., Richard E. Pearson. *Accounting:* F. Charles Brown, George F. Fogle, Martha K. Allen. *Cashier:* Frank S. Delk. *Statistics:* Everett C. Brown. *Procurement:* J. P. M. Johnston. *Payroll:* Esther M. Lobert, Marie S. Edwards. *Membership Fulfillment:* Roy J. Klockenbrink. *Promotion:* James Heermance, Stan Jennings, E. M. Pusey, Jr., Gordon Young. *Accounting Records:* Della M. Hiatt. *Personnel:* J. B. Mahon, Mary Louise Cross, Frank A. Holman. *Medical:* Thomas L. Hartman, M.D.

EUROPEAN OFFICE

W. E. Reichelt (Director)
161–166 Fleet Street, *London* E.C. 4, England

ADVERTISING

Director: John F. Conney, *New York*
Advertising Manager: Hurley L. McDevitt, *New York*
Chicago: William Turgeon. *San Francisco:* Donald F. Mikkelsen
Los Angeles: Jack V. Sheehan
Automotive Manager: William A. Boeger, Jr., *New York*

People who Thunderbird move in a special atmosphere

Their car is unique. It has a tradition for innovation that sets it apart from all others . . . that has made it a classic in its own lifetime. This year a completely new Thunderbird continues this heritage—in many new ways: An exclusive Silent-Flo ventilation system gently pulls fresh air through the Thunderbird cabin . . . even with the windows up. New "shell design" contoured front seats cradle you luxuriously—give rear passengers more foot room, knee room. The padded top of the driver's console is a convenient arm rest. Rear seats are elegantly coved for an extra measure of Thunderbird comfort. A warning light reminds you to fasten the retractable seat belts. Optional lights tell you when fuel is low, a door is ajar. There is a new touring-size luggage compartment. All are examples of the engineering thoughtfulness you can enjoy only when you Thunderbird. And *that* special excitement is waiting for you now . . . at your Ford Dealer's.

Thunderbird

unique in all the world

A little something to lean on

Even a hefty-sized man can lean with confidence on this kind of dollar. It's a growth dollar. It has grown big and solid on husky earnings in an Insured Savings and Loan Association. 34 million savers get extra support and extra buying power out of these growth dollars. You can too. Open a savings account at your nearby Insured Savings and Loan Association. Nothing like a little extra to lean on.

INSURED

Savings and Loan Associations

Where your dollar works harder . . . grows bigger!

FIFTY FEET ALOFT in a power company's hydraulic lift, or "aerial bucket," National Geographic photographer George F. Mobley finds an exciting new way to view the United States Capitol. From this vantage point he made the picture that appears on the cover and on pages 4-5 of this issue.

Many months ago the U. S. Capitol Historical Society sought National Geographic Society collaboration in issuing an authentic, colorful guidebook and history of the Nation's most important public building. A team of Geographic specialists—editors, writers, photographers, artists, layout men, and researchers—combined their skills. The result: a much-needed book (page 1), and a magazine article (pages 4-59) that takes you on an unprecedented working-hours tour of the Capitol.

You may share with others the satisfaction of furthering such worthwhile projects, which can be accomplished only with the help of members' dues. Nominate your friends for membership on the form below.

NATIONAL GEOGRAPHIC SOCIETY MEMBERSHIP

CHECK ONE

Mail to: The Secretary
National Geographic Society
Washington, D. C. 20036

$6.50 **CALENDAR YEAR 1964 MEMBERSHIP DUES INCLUDE SUBSCRIPTION TO THE NATIONAL GEOGRAPHIC.**

Annual dues in the United States and throughout the world are $6.50. To compensate for international postage differentials, remit in U.S. funds or equivalent, $7.00 for Canadian membership; $8.00 for all other countries.

Life membership for the U.S., its outlying areas, and Canada is $150, elsewhere, $200. Remittances should be sent direct to the National Geographic Society in U.S. funds or equivalent. —GB

☐ **I NOMINATE** for Society membership the person named at left. (Use separate sheet for additional nominations.)

☐ **(GIFT MEMBERSHIP)** I nominate and enclose $_____ for dues of the person named at left. Send gift card ☐

☐ **I DESIRE INFORMATION** concerning membership and the NATIONAL GEOGRAPHIC. (Fill in at left.)

NEW MEMBER'S NAME _____
(PLEASE PRINT NAME OF AN INDIVIDUAL ONLY)

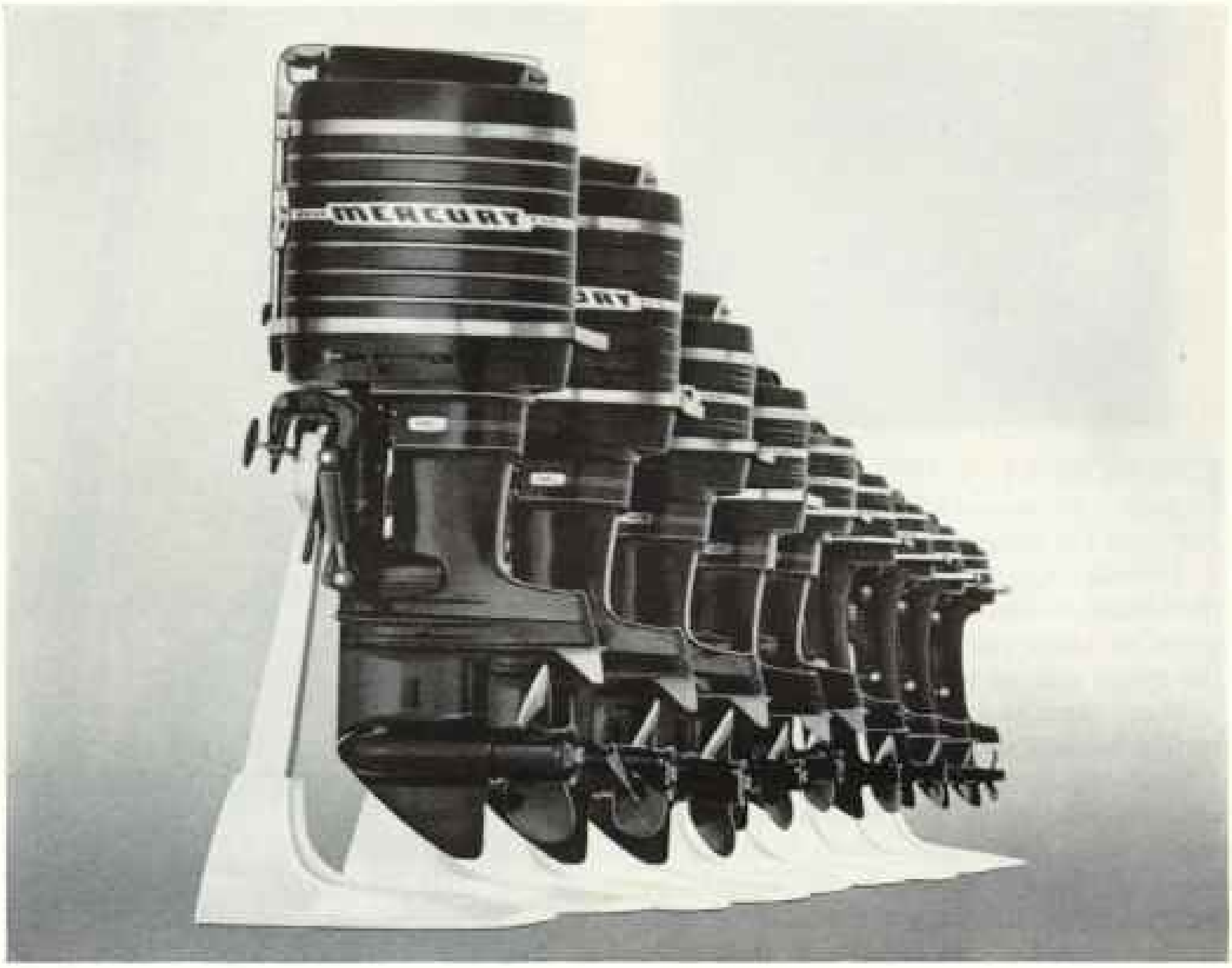
STREET _____

CITY, ZONE, STATE _____

MY NAME _____
(PLEASE PRINT)

STREET _____

CITY, ZONE, STATE _____



Fleet

These nine new Mercs will *outrun* and *outpull* any other outboards in their power class. It's the Mercury Silver Anniversary Fleet . . . the widest selection of outboard power ever offered . . . by anyone.

The leader of them all is the mighty Merc 1000 with 100 horsepower. It's the world's most powerful outboard and will handle any job with ease. This 6-cylinder Merc will *cruise* faster than most outboards will run at "full bore" . . . pull more skiers and range farther on less fuel.

At the other end of the power range is a little Mere fishing motor . . . Mere 39 with 3.9 hp. It's a perfectly balanced single-cylinder outboard with full-power features that you won't find on other motors in this power class . . . like full gearshift, rubber-mounted twist-grip throttle, remote fuel tank (at no extra cost), dual-clamp brackets, Jet-Prop exhaust, and Glide-Angle styling.

In between there are seven more outboards . . . from 6 to 85 horsepower . . . two, four and six-cylinder engines. All the 1964 Mercs have small-bore, short-stroke design to reduce engine wear and boost the power by using fuel more efficiently.

Fixed-jet carburetors with special fuel-economy linkages give the correct mixture at all speeds . . . to give you the most miles per gallon. All have Mercury's exclusive Jet-Prop exhaust to bury sound and fumes deep underwater. There are no shear or "drive" pins on *any* Merc. The propellers are splined on and protected by a live-rubber safety clutch that yields momentarily on impact. Only Mercury has 6-cylinder outboards. All Mercurys have full gearshift, and *single-lever* remote control is available for all models . . . even the smallest.

This is the Silver Anniversary Fleet . . . engineered to give you the *most* RUN for your money with Mercury . . . 100, 85, 65, 50, 35, 20, 9.8, 6 and 3.9 horsepower outboards . . . and MerCruiser Stern Drive Power Packages . . . 110 to 310 horsepower.

MERCURY

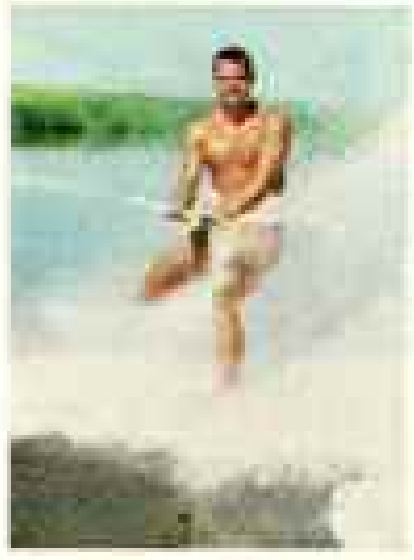
KIEKHAEFER MERCURY

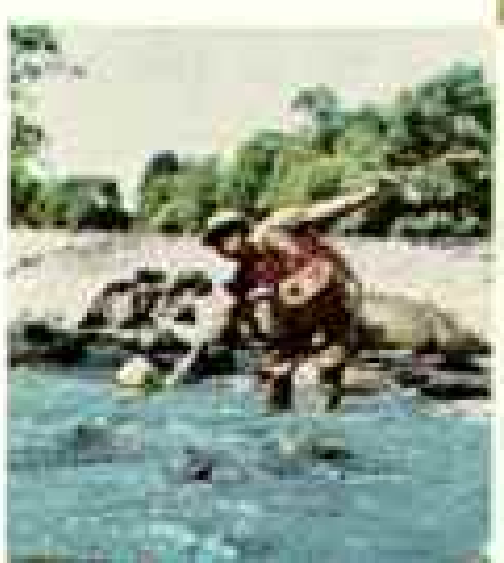
SILVER ANNIVERSARY FLEET

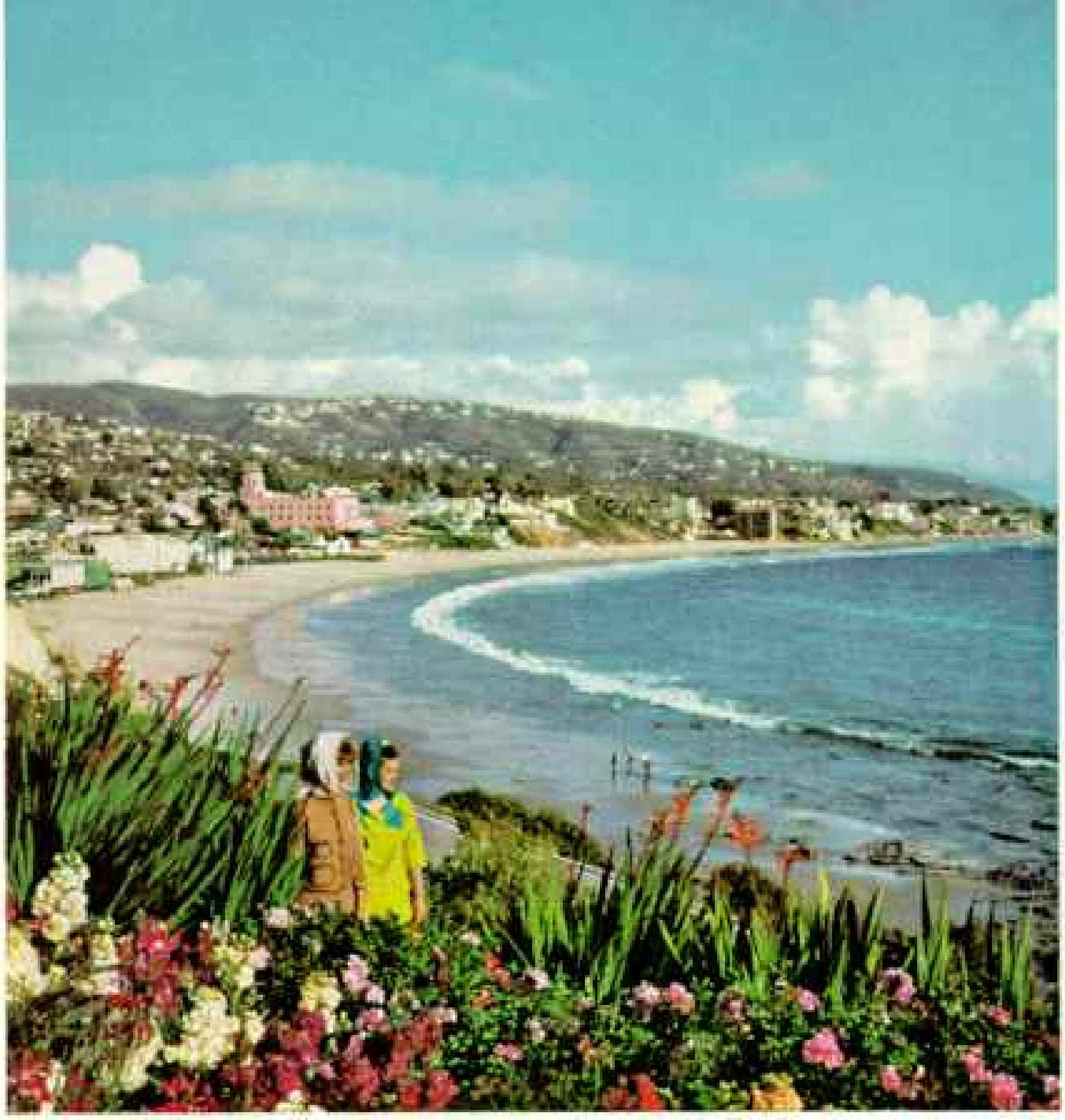
Starfire — *High adventure starts right here!*

Someday there'll be another car that combines the niceties of life with the thrill of the open road as neatly as Starfire does. But not *this* year. From its bold grille to its exclusive dual chambered exhausts, this beauty's new action silhouette says '64 belongs to Starfire! Sample the response of the 345-h.p. Starfire V-8. The quiet authority of Hydra-Matic, power brakes, power steering. Along with leather-trimmed buckets and a sports console, they're all part of the package! One thing's for certain: When you flip the key to a Starfire, you're pulling the pin on one of 1964's most exciting performers.

'64 OLDS — *WHERE THE ACTION IS!*







Pacific in winter: go fishing, sightseeing, shell collecting

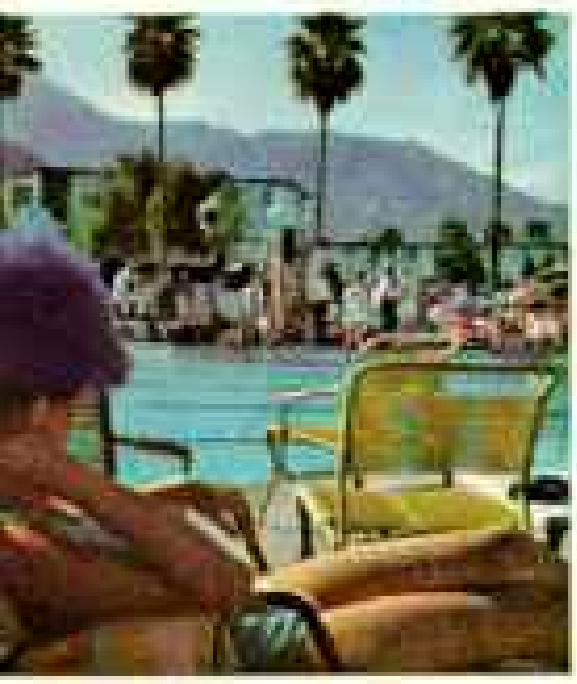
Desert movie site

This goes on all year

See stars' footprints

Look what's under our winter sun! Unusual sights like these are almost next door to each other in Southern California. That's why you see so much. With all this variety there's a rare and gentle climate (the only one like it in North America). Most winter days are sunny. Summers are rainless with cool nights, low humidity. And 12 out of 12 months are vacation months! Visit us soon. Send coupon for vacation facts. **Southern California**

Winter day at desert



Shop in parklike settings

Look for movie stars here

A lawn of geraniums

Oranges below ski slopes

Winter in a sunny suburb

Free: Official Vacation Guide. Color pictures, sightseeing map, dozens of attractions.
ALL-YEAR CLUB, Div. S-1
628 W. 6th St., Los Angeles, California 90017

NAME_____

ADDRESS_____

All-Year Club of Southern California. This advertisement sponsored by Los Angeles County Board of Supervisors for citizens of Glendale, Hollywood, Long Beach, Inglewood, Los Angeles, Pasadena, Pomona, Santa Monica, Torrance, 181 other communities.

The friendly face of Alaska says

WELCOME VISITOR!

Getting to know the warm-hearted, friendly people of Alaska is one of the nice things about coming to this big, adventurous land. Informality and hospitality are everywhere. Vast mountain ranges, sparkling glaciers and Gold Rush towns are all part of an exciting Alaska vacation. C'mon up. See your travel agent or write Dept. N-1, Alaska Travel Division, Juneau.

You haven't seen your country if you haven't seen

ALASKA

Alaska Travel Div.—Dept. of Economic Development & Planning

9 Sunny Vacations for the Price of 1

Terrific Tucson where Winter is Wonderful! Where in the world can you Ride a Horse / Schuss a Slope / Explore a Mission / Bet on a Nag / Fight a Bull / Score a Birdie / Catch a Sailfish / Climb a Mountain . . . or simply bask in the warm, dry sunshine, yet never be more than an hour or two from sensibly priced accommodations? In Tucson, of course.

Western Gateway to Mexico

Tucson

See your travel agent or write for more wonderful details.
SUNSHINE CLIMATE CLUB DEPT. NG14, TUCSON, ARIZONA

FREE to National Geographic readers:

Why Fort Lauderdale is the place to go in Florida

Here is a little booklet that gives you the big reasons why knowing people choose Fort Lauderdale as the place to go in Florida.

Its 16 pages sparkle with natural-color views. Its factual text tells why this city is called "Venice of America"; why Fort Lauderdale's beach is the finest on lower east coast. Read about golf, fishing, all the suntime sports, the sights to see, and places to stay. It's almost as exciting as a personal visit. To get your free copy, simply mail the coupon today.

Information Department G-10
City of Fort Lauderdale
P.O. Box 1181, Fort Lauderdale, Florida

Gentlemen: I'd like to be convinced Fort Lauderdale is the place to go in Florida. Please send the free brochure to:

Name_____

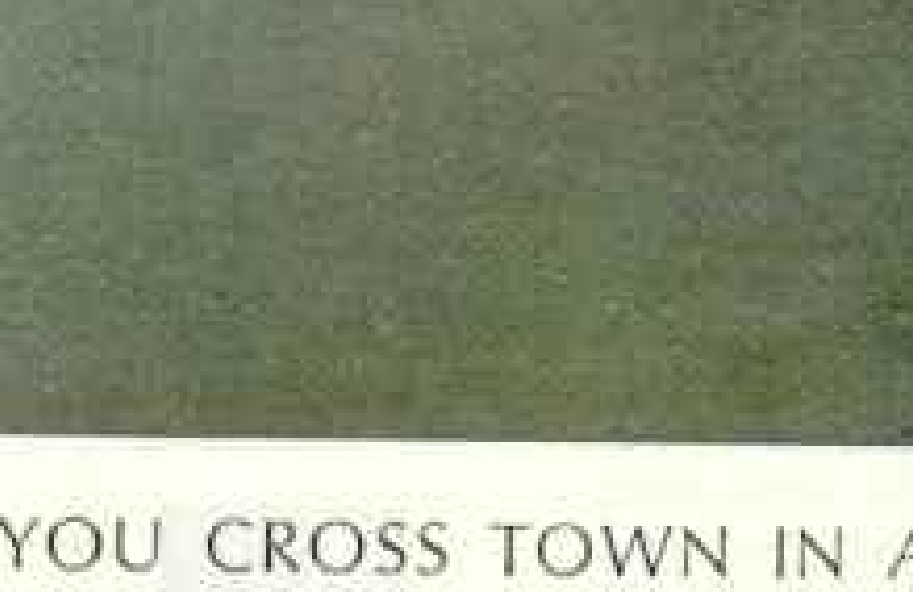
Address_____

City_____ Zone____ State_____

RUSH REPLY Get this spectacular FREE collection of 100 different stamps — new issues, new countries, pictorials, commemoratives, multi-colors — from the world over. Get new issues shown PLUS colorful Greenland, Thailand, Singapore, Maldive, many others. Weird animals, strange birds, fierce natives. Send today for this valuable FREE collection, other stamp offers for approval. Enclose 10¢ handling.
GARCELON STAMP CO., Dept. 1NG3, Calais, Maine

THE FIRST TIME YOU CROSS TOWN IN A 1964 CADILLAC

. . . you're going to be amazed at the wonderful way it moves and handles. For this great new car introduces a standard of performance and action that is new even to Cadillac. It comes from an advanced high-performance engine—the most powerful in Cadillac history. It comes from an improved Hydra-Matic Drive—and on some models, a new Turbo Hydra-Matic—that provides incredible response and agility. And it comes from a host of other Cadillac advancements—refined Cadillac power steering, an exclusive true-center drive line, and motordom's only real triple braking system. *It's more tempting than ever—and just wait till you drive it!* Your dealer will arrange it all.



Cadillac Motor Car Division • General Motors Corporation

"if ever I cease to love"

The haunting theme song of Mardi Gras—first sung almost a century ago by a beautiful soubrette to a Russian Grand Duke. He never forgot the joyousness of that glorious Carnival Season in New Orleans, the "City that Care Forgot" . . . and you won't either. For two weeks, Rex, the Lord of Misrule, takes over . . . the exquisite balls, the exciting parades lit by burning flambeaux, the music, the laughter, the dancing in the streets.

The whole state has a festive feeling that's unique in the world. And during the last intoxicating evening parade, when the band begins to play that beloved melody, you know that you too will "never cease to love . . ."

Mardi Gras in Louisiana

The season—2 weeks ending on Feb. 11

Write: Tourist Bureau, Dept. of Com. & Ind.,
P. O. Box 4231 N 1-4, Baton Rouge 4, La.

Enjoy winter where you wish in an AVION Travel Trailer

Hitch your car to an easy-towing Avion and head for relaxing, sun-drenched destinations. Travel leisurely, carefree, schedulless.

Forget costly motel and meal bills. Avion offers red-carpet accommodations—hot and cold running water, modern kitchen and bath, plush beds. Other self-contained conveniences optional.

Construction is the finest: lightweight riveted anodized aluminum. Lifetime Guaranteed. A quality investment for the practical, fun-minded and travel-wise.

AVION
COACH CORPORATION
Dept. G, Benton Harbor, Michigan

Models 18 to 30 ft.
Write for FREE Catalog & Dealer's Name.

ONLY 10¢! AIRMAILS

Fabulous collection of all-different genuine **Airmail Stamps** from remote corners of the world — Africa, Europe, Exotic Orient, everywhere! World's Largest Airmail, Flying Doctor, Bomber, $2.50 Helicopter, many others. **PLUS** Collection of thrilling Space-Age stamps . . . Sputniks, Jets, fantastic Moon Rocket stamps. **Both** of these remarkable collections — **containing stamps worth up to 25¢ each!** — Send only 10¢. **Extra:** Illustrated Bargain Catalog and an attractive selection of stamps on approval.

Jamestown Stamp Co. Dept. F14NG, Jamestown, New York

there's something for everyone in the

DAYTONA BEACH

resort area

THE "WORLD'S MOST FAMOUS BEACH" AND FLORIDA'S HEALTHIEST CLIMATE

P.O. Box 169, Dept. M-11
The Daytona Beach Resort Area (Ormond Beach, Holly Hill, Daytona Beach Shores, S. Daytona, Port Orange), Daytona Beach, Florida.

Name .....
Address .....
City ..... Zone ..... State .....

Do you know how it feels to drive the world's most imitated car?

**Drive the Continental.
Discover its ride,
its spaciousness
and all the reasons
why more than half
the people who buy
in our price range
choose the Continental.**

When do you alter a classic? Only to improve it. The Continental for 1964 offers a remarkable gain in passenger compartment space.

You will appreciate four inches more leg room in the rear, and 2.5 inches more knee room. And there is 15% more luggage space.

The Continental is available in only two models: the four-door sedan and the only four-door convertible made in America. There are no lower priced models.

The Continental's doors open from the center for easy entrance.

Its unique integral construction (body and frame are one unit) contributes to an unsurpassed ride.

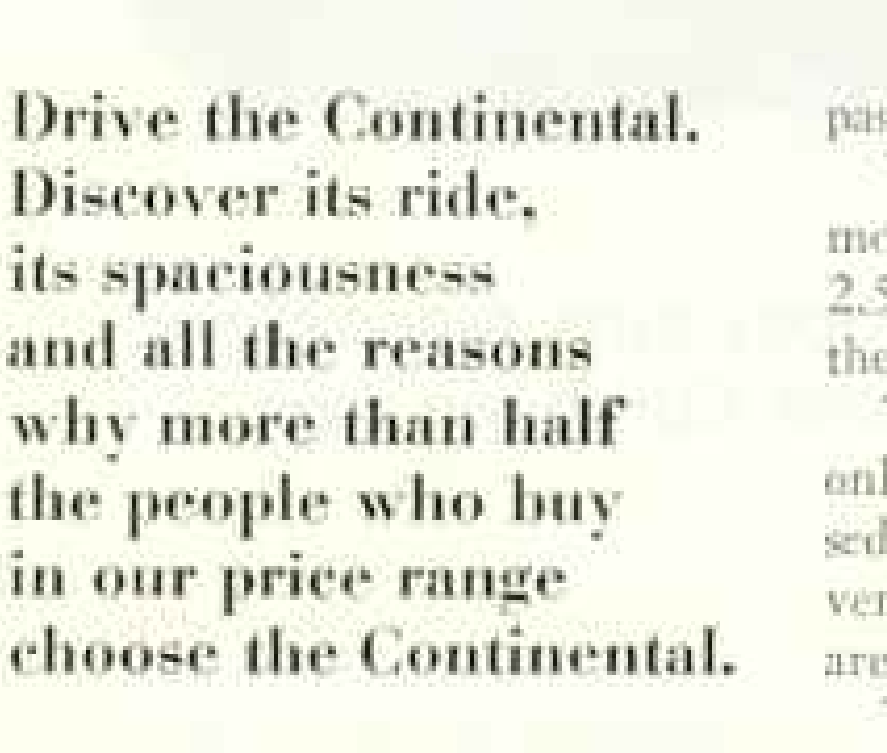
The interior is appointed with virtually every luxury, and the Continental includes, as standard equipment, full power auxiliaries.

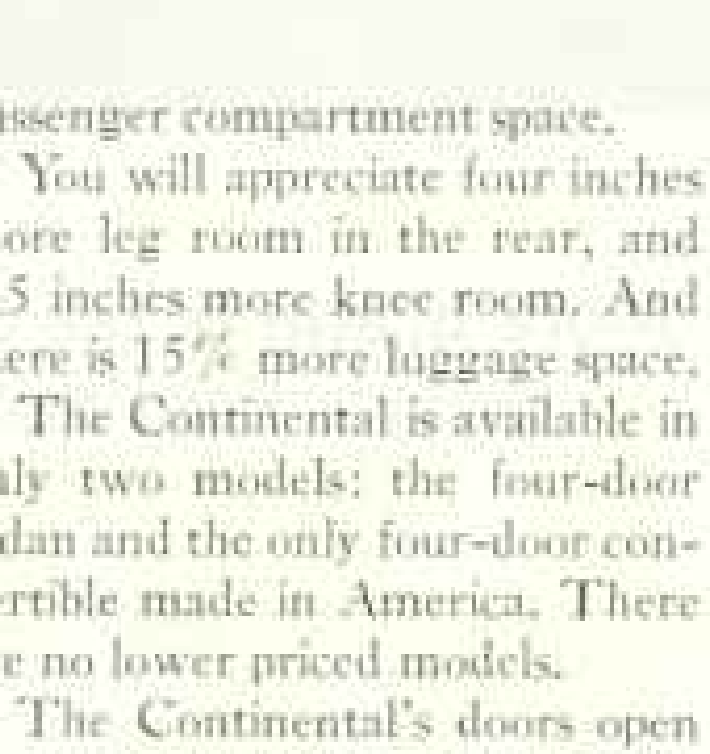
Each Continental is built in a special plant at Wixom, Michigan, that sets the world's highest automotive engineering standards.

After thousands of inspections during manufacture, every Continental must pass 189 road performance tests. The Continental is built to last and retain its value.

When you see this automobile, don't just admire it. Notice the kind of person who drives it.

Then drive it yourself. Your Lincoln Continental dealer will arrange to place you behind the wheel of the world's finest car.





LINCOLN CONTINENTAL

Product of the Lincoln-Mercury Division, Ford Motor Company

Here's a car built to support any population explosion. It's a 1964 Ford Country Squire.

There's more life built into cars by Ford Motor Company

More brawn in the body puts more life in today's Ford Motor Company cars.

How long a life your car body has depends on how solidly it's built. If it's not strong—wear and tear, squeaks and rattles. That's why all Ford Motor Company cars give you so much extra reinforcing.

Take the roof those youngsters are perched on. Three separate steel braces make it solid to sit on (or ride under). And those doors are built like a safe. They're steel inside and out. Underneath, too, extra heavy construction keeps the body more solid and silent.

And more life is built into Ford Motor Company cars wherever you look. It's all part of a plan to give you today's best-built cars. A plan where engineering designs the quality for the car. Manufacturing precision puts it there. And severe testing sees that it stays there.

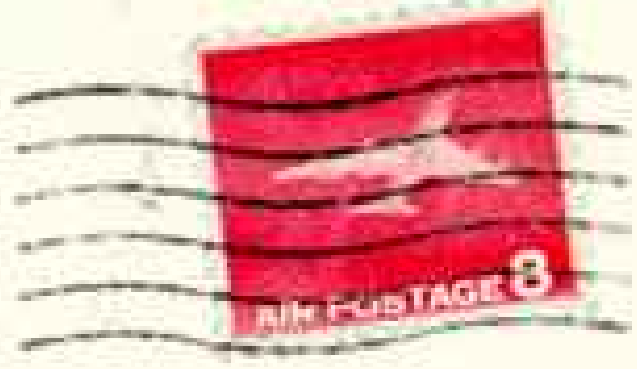
FORD • MERCURY

THUNDERBIRD

LINCOLN CONTINENTAL

Ford

MOTOR COMPANY



If you want higher earnings with insured safety, get your money on the first plane to California.

The seven insured California savings and loan associations of the Great Western Financial group* offer the best combination of earnings, safety and availability to be found in the world today.

EARNINGS. Each association pays the highest rate prevailing in its area. In fast-growing California these rates historically run ½% to 1% higher than other parts of the United States. Funds postmarked by the 10th of any month earn from the 1st.

SAFETY. We offer the strength of consolidated assets that exceed $1.4 billion. Plus the protection of the Federal Savings and Loan Insurance Corporation. Individuals can maintain insured accounts to $70,000; families and corporations to $1 million or more.

AVAILABILITY. We have never failed to honor a withdrawal request in full, plus earnings.

To open your account you can send just one check and—unless you specify otherwise—we'll distribute the funds automatically to the associations paying the highest rate.

And we suggest you send the check air mail. Time, particularly in growing California, is money.

To: John F. Marten, Attorney-in-Fact
(President, Great Western Financial Corporation)
Dept. G13, 9601 Wilshire Blvd., Beverly Hills, Calif.

☐ Here is my check for $_____
(Payable to John F. Marten, Attorney-in-Fact)

Please open the following types of insured savings account(s)

☐ Individual ☐ Joint tenancy ☐ Corporation
☐ Trust (Pension, etc.)

In the name(s) of:_____

Address_____

City_____ Zone_____ State_____

☐ Send the necessary forms to arrange a transfer of my savings to the Great Western Financial group*.
☐ Send current information on rates.

GREAT WESTERN SAVINGS, LOS ANGELES, founded 1925 SANTA ANA SAVINGS, SANTA ANA, founded 1923 BAKERSFIELD SAVINGS, BAKERSFIELD, founded 1948 CENTRAL SAVINGS, SAN LUIS OBISPO, founded 1927 GUARANTY SAVINGS, SAN JOSE, founded 1919 FIRST SAVINGS, OAKLAND, founded 1927 WEST COAST SAVINGS, SACRAMENTO, founded 1952

*Great Western Financial Corp. (NYSE symbol: GWF) is parent company of associations above, with consolidated assets of over $1,000,000,000.

The Nation's Capitol Revealed as Never Before

An introduction by SENATOR CARL HAYDEN of Arizona

Honorary Chairman, United States Capitol Historical Society,
veteran of 52 years in Congress, and a member of the
National Geographic Society for 58 years

TO ME THE CAPITOL of the United States is the most thrilling place in the world—the focal point for the wishes, the aspirations, the strength of 190 million Americans.

As one who has been privileged to serve in this forum of the Nation's power for more than half a century—15 years in the House of Representatives and 37 years in the Senate—I have often wished more Americans could know their Capitol as I have known it.

Thus it is a particular satisfaction to me to introduce the 56-page article that follows, and to announce to the 3½ million members of the National Geographic Society an important event in the annals of our Capitol—publication of a beautiful new history and guidebook illustrated with the finest color photographs.

Guidebook and article are closely related, for both owe their origin to the splendid cooperation afforded by the National Geographic Society to our United States Capitol Historical Society.

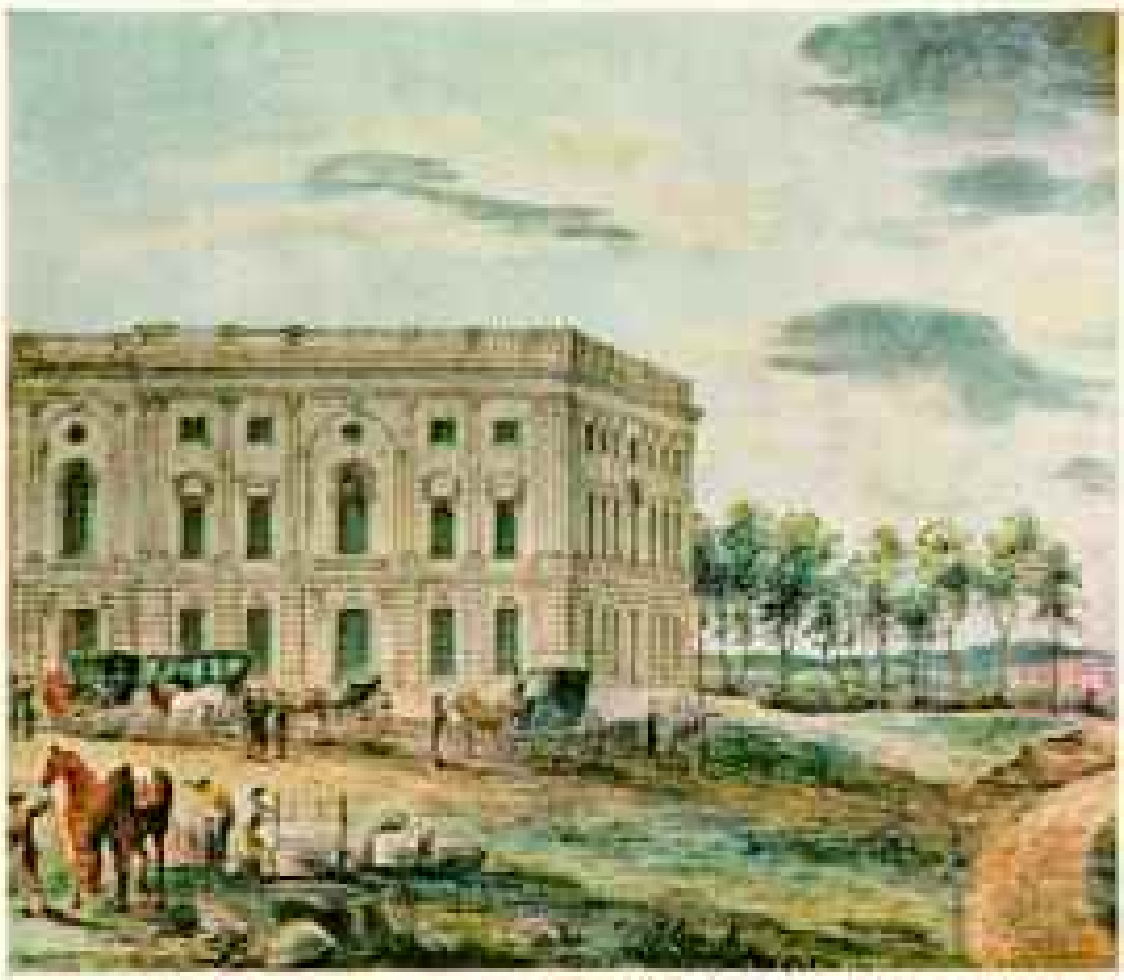
This organization was founded in August, 1962, to "encourage in the most comprehensive and enlightened manner an understanding by the people of the founding, growth, and significance of the Capitol of the United States. . . ."

Its officers and trustees include not only many Members of Congress, but also distinguished historians, educators, businessmen, and the President of the United States. Membership in the Capitol Society—which we hope will grow very large—is open to anyone willing to make a modest contribution.

We were fortunate in enlisting at the outset the interest and support of the officers and trustees of the National Geographic Society. As a public service, the National Geographic agreed to produce the book, much as it had helped the White House Historical Association produce an authentic guide to the White House a year ago. Dr. Melvin M. Payne, the National Geographic's Executive Vice President and Secretary, took an active role in our Capitol Historical Society and now serves as its Vice President.

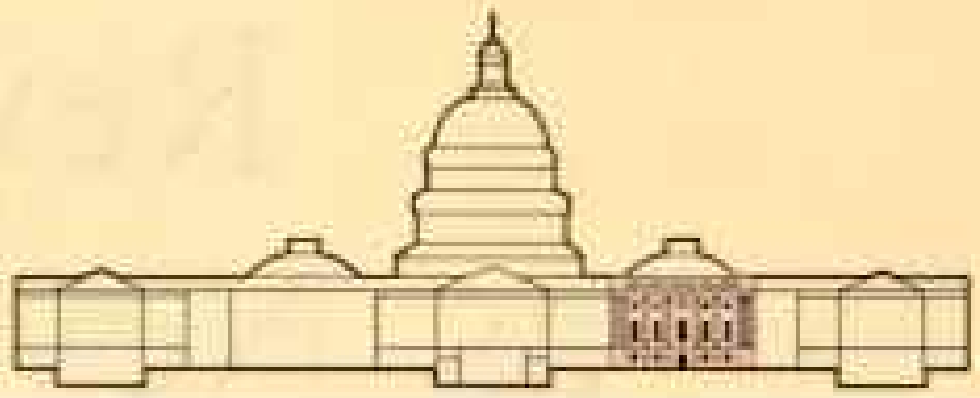
Some 30 Geographic staff members contributed editorial, photographic, and publishing skills to the Capitol book, *We, the People*. Mrs. Lonnelle Aikman of the Society's Senior Editorial Staff wrote not only the article that follows but the entire text of the book.

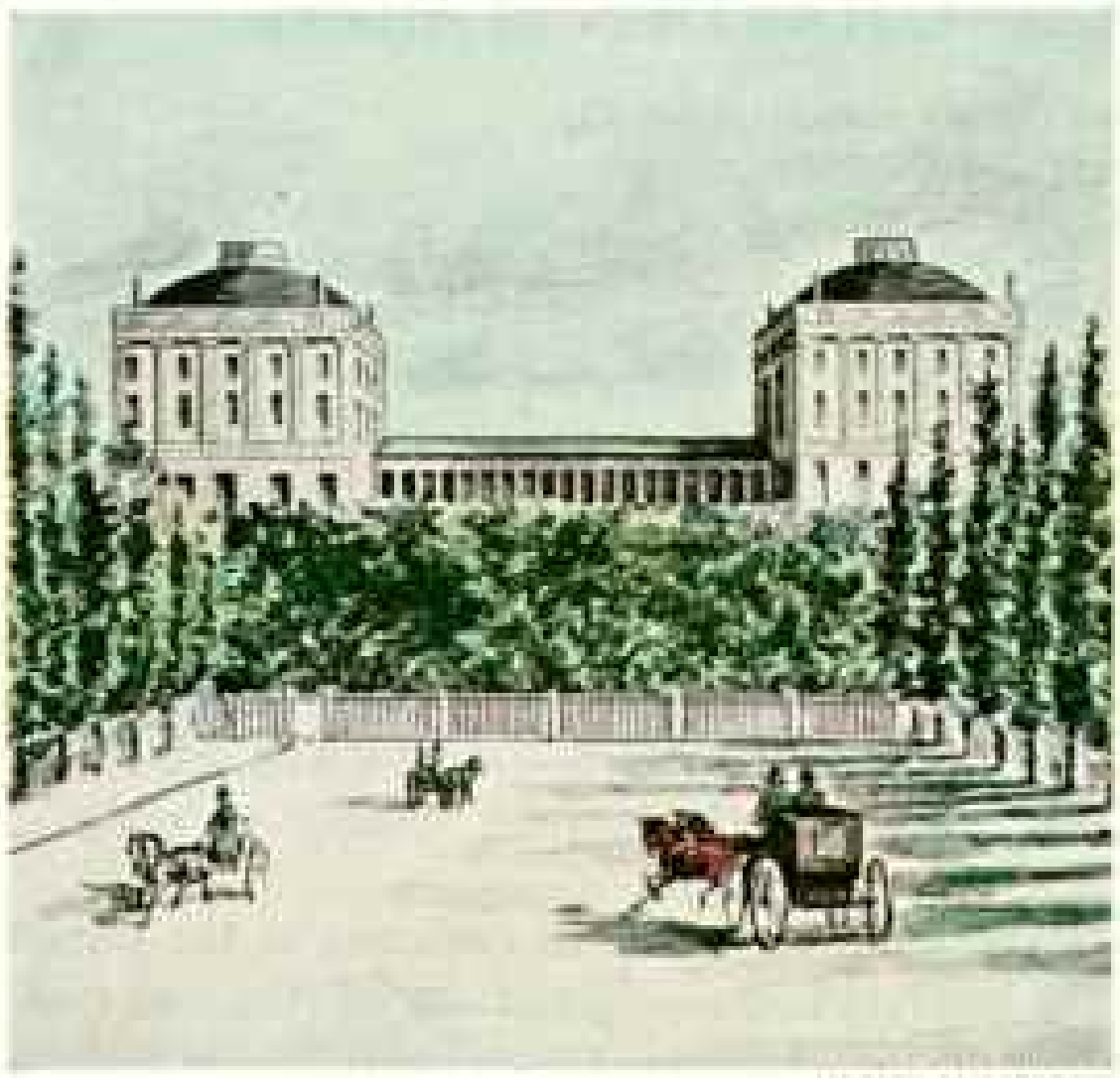
Sunset silhouettes the Capitol dome's lofty Statue of Freedom.



WILLIAM H. BIRCH, LIBRARY OF CONGRESS

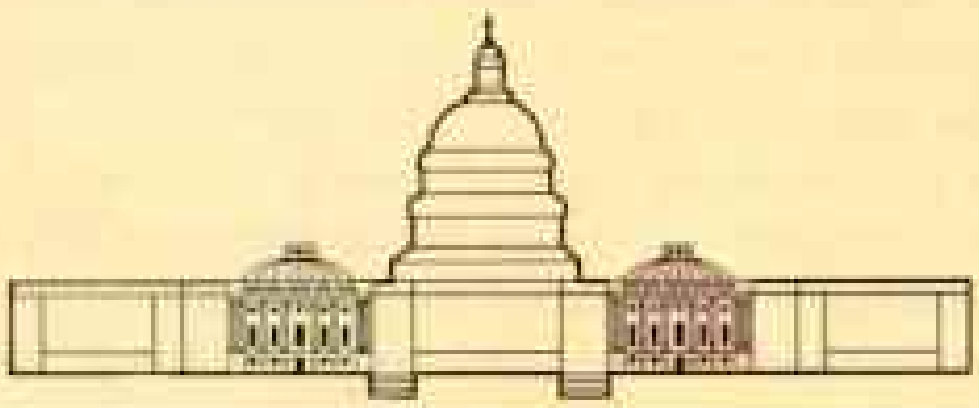
Boxlike new Congress House, or Capitol, held the Senate and House when they arrived in 1800; the Supreme Court joined them the following year. In a water color of the East Front, the finished wing, designed by Dr. William Thornton, stands forlornly amid raw earth and scanty grass. Pink in sketch below shows how it fits into the present structure.





LIBRARY OF CONGRESS

Covered walkway a hundred feet long links Senate and House wings in a view from the opposite side sketched by architect Benjamin Henry Latrobe. He had completed this much when George III's invading troops fired the Capitol in 1814. Several years later Latrobe made this water color from memory. Pink on plan below shows present location of the south, or House, wing occupied in 1807.



HOW TO ORDER YOUR CAPITOL GUIDE

We, the People, the Story of the United States Capitol, Its Past and Its Promise (144 pages, 175 illustrations, indexed) may be ordered from the United States Capitol Historical Society, House Office Building, Washington, D.C., 20515. Send $1.25 for paperbound; $2.75 for cloth-back.

JOINING THE CAPITOL HISTORICAL SOCIETY

To encourage broad participation, the Capitol Society offers: Junior membership (up to high school age), $1; Student (high school and college), $2; Supporting, $5; Contributing, $10; Share, $100; Sustaining, $1,000; Organization (for groups or firms), $25 or more. Grants in any amount are welcomed. Each member receives a certificate bordered with seals of the 50 states. Address: The United States Capitol Historical Society, Study Room 145, Annex, Library of Congress, Washington, D. C., 20540.

The result is far more than just a guide. The book tells of the great events in the Nation's history, as reflected in the growth of the Capitol. Its 144 pages explain the Capitol's working parts—committee rooms, press galleries, document rooms, even restaurants—and in so doing, give readers a clear picture of how Congress does its job.

Many of the book's pictures illustrate this magazine article. A picture of special interest, on pages 40-41, shatters a tradition of long standing.

For many years the Senate has had rules prohibiting the taking of photographs during regular sessions. For the new book the Senate for the first time voted to lift the ban, and National Geographic photographers, acting in behalf of the Capitol Society, were permitted to make pictures of the Senate in session on September 24, 1963. I may add

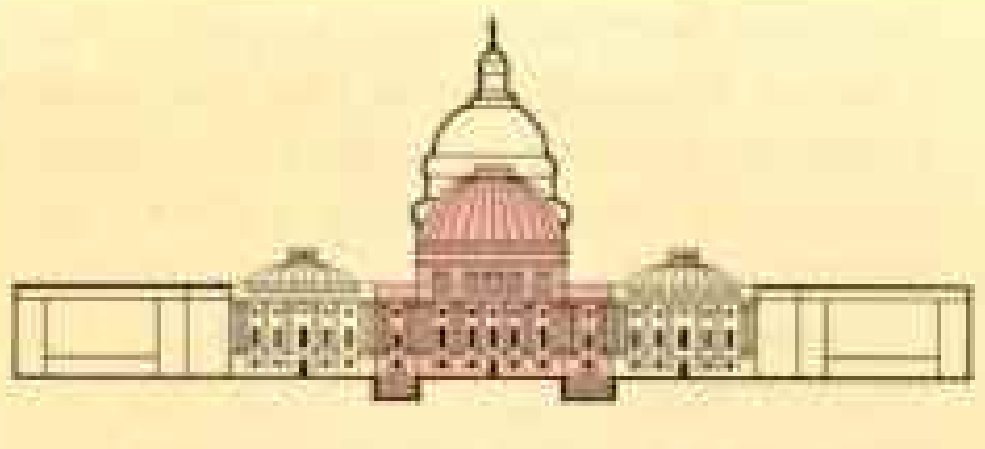
PRINT FROM A PAINTING BY W. H. BARTLETT, KIPLINGER COLLECTION

that I have never seen a better attended (or better dressed) session.

This picture, which shows the Senate voting on the nuclear test ban treaty, was published in newspapers all over the country. It and all other photographs for the book have been presented to the Historical Society for any worthy public use.

More than 5 million visitors walk through the Capitol every year, and for them the new book will be invaluable. Yet I think it will be just as valuable to people who never come to Washington. For the Capitol is more than a massive stone structure; it is a living, changing thing: an assembly of free people ruling themselves. Their story, which is your story and mine, is worth reading wherever you are.

Carl Hayden



Ravages of fire erased, the Capitol lifts a dome of wood sheathed in copper. In this 1837 print, strollers along muddy Pennsylvania Avenue view the building several years after Charles Bulfinch's work was completed. In the south wing, Abraham Lincoln sat as Representative from Illinois, at a time, as he later remarked, when the Capitol stood in sight of slave pens for human property in transit. Diagram shows how Bulfinch's dome compared with today's 287-foot-high structure.

THE UNITED STATES CAPITOL

Under the Dome of Freedom

By LONNELLE AIKMAN
National Geographic Senior Editorial Staff

Illustrations by National Geographic photographer
GEORGE F. MOBLEY

AS A CHILD growing up in Washington, I often trudged long blocks to play on the terraced green lawns of the United States Capitol. With adventurous comrades, I raced down the West Front's cascades of steps and teetered precariously atop its carved marble parapets.

The great white building, shimmering in the sun against blue skies, seemed to me then an enchanted castle guarding romantic and mysterious rites. It still does. For real magic goes on behind these thick stone walls. The Capitol furthers a powerful idea traceable back to the city-states of ancient Greece—that free men and women have the right and ability to govern themselves.

The home of Congress is at once the heart and symbol of the American system of representative government. From all over the country, citizens flock to it as if drawn by a magnet. Watching the ceaseless flow of visitors through the Capitol's marble halls, you sometimes think all Americans are bent on seeing the place where their laws are made.

Some five millions do just that each year, gazing upward in the great Rotunda, pausing to study paintings and statues of famous men, and filing quietly into the public galleries to hear debates on the floors of the Senate and the House of Representatives.

Viewed merely as real estate, the Capitol presents an impressive sight. Planted majestically on what was weed-covered Jenkins Hill, it looks down on a Federal City forbidden by law to build to heights that would overshadow the Nation's best-known dome.

"... No walls can hold us," exulted the editor of the *National Intelligencer* in 1851 when the cornerstone was laid for the extensions that would bring the Capitol to its present width. "It is, in all likelihood, not the last enlargement that will be needed. . . ."

Symbol of strength, the floodlit dome of the Capitol stands surmounted by its bronze Statue of Freedom. Within these walls, representatives of the people shape the Nation's destiny. Frieze on the east portico, where 24 Presidents have taken the oath of office, depicts America flanked by Hope and Justice. A summer evening finds portico steps serving as a grandstand for hundreds enjoying a concert by the United States Marine Band.

Today, this national legislative center covers four acres. From George Washington's unused tomb in the basement level (page 24) to the heroic-size Statue of Freedom, the building rises nearly 300 feet. Floor space totals 16½ acres, in 540 rooms on five floors.

It is easy for the uninitiated to get lost by straying from the broad central thoroughfares that link Senate and House wings (see the three-page foldout of the Capitol, pages 26-8). Threading mazes of corridors, you pass Congressional committee and administrative offices, document rooms, libraries, restaurants, kitchens, maintenance shops, and gilded reception rooms. Turning off under an arched doorway, you may suddenly come to a spiral stair well with worn sandstone steps, like those in some medieval monastery, or following the crowds, you may find yourself facing a stately double staircase fit for a palace.

Yet despite ever-increasing facilities, there is never enough room for the burgeoning activities of modern Congresses. Since the turn of the century, four massive office buildings—two each for House and Senate Members—have risen on either side of the Capitol's spacious, tree-dotted grounds. Another for Representatives is nearing completion.

Nearby, the Library of Congress, once contained in a single room of the early Capitol, now fills to overflowing its huge main building and Annex. It houses 43 million books, manuscripts, and other research items for the use of Congress and the people.

The Capitol itself was expanded several years ago by construction that pushed the East Front forward 32½ feet. Though the extension was passionately opposed by many who wanted no changes in this historic building, some of the severest critics now concede numerous benefits.

The crumbling old sandstone front has been duplicated in durable marble walls, columns, and decorative art. Congress has gained 102 rooms for practical needs, yet has kept the original outer walls on public display as

---

The Author: Senior Editorial Staff member Lonnelle Aikman has become known as a biographer of historic buildings in and near the Nation's Capital, her home town. She told the story of the White House in the January, 1961, GEOGRAPHIC, of Mount Vernon in November, 1953, and wrote previously on the Capitol in August, 1952. Her story, "New Stars for Old Glory," in the July, 1959, issue, brought her the George Washington Honor Medal of the Freedoms Foundation at Valley Forge.

US CAPITOL (ABOVE) AND ROTUNDA © UNITED STATES CAPITOL HISTORICAL SOCIETY

In the heart of the Capitol—the 96-foot-wide Rotunda beneath the great dome—five million pilgrims pause each year to get their bearings as they visit the fountainhead of the Nation's laws. In the paintings, Cornwallis's troops surrender (left), Washington becomes a private citizen as the Revolution ends, Pilgrims leave the Old World, and Columbus sets foot in the New (page 10).

The Rotunda was a no man's land in the Capitol's early days because neither House nor Senate would assume responsibility for it. Peddlers moved in, and visitors could buy apple peelers or corn shellers here, or view a panorama of Paris for 50 cents.

LIBRARY OF CONGRESS

Child's arms reach up toward a contemplative Lincoln, a statue by Vinnie Ream (left), from sketches made in her teens. A friend asked Lincoln to pose for the artistically talented girl, explaining that she was a Government clerk who made only $600 a year. "Well, that's nothing agin' her," remarked Lincoln, dropping into dialect, and agreed. Congress paid her $15,000 for the statue and unveiled it in 1871.

interior walls (page 11). It has acquired a private corridor permitting direct transit between legislative chambers.

During the past year I spent months and walked miles in the Capitol to gather material for this article, and for the book being published simultaneously by the United States Capitol Historical Society (page 3).

I poked into odd nooks and crannies, climbed narrow, circular stairs to the dome's tiptop, crept through eerie underground passages. I was taken into Congress's new Prayer Room for Members, simple and nondenominational, where even the Bible and the United States flag are anonymous gifts (page 50). I circled the Capitol in a Presidential helicopter, tilting close to the bronze goddess of freedom breathtakingly framed by the copter's open door.

Once I clambered down an iron ladder into a tunnel built in the late 19th century to draw fresh air into the building. Using steam-powered, then electric, fans, the system was an early version of air conditioning.

But I remember best that spring-vacation day I trailed a group of youngsters through one of the Capitol's many entrances.

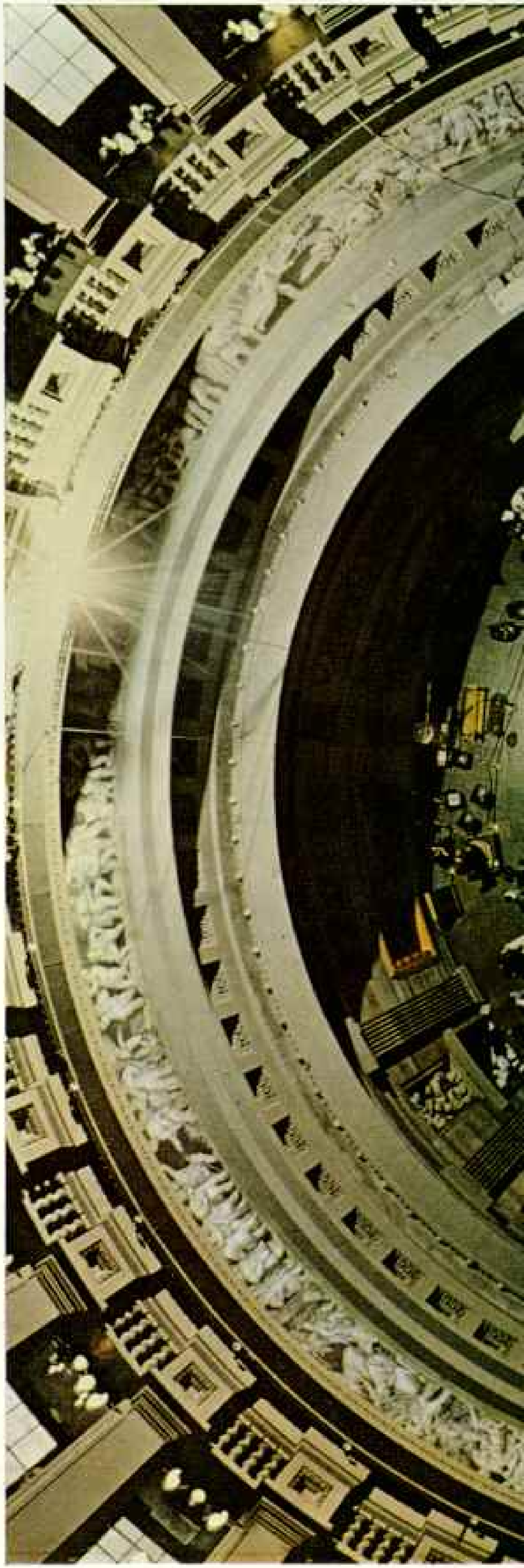
"How much?" a boy called out to the guard.

"For what?" asked the man.

"To get in."

The guard smiled. "This whole place belongs to you," he said.

Any American who expects to find his Capitol simply a lawmaking factory is due for a surprise. What he actually sees is a combined art gallery and museum, with a short course in history thrown in.



View From 180 Feet Up Shows the Hollow Immensity Below the Dome

Narrow, twisting stairs lead to this dizzy vista, but the climb exhausted so many visitors that it was closed to the public.

At age 72, Constantino Brumidi began the band of fresco scenes circling the wall; his skill made the flat figures look like sculpture. During his work, he slipped on the scaffold and hung helpless 58 feet above the floor for 15 minutes before aid came. Weakened by shock, he died soon after; his pupil, Filippo Costaggini, took over the task.

For this picture, photographer Mobley hung his camera on a rope stretched across the chasm. During his Capitol assignment, on which he shot some 4,000 exposures, he rode a 50-foot hydraulic lift, climbed special scaffolds and 100-foot extension ladders, and circled the soaring dome in a helicopter.

PHOTOGRAPHED BY NATIONAL GEOGRAPHIC PHOTOGRAPHER GEORGE F. MOBLEY © U. S. CAPITOL HISTORICAL SOCIETY

Painted in the 1840's by John Vanderlyn, "The Landing of Columbus" adorns the Rotunda. Claiming the Bahamas, the explorer holds aloft the flag of Spain. Elation seizes ocean-weary sailors (left). Hopeful of easy gold, two grasp glittering sand.

Revolutionary War artist John Trumbull, who painted "The Surrender of Lord Cornwallis" for the Capitol, knew his subjects well and portrayed many from life. For a time he served as an aide to Gen. George Washington, who here sits astride a brown charger at Yorktown, October 19, 1781. Maj. Gen. Benjamin Lincoln, aide to Washington, conducts the defeated British between the victorious Americans and their French allies.

Leafy scroll once bore its sandstone flowers in the open air of the east portico. When Congress enlarged the Capitol in 1958-61, the old outside wall was preserved intact within the new addition. Builders left an opening in a corridor panel to display the battered old stones. Extension added two and a half acres of floor space—enough for 102 rooms.

Most visitors come first to the vast central Rotunda, passing through Randolph Rogers's superbly sculptured doors. These 10-ton bronze portals—modeled in Rome, cast in Munich, and installed at the main east entrance in 1871—depict scenes from the life of Columbus, whose voyages started it all.

From the Rotunda, many sightseers take the official tour conducted by Capitol guides. Others wander on their own through statue-lined corridors and rooms of the House and Senate wings. Guided tours include a stop in the debating chambers. Individual visitors need passes, which are gladly provided by Members of Congress on request.

Aside from private lobbies and offices near Senate and House Chambers, few spots of historic interest are closed to the public.

In the Senate Reception Room, a lushly decorated chamber at the east end of the main Senate lobby, Members of the Senate meet friends and constituents (page 38).

The President's Room, on the opposite side, can be seen only when the Senate is not in session. It is well worth a special trip to look in at its ornate decor and the Victorian table on which many Presidents signed last-minute bills passed by Congress (page 53).

Two of the most fascinating rooms in the Capitol—one above the other in the original Senate wing—were used in turn by the Senate and the United States Supreme Court, between 1800 and 1935. Now off limits for tourists, but proposed for restoration and future exhibit, these rooms saw many momentous events in the Nation's life (pages 56-7).

On the House side, visitors look for their state heroes in Statuary Hall, where the House met from 1807 until its present wing was occupied in 1857. Here, in assorted poses and costumes, stand 47 bronze and marble figures presented by states in memory of distinguished citizens (pages 14-17). Thirty-nine others are displayed elsewhere, moved out because of their crushing weight.

Still incomplete, this national hall of fame originated in 1864, when Congress asked that each state choose two outstanding deceased persons to be honored by a statue in the former House Chamber. The abandoned room was at that time "draped in cobwebs and carpeted with dust, tobacco, and apple pomace," as one Congressman remarked. Where great statesmen of the past sat, said another, "I see a huckster woman selling gingerbread."

Feminine Quartet Graces Hall of Fame

Cleared and renovated, Statuary Hall received its first contribution in 1870—a marble figure of the Revolutionary hero Nathanael Greene of Rhode Island.

Thirty-five years passed before a woman made the statuary team. She was Frances E. Willard of Illinois, President of the National and World's Woman's Christian Temperance Unions, and frequent contributor to 19th-century newspapers and magazines.

Three more women have joined the states' honor corps in the past six years: Minnesota educator Maria Sanford, Colorado research biologist Florence Rena Sabin, and Wyoming's Esther Hobart Morris, crusader to make her state first to vote woman suffrage, which it did in 1869 while still a territory.

Among the states' favorite sons and daughters are Colonial governors and modern-day scientists. Oklahoma chose a humorist—Will Rogers, who wanted to be where he could "keep an eye on Congress"—and an Indian sage, Sequoya, who developed the Cherokee alphabet. Virginia predictably selected George Washington and Robert E. Lee.

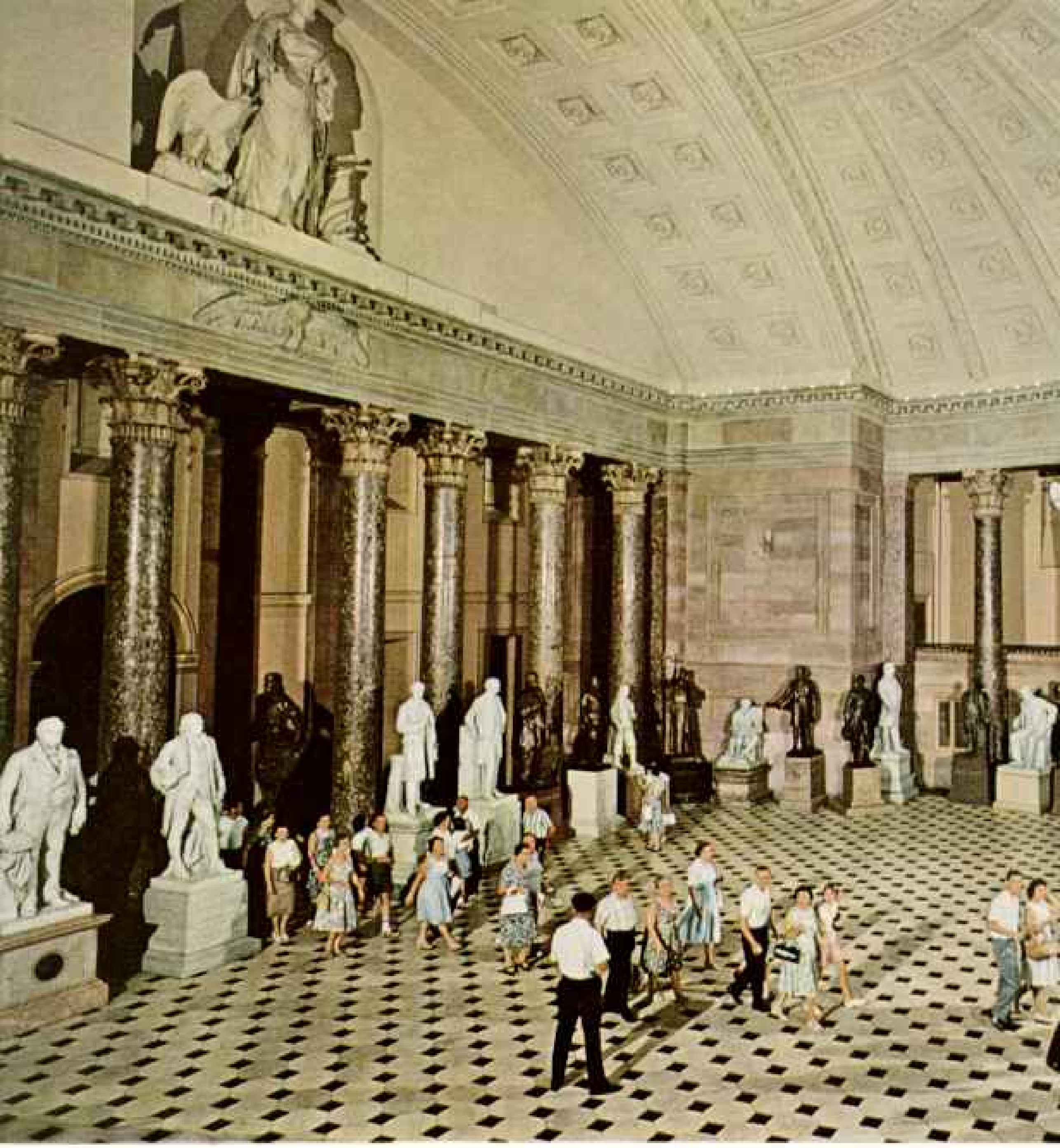
Heroic Figures in the Lofty Dome Appear Life-size From the Floor

In Brumidi's allegory, forms of the Thirteen States (inner circle) proclaim the strength of the Union: "*E Pluribus Unum*"—"Out of Many, One." Washington, the central figure, sits immortalized. Classical deities around the rim symbolize the Republic's growth. Counterclockwise, Ceres, riding a reaper, represents agriculture; Vulcan, with a hammer, mechanics; Mercury, with a money-bag, commerce; Neptune, with trident, and Aphrodite, holding the Atlantic cable, maritime progress; Minerva, arts and sciences; and armed Freedom, modeled after the aging artist's young wife, defeating tyranny.

Two technicians and their police escort peer over the balustrade at right, showing the true height of the titans, some 15 feet.

Craning foursome peers up at Brumidi's fresco. In John Trumbull's canvas, a life-size General Washington resigns his Army commission in the Annapolis State House.

DAYACHRISMA (KEOGH) AND CODICHRISMI BY NATIONAL GEOGRAPHIC PHOTOGRAPHER GEORGE F. MOBLEY © U. S. CAPITOL HISTORICAL SOCIETY



From his pedestal in Statuary Hall, Lee soberly looks out over the spot, marked by a bronze circle, where John Quincy Adams suffered a fatal stroke in 1848. Adams, who had served as a diplomat, Senator, Secretary of State, and President of the United States, spent the last 17 years of his life here as a Massachusetts Representative.

"My election as President . . . was not half so gratifying to my inmost soul," Adams commented on learning he had won the House seat. "No election or appointment . . . ever gave me so much pleasure."

Only New Mexico, Alaska, and Hawaii have yet to deliver their first statues. I saw a "first" installed last year in a flower-decked ceremony—North Dakota's Governor "Honest John" Burke, who died in 1937.

But each state is still limited to two choices. Once a statue is installed, Congressional action is required to make a substitution. And so far, though at least one state has had second thoughts, no such action has been taken.

In all, the Capitol contains more than 500 works of art, many of them portraits, busts, and life-size sculptures of political leaders

who served in this building. In the long lobby outside the House Chamber hang portraits of 43 Speakers from Frederick Muhlenberg, who was a Member of the first Continental Congress, to the late Sam Rayburn (pages 32-3). Looking out from niches around the galleries of the Senate Chamber are marble busts of 20 Vice Presidents—beginning with John Adams—who presided over that body.

"I never dreamed there was so much," sighed a friend who had joined me for a tour, as we passed a pensive statue of Benjamin Franklin and gazed up at William H. Powell's mammoth painting, "The Battle of Lake Erie," hanging over the Senate's east stairway.

The turbulent lake scene is one of four paintings at House and Senate stair landings. An eye-catcher on the House side is Emanuel Leutze's "Westward the Course of Empire Takes Its Way." Bought by Congress a century ago, this melodramatic portrayal of pioneers battling the wilderness was a bit of super-realism from current events of the day.

Probably the oddest exhibit is three marble ladies sitting—fully clad—in what the flippant call a snowbank or bathtub. The portrait busts, rising from an 8-ton block of marble, honor crusading suffragettes Lucretia Mott, Susan B. Anthony, and Elizabeth Cady Stanton. Their monument, presented by

Vaulted Statuary Hall Once Rang With Debates of the House

Here Representative Henry Clay helped frame the Missouri Compromise. Here in one Congress sat Andrew Johnson, Horace Greeley, John Quincy Adams, and Abraham Lincoln. Abandoning the hall to cobwebs, apple cores, and hucksters in 1857, Congress later revitalized it as a repository for statues of each state's noted sons and daughters.

Capitol guide demonstrates Statuary Hall's whispering gallery. Janet McCormick's "ssh" carries to the group 45 feet away, but is inaudible in between. Poor acoustics plagued the House for decades; ghostly echoes still pervade the old room.

Marble giants in Statuary Hall ignore two wondering little figures. Georgia's Alexander H. Stephens served the Confederacy as Vice President. Utah's Brigham Young led the Mormons west. Vermont's Ethan Allen took the Green Mountain Boys into the Revolution. Idaho's George L. Shoup became his state's first governor. South Carolina's Senator John C. Calhoun championed the states'-rights cause in Congress.

Sam Houston in stone meets fellow Texans, presented by Representative George H. Mahon.

the women of America in 1921, received a royal welcome in the Rotunda, but because of its formidable weight it has since reposed in lonely state in the crypt (page 20).

Looking Over the Family Album

Critics who have commented harshly on some of the works—Mark Twain called the giant frescoes in the dome "the delirium tremens of art"—forget that their appeal lies not so much in artistic merit as in persons and events they represent.

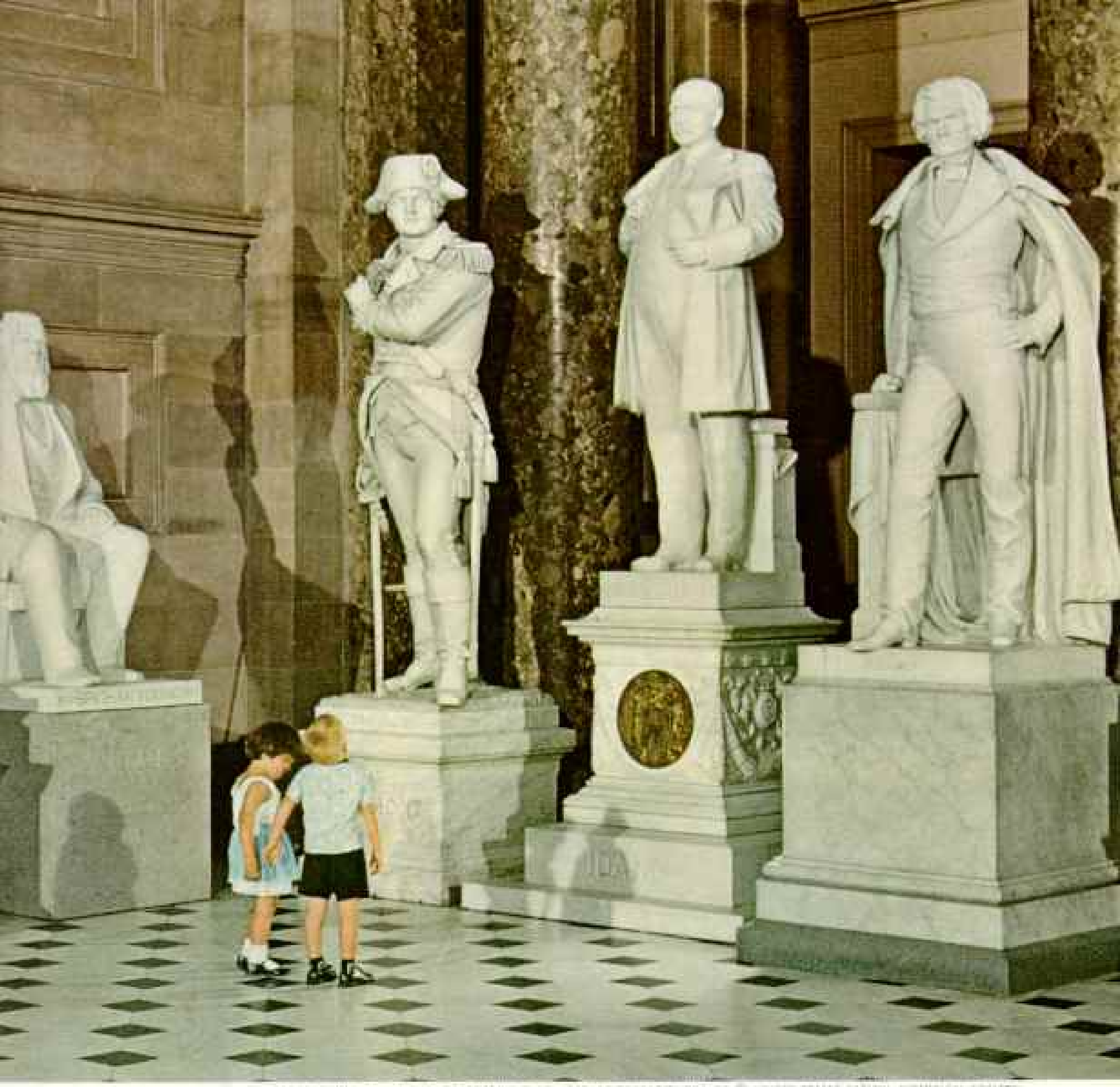
To Americans a stroll through the building is a little like turning the pages of the family album. In the Rotunda, for instance, stands an austere Washington in Continental uniform. Over there, young Jefferson unrolls the Declaration of Independence he wrote.

I met a small boy fingering the bronze scroll one day, and asked him if he knew why John Hancock's signature was so big.

"Of course," he said with scorn for my ignorance. "Because he wanted King George to be able to read it without his glasses."

The figure of Andrew Jackson, slim and dashing as he appeared at the Battle of New Orleans, is a reminder of the attack made on his life, in January, 1835, just as he left this room. Jackson, then President, had attended the funeral of a Member of Congress at the Capitol. A madman in the crowd tried to shoot him, but both his pistols misfired. It was the first attempt to assassinate a President of the United States.

Two Lincoln sculptures stand out against the soaring walls of the Rotunda. The large



REDUCED FROM 61 NATIONAL GEOGRAPHIC PHOTOGRAPHS BY GEORGE F. MOBLEY © UNITED STATES CAPITOL HISTORICAL SOCIETY

marble head was carved by the noted sculptor Gutzon Borglum, twenty years before he began his colossal Mount Rushmore heads. The perceptive full-length study was created by a 19th-century girl named Vinnie Ream.

Vinnie was a 17-year-old prodigy working as a Post Office clerk when a friend introduced her to the President. Lincoln, touched by her youth and poverty, agreed to let her sketch him while he worked. As she observed the wartime President at his desk, she saw the man of sadness portrayed here (page 7).

For authentic group pictures from the early days of the Nation, the Rotunda offers John Trumbull's four oils crowded with Revolutionary leaders—"The Declaration of Independence," "The Surrender of General Burgoyne," "The Surrender of Lord Cornwallis," and "Washington Resigning His Commission."

Son of Jonathan Trumbull of Connecticut (the only Colonial governor to support the rebels) and aide to Washington, John Trumbull knew many of his subjects personally. He had traveled widely to verify details used in his Revolutionary paintings. To reproduce the Declaration scene, the artist copied the room "from that in which Congress held their sessions at the time . . . before the spirit of innovation laid unhallowed hands upon it. . . ."

It is hard to believe, as you look at the fantastically varied decorations lavished on much of the Capitol's interior, that one man produced virtually all these designs.

The artist was Constantino Brumidi, an Italian refugee of Greek descent who found political asylum in the United States in 1852

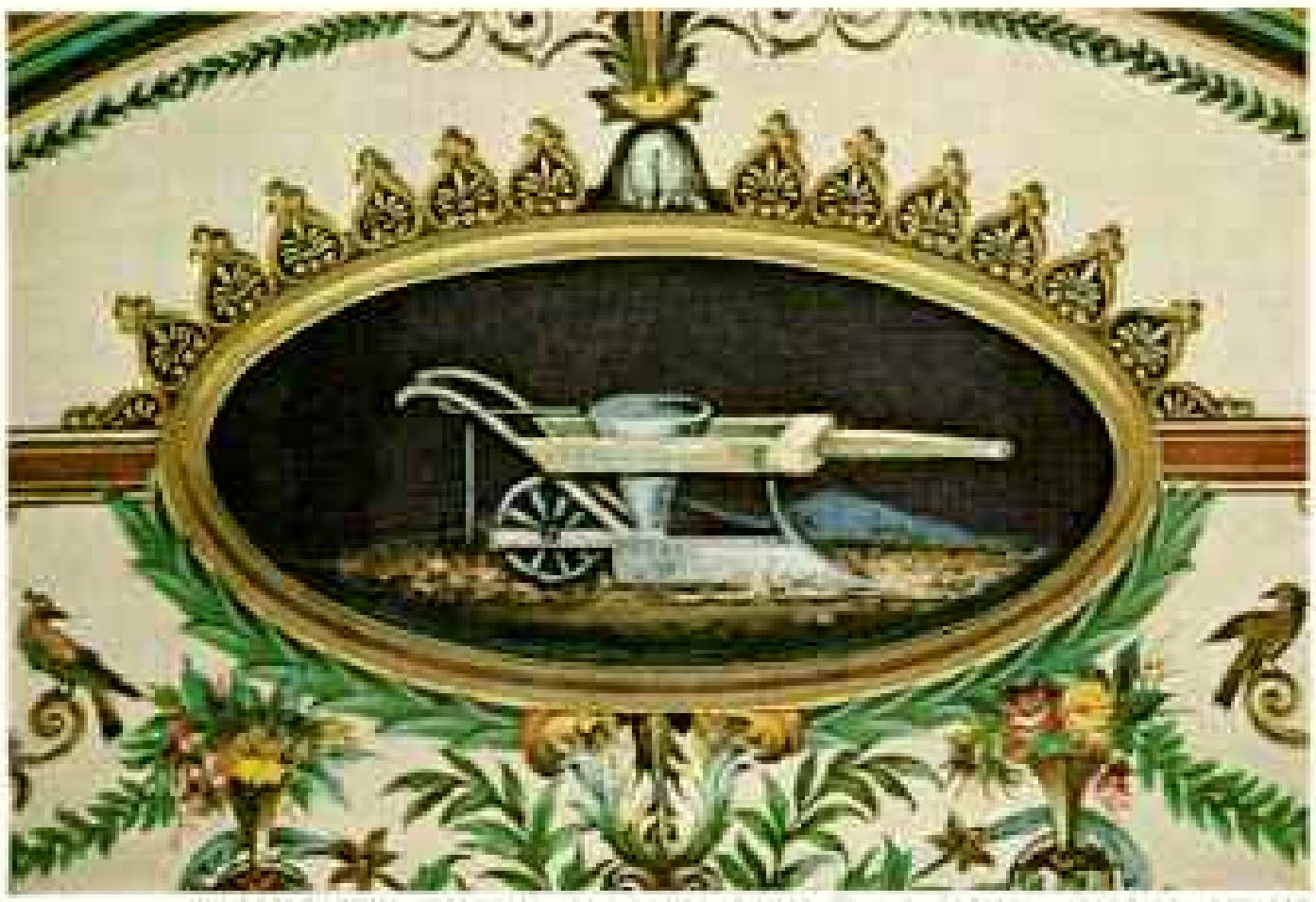
Brumidi's Rich Colors Enthrall Visitors to the Senate Wing

An Italian guardsman who refused to fire on the people in the revolution of 1848, Constantino Brumidi fled to the United States when middle-aged. He devoted the rest of his life to adorning "the Capitol of the one country on earth in which there is liberty." Proudly he signed one of his works: "C. Brumidi, artist. Citizen of the U. S."

Scarlet macaw, painted from a design by Brumidi, perches on a panel between tanager and vermilion flycatcher (top) and parrot.

Square-rigged, three-masted frigate resembles the U.S.S. *Constellation,* which fought the pirates of the Barbary States in the early 1800's.

Seed planter in the Patent Corridor honors the Nation's inventors.



January, 1964

NATIONAL GEOGRAPHIC

To the Memory of Our Beloved President
Friend to All Mankind

1917 *John Fitzgerald Kennedy* 1963

THIS IS THE BLACK FRIDAY of President Kennedy's passing from the world of men, and the giant presses which have printed nearly all of this issue have been stilled that we may add these words of tribute.

We weep for him, but more we mourn for the world in its loss of a leader of great good will who devoted his talents and energies to peace, justice, and understanding.

In this time of shock and grief, words fail, but we offer here two photographs. One, on the previous page, was Mrs. Kennedy's favorite. The First Lady chose it last summer for the latest edition of the White House Historical Association's guide to the Executive Mansion. To our editors consulting with her on the book she explained that to her the somber setting seemed to reflect the burdens of the Presidency.

In the other picture, below, the President sets forth his 1962 program for a greater America and a peaceful world. We can almost hear his familiar voice saying:

"A strong America requires the assurance of full and equal rights to all its citizens, of any race or of any color. . . . As we approach the 100th anniversary next January of the Emancipation Proclamation, let the acts of every branch of the Government—and every citizen—portray that righteousness does exalt a nation."

On two memorable occasions in the White House Rose Garden, President Kennedy presented gold medals on behalf of the National Geographic Society for outstanding achievement—to the American Mount Everest Expedition and to the French undersea explorer Capt. Jacques-Yves Cousteau. Characteristically, each time he emphasized the importance of international effort.

President Kennedy had graciously agreed to dedicate the National Geographic Society's new headquarters building on December 16, 1963. Perhaps, with typical eloquence, he would have spoken to us of the challenge of the unknown, for he was the kind of man who looked upon such challenge as an opportunity.

And now he is gone. In the words of his own tribute to the memory of another great American, poet Robert Frost: "His death impoverishes us all . . . leaves a vacancy in the American spirit."

GEORGE HARRIS, COURTESY MCCANN-ERICKSON, INC. (PRECEDING PAGE) AND GEORGE F. MOBLEY, NATIONAL GEOGRAPHIC ©

President Kennedy as he delivered his 1962 State of the Union Message before a Joint Session of Congress. Behind him sit the two men next in line for the Presidency, Vice President Lyndon B. Johnson (page 55), who succeeded to the office immediately following the President's assassination in Texas on November 22, 1963, and John W. McCormack of Massachusetts, Speaker of the House (page 34).

City in miniature:

GROUND-FLOOR CRYPT below the Rotunda stops passers-by with its memorial to woman-suffrage leaders Lucretia Mott, Susan B. Anthony, and Elizabeth Cady Stanton. The marble block from which the figures rise has been likened by many to a bathtub or snowbank.

Glass shaker of black blotting sand stands on each Senator's desk, a holdover from the days of quill pens. In five years, the Senate has used slightly more than a pint of the fine, clinging grains. Where does it go? Perhaps for souvenirs.

Reporter Willard Edwards (opposite), in the Senate Press Gallery, mulls over wording of a dispatch.

Restoring a panel, Polish-born Joseph S. Serafin retouches the background of a Brumidi design.

© UNITED STATES CAPITOL HISTORICAL SOCIETY

at the age of 47. Three years later he began his great task, devoting his remaining quarter of a century to the sole ambition, as he put it, "to make beautiful the Capitol of the one country on earth in which there is liberty."

Much of Brumidi's work is in true fresco, like Michelangelo's in the Sistine Chapel of the Vatican. In this art, water-mixed pigments, applied to wet plaster, leave glowing and durable colors. From a scaffold suspended some 180 feet above the Rotunda floor, Brumidi covered the dome's curved canopy with his monumental allegory on the glorification of Washington (page 13). Yet he could also paint the small and delicate figures that fill corridors and committee and reception rooms with cherubs, nymphs, birds and flowers, with landscapes and with portraits of American inventors and statesmen.

Death in 1880 cut short the aging artist's career before he could finish his frescoed frieze on American history encircling the Rotunda. His pupil, Filippo Costaggini, continued the work. But it was not until 1953 that muralist Allyn Cox added the last of three panels, depicting the Wright brothers' flight of 1903.

Nearly 100 years late, Brumidi's blank oval medallions in the Senate Reception Room also have finally been filled in. In 1957 a Special Senate Committee, headed by future President John F. Kennedy, chose five Senators of the past—from scores suggested—to be honored as "men whose statesmanship, transcending party and State lines, left a permanent mark on our Nation's history. . . ."

Now, from Brumidi's painted gold frames, gaze the faces of three 19th-century giants, Henry Clay, John C. Calhoun, and Daniel Webster; and two vigorous 20th-century spokesmen for the progressive and conserva-

TV, art, train

GIANT HEAD of Lincoln draws visitors. Iowa Representative Fred Schwengel (right) points out that sculptor Borglum omitted an ear.

Bronze eagle glares from a Senate stairway.

Subway train zips between New Senate Office Building and Capitol in a breezy 60 seconds.

Television panel in the Senate recording studio stars Senators Clark and Scott of Pennsylvania and their guest, A.I.D. chief Bell. Studio backdrop shows the Capitol.

BOOKHANDOUTS AND CATACHRONOMES © U. S. CAPITOL HISTORICAL SOCIETY

tive movements—Robert M. La Follette, Sr., and Robert A. Taft (pages 38-9).

The fact that no five men could have had more different political beliefs highlights not only the choice of these Senators, but the principle of free play of opposing ideas that is part of our representative form of government.

Nation's Course Was Set in Capitol

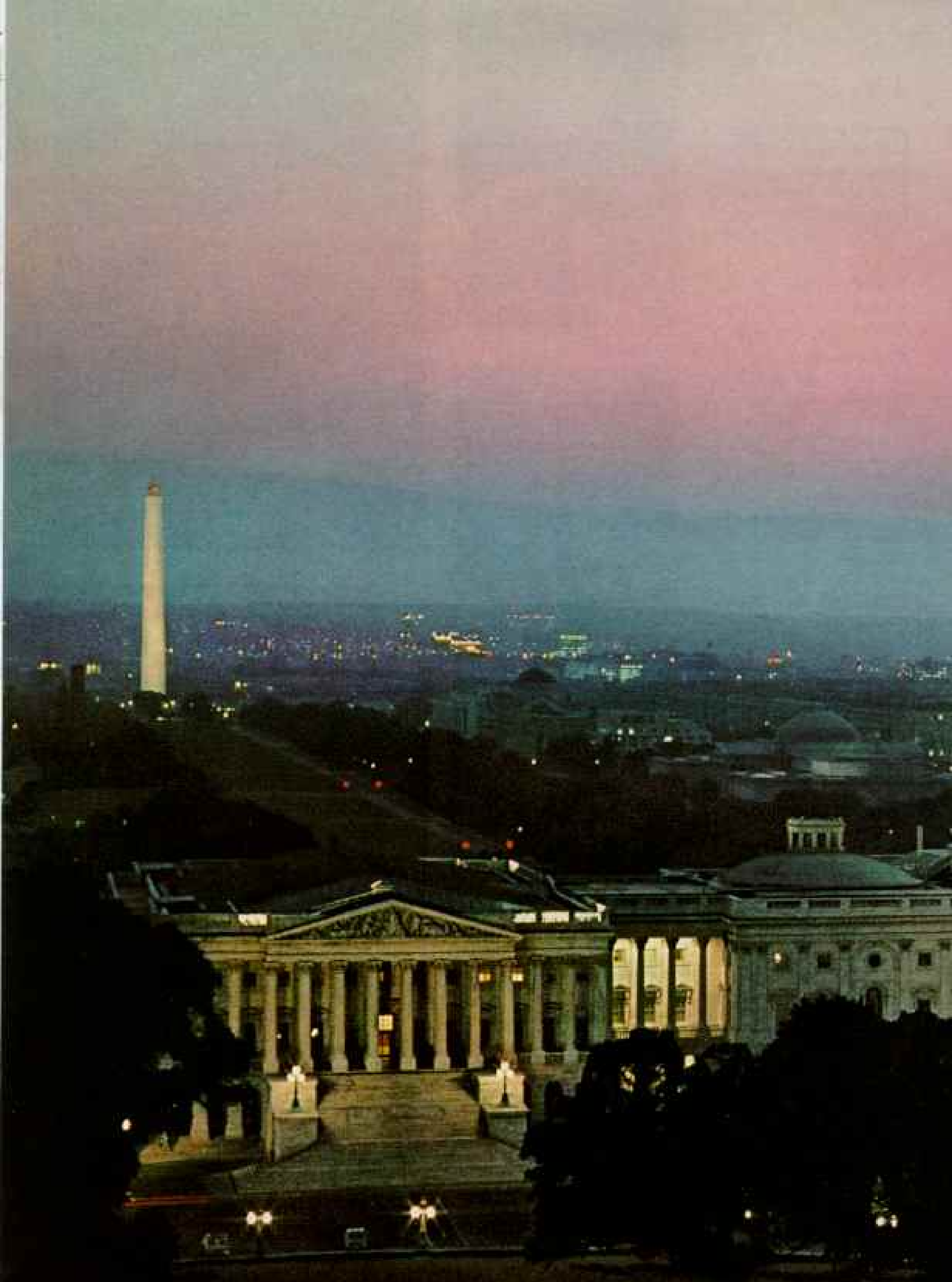
No other building anywhere has seen so much achieved in the name of what Lincoln called government of, by, and for the people.

Here, since the Capitol's first boxlike wing was completed in 1800, men of varying views have come together—a Washington newspaperman once called it "at loggerheads together"—to make the rules for all of us. By trial and error, battle and compromise, they hammered out the laws that shaped the country's growth from a thin line of seaboard states to a Nation reaching the mid-Pacific—with the status of a world power.

"You can write a history of the United States from the annals of Congress," the late Speaker of the House, Sam Rayburn, used to say. He was in a position to know. He was a Texas Representative for more than 48 years, and Speaker for 17, more than twice as long as the previous record holder, Henry Clay.

In his own time, Mr. Rayburn took part in, and sometimes presided over, Capitol events that changed political, economic, and social life in 20th-century America. He sat in Congress during the terms of eight Presidents, beginning with Woodrow Wilson in 1913.

That year, the far-reaching 16th and 17th Amendments to the Constitution were adopted. The 16th authorized the Federal graduated income tax, though its provisions were so liberal that at first citizens hardly felt the tap.



STANDING MAJESTICALLY ON ITS HILLTOP, *the Capitol looms over Washington's historic buildings and broad, tree-shaded avenues. Viewed from the dome of the Library of Congress, the shrine glows brightly against a twilight sky. To the west, the Washington Monument flashes its red beacon 555 feet above the ground.*

The 17th Amendment made a basic change in the electoral process. In providing for direct elections of Senators, instead of by the vote of state legislatures, it gave the people a far greater voice in their Government than the Constitutional fathers had ever envisioned for them.

Vinson Sets House Record—49 Years

Last fall another veteran, Carl Vinson of Georgia, topped even the Rayburn record of service in the House, achieving 49 years. As chairman of its military committees for 30 years, Mr. Vinson has had a major role in raising and keeping U. S. military power at unprecedented peacetime levels. He shared in the labors and debates of the historic Congresses that declared American entry into two World Wars; that ushered national prohibition in—and out; that voted New Deal innovations.

He has seen the legislative process grow increasingly complex, he told me, as issues of the roaring twenties and depressed thirties gave way, in the forties, fifties, and sixties, to problems of atomic power, cold war, space flights, and civil rights.

"To me, the two most notable events of that time," Mr. Vinson said, "were the declaration of World War I, and giving women the vote.

"The war changed the course of American foreign relations, and pushed the country into tremendous economic and technical development. As for the ladies, I recall how they paraded and demonstrated. It caused a lot of excitement on the Hill. But the women were determined. A good thing, too. The suffrage act was fine legislation."

As we sat in the House Restaurant, a small boy from Georgia came up for the Congressman's autograph.

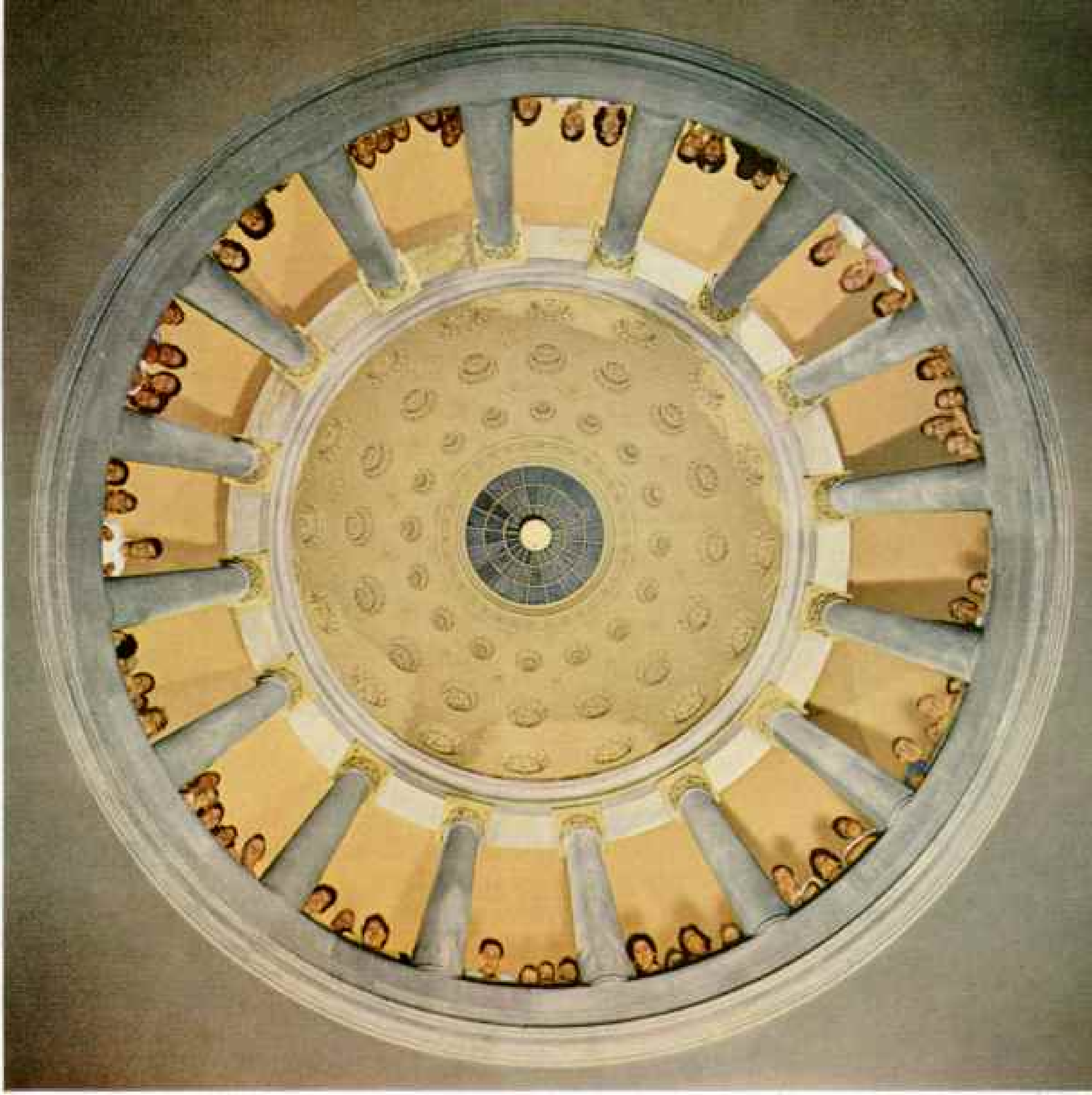
"Visitors find a changed Congress today," Mr. Vinson said after the boy left with his signed menu. "The average Member is younger now, and more casual. Fifty years ago, the

Tobacco leaves adorn a capital in the Senate Small Rotunda (opposite). The designer, architect Benjamin Latrobe, also created a cornstalk column to honor New World products.

Lincoln's Catafalque Lies in Washington's Unused Tomb

On this black-draped platform have rested the coffins of all who have lain in state in the Capitol, beginning with the Civil War President. Among those mourned: Garfield, McKinley, Admiral Dewey, Pershing, the Unknowns of the World Wars and Korea, and a father and son, William Howard and Robert A. Taft.

Congress planned the tomb for Washington, but heirs, heeding his will, kept the body at Mount Vernon.



EXTERIORS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER GEORGE F. MOBLEY © U.S. CAPITOL HISTORICAL SOCIETY

Visitors on a guided tour crowd the balustrade of the Senate Small Rotunda.

first thing a new Congressman did was to have a frock coat made and buy a high hat."

On the Senate side, I met a man who has been in Congress longer than any other in history. A living link with the frontier, Senator Carl Trumbull Hayden came to the House when Arizona joined the Union in 1912.

"There were still Civil War veterans here," the Senator said in recalling his days as a tenderfoot legislator, fresh from being county sheriff and apprehender of train robbers back home. "One of them sat next to me. He gave me some advice I never forgot.

" 'There are two kinds of Congressmen,' he said, 'work horses and show horses. Show horses get their names in the papers. But if you study the bills in committee, and don't let anything slip by, you'll end by getting somewhere a lot better than in print.' "

Following this advice, Hayden has earned distinction as a "Senator's Senator." A longtime Chairman of the Appropriations Committee, he holds a key to billions in the Nation's cash register. As President *pro tempore* of the Senate, he is third in succession, after the Vice President and the Speaker of the House, for the United States Presidency.

Because of his interest in the Capitol and its part in the American past, Senator Hayden has accepted permanent chairmanship of the Honorary Board of Trustees of the

(Continued on page 32)

HOUSE

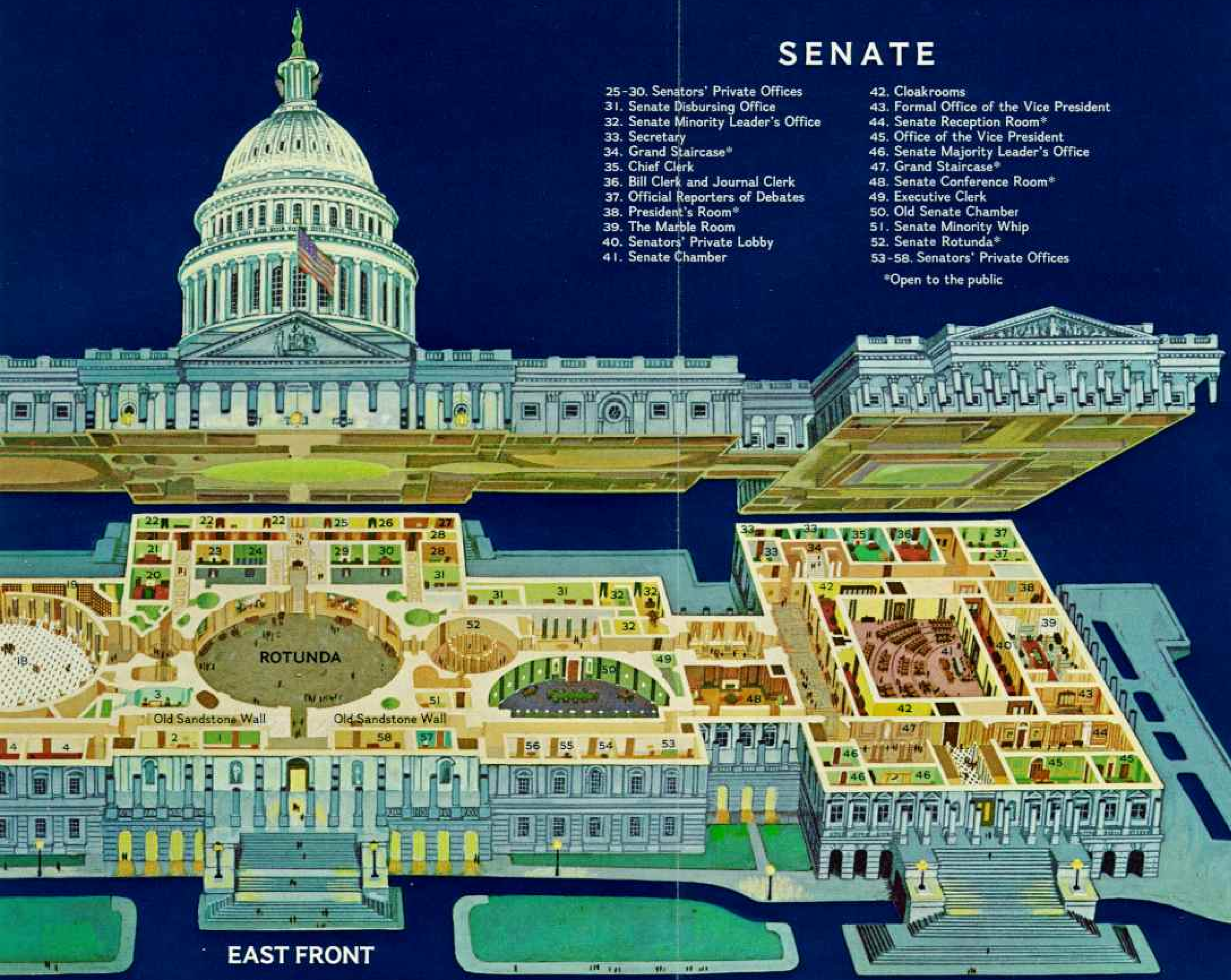
1. House Majority Conference Room
2. House Minority Conference Room
3. Congressional Ladies' Reading Room
4. Office of the Speaker
5. House Reception Room
6. Committee on Ways and Means
7. Grand Staircase*
8. Formal Office of the Speaker
9. Parliamentarian
10. Members' Reading Rooms
11. Speaker's Lobby
12. House Chamber
13. Library
14. Cloakrooms
15. Committee on Appropriations
16. Grand Staircase*
17. House Minority Whip
18. Statuary Hall*
19. House Document Room
20. House Subcommittee on Foreign Affairs
21. Representative's Private Office
22. House Minority Leader's Office
23. Representative's Private Office
24. Prayer Room for House and Senate

*Open to the public

SENATE

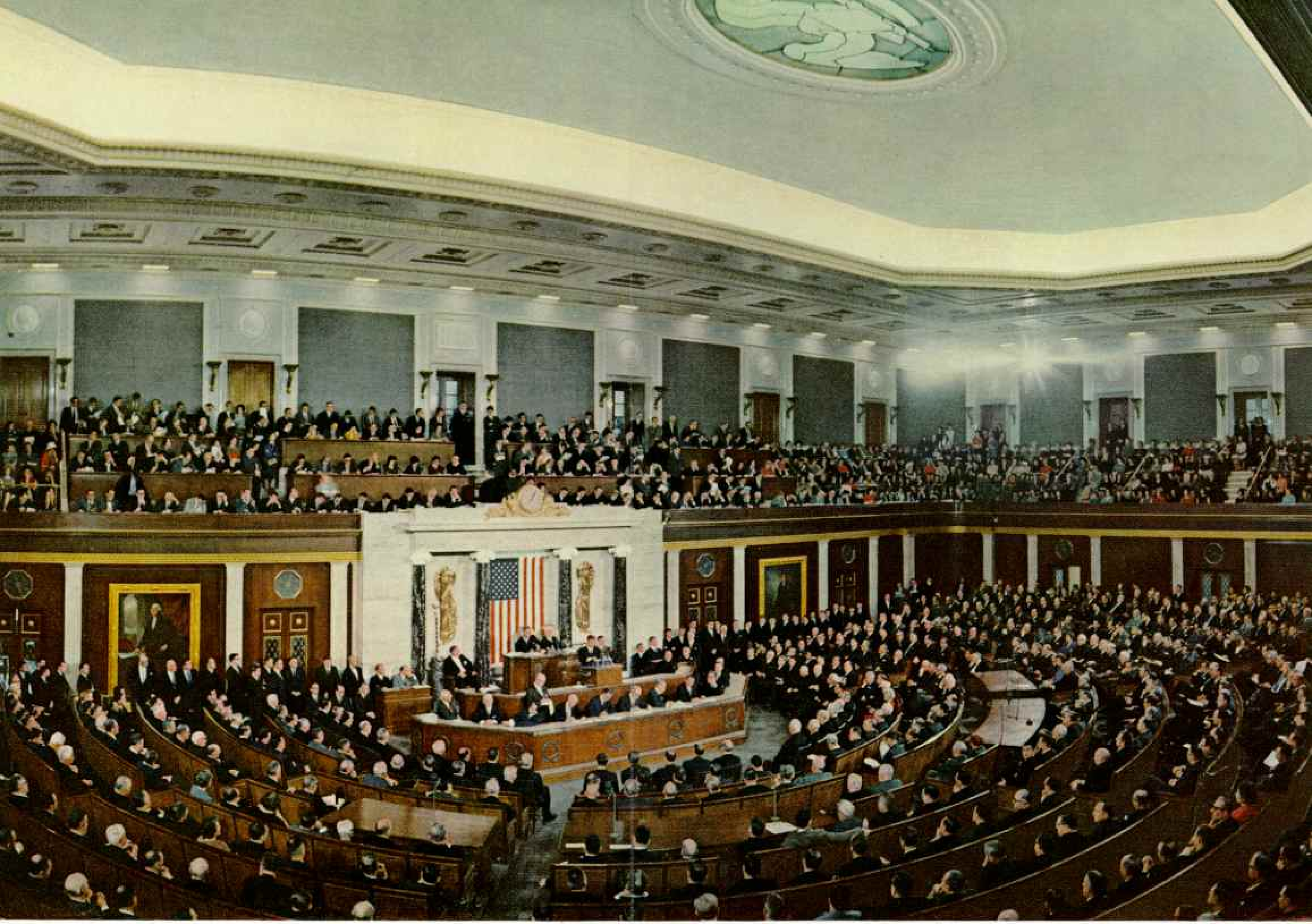
25-30. Senators' Private Offices
31. Senate Disbursing Office
32. Senate Minority Leader's Office
33. Secretary
34. Grand Staircase*
35. Chief Clerk
36. Bill Clerk and Journal Clerk
37. Official Reporters of Debates
38. President's Room*
39. The Marble Room
40. Senators' Private Lobby
41. Senate Chamber
42. Cloakrooms
43. Formal Office of the Vice President
44. Senate Reception Room*
45. Office of the Vice President
46. Senate Majority Leader's Office
47. Grand Staircase*
48. Senate Conference Room*
49. Executive Clerk
50. Old Senate Chamber
51. Senate Minority Whip
52. Senate Rotunda*
53-58. Senators' Private Offices

*Open to the public



EAST FRONT

Dick Loomis



State of the Union, 1963—the President Greets House and Senate in Joint Session

"You and I are privileged to serve the Great Republic in what could be the most decisive decade of its life," John F. Kennedy told the 88th Congress, meeting in the House Chamber January 14, 1963. Mr. Kennedy stands alone on the intermediary dais. Vice President Lyndon B. Johnson, who is President of the Senate, and Speaker of the House John W. McCormack sit behind him; before him sit officers of the two Chambers. The Supreme Court, Cabinet, and the Joint Chiefs of Staff occupy temporary chairs encircling the rostrum. Senators, Representatives, and the diplomatic corps share the rest of the floor. Reporters fill three tiers of desks in the balcony behind the clock. Relatives of top officials and special guests sit in the galleries, where television, newsreel, and still cameras record the event.

Except on guided tours, visitors to any session of Congress need admission cards, which are checked at the doors by guards, a precaution stemming from the aftermath of March 1, 1954, when

US EXPLORERS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER THOMAS NEBBIA © NATIONAL GEOGRAPHIC SOCIETY

armed Puerto Ricans fired a volley of shots into the House Chamber and wounded five Representatives, two seriously. The terrorists, a woman and three men, were captured quickly.

Congress usually sits in Joint Session only for Presidents; other assemblies of the House and Senate are called Joint Meetings. Eminent guest speakers in recent years have included former British Prime Minister Winston Churchill (twice), French President Charles de Gaulle, the Shah of Iran, poet Carl Sandburg, and Astronauts John Glenn and Gordon Cooper.

Texan Sam Rayburn outdid Henry Clay's long record as Speaker of the House. Score: Rayburn, 17 years, Clay, 8. Representative Rayburn, noted for his remarkable ability to weld diverse factions for a common cause, won Congressional approval for extension of the Capitol's East Front. Douglas Chandor's oil hangs in the Speaker's Lobby (right).

Portraits of Speakers line the walls of the Speaker's Lobby, where some early arrivals await the call to order in the House. Left to right: Chaplain Bernard Braskamp and Representative Charles B. Hoeven of Iowa, Parliamentarian Lewis Deschler and Sergeant at Arms Zeake W. Johnson, Jr. (rear), and Representatives Robert G. Stephens, Jr., of Georgia and Carlton R. Sickles of Maryland.

Capitol Historical Society (pages 1 and 53).

With the Capitol Society's president, Representative Fred Schwengel of Iowa, I showed the Senator the historic pictures selected for the organization's first book. He stopped at one showing President Wilson reading his War Message of April 2, 1917, before a Joint Session of Congress.

"I remember that well," Hayden said. "Speaker Champ Clark and Vice President Thomas Marshall were presiding . . . And I remember something else that happened soon afterward. Somebody suggested that we fly the flags of our Allies over the Capitol. Champ Clark, who was a blunt and forceful Speaker, put his foot down. No flag of the British, he declared, would wave over the building they set fire to in the War of 1812."

Such anecdotes are forever popping out of the Capitol's endless store of memories. They bring to life the leaders who, for five generations, have passed in review under the spot-

light perpetually beamed on this building.

None was saltier than John Randolph of Roanoke, a member of the first Congress to meet in the embryo Capitol by the Potomac.

Only the original north wing, still part of the Senate section, was finished in the fall of 1800. With other House Members, Randolph sat briefly in a room borrowed from the Senate, then moved to a temporary oval structure —descriptively called the "Oven"—built in the foundation of the future House wing.

Randolph's Congressional career has never been equaled for biting wit and personal eccentricity. When the new House Chamber replaced the Oven in 1807, and echoes drowned out speakers in the magnificently decorated hall, it was Randolph who remarked acidly that the Chamber was "handsome and fit for anything but the use intended." No entrance was ever more dramatic than that of the Gentleman from Virginia as he strode in, booted and spurred, riding crop

Veteran Democratic leaders in Congress include Senate Majority Leader Mike Mansfield (left) and Speaker of the House John W. McCormack. Here Senator Mansfield drafts a floor speech with secretary Elizabeth H. Oliver in his Capitol office. Speaker McCormack discusses the 1963 tax bill with administrative assistant Eugene T. Kinnaly (center) and legislative aide Dr. Martin Sweig in the Speaker's office.

in hand, and his favorite hounds at his heels.

For more than two decades, Randolph's erratic genius played like summer lightning over legislative battles in the Old House Chamber. He strongly opposed the War Hawks, who were clamoring for a showdown with Great Britain on "freedom of the seas." After their brilliant leader, Henry Clay, entered the House in 1811, the political struggle took on increasing personal bitterness.

"Clay's eye is on the Presidency," Randolph once observed of the man who would end as a three-time loser for the highest office, "and my eye is on him."

During the "Misery Debates" on slavery that preceded the Missouri Compromise of 1820, Randolph rose and pointed a long, bony finger at the women in the gallery.

"Mr. Speaker," he said in his penetrating voice, "what, pray, are all these women doing here. . .? Sir, they had much better be at home attending to their knitting."

Even South Carolina's John C. Calhoun, whose views on states' rights would become more inflexible than Randolph's, was not spared the vitriolic outbursts.

"Mr. President of the Senate," Randolph addressed Calhoun on one occasion, "and would-be President of the United States, which God in his infinite mercy avert. . . ."

Modern Congresses have adopted rules and precedents on decorum that put such attacks on a colleague beyond the pale. But in the Republic's formative years, and especially in the turbulent decades before the Civil War, Members used ridicule and name-calling as

Republican stalwarts, Senator Everett Dirksen (left) and Representative Charles A. Halleck serve as Minority Leaders. Dictating to secretary Glee D. Gomien, the Senator answers one of the thousand-odd letters that pour into his office daily. Mr. Halleck confers with administrative assistant Robert G. Allett and secretary Susanne Ridlen. The view from his Capitol office looks down the Mall toward the Washington Monument.

common weapons of floor debate and attacks on the administration.

At times the unbridled language—and insults couched in polished classical phrases—led to duels on nearby fields of honor. A famous duel was fought with pistols in 1826 between Randolph and Clay, the challenger, who was then Secretary of State.

Carried out with elaborate ceremony, the affair was a bloodless one, though both missed narrowly on the first exchange of shots. On the second, Clay again missed Randolph, and Randolph fired into the air.

"It was among the highest-toned that I have ever witnessed," Senator Thomas Hart Benton of Missouri later described the duel—speaking from long personal experience in the art of pistols at dawn.

From the 1820's on, changing and expanding Congresses clearly reflected the rivalries and travail of a growing Nation. No issue was surer to provoke fireworks than the question of allowing slavery to spread into the Western territories.

In one violent dispute over statehood for California, Senator Benton—an ardent free-soil man—suddenly found himself facing the drawn pistol of the fiery little Senator from Mississippi, Henry S. Foote.

"I have no pistol," Benton cried, throwing his coat open. "Let the assassin fire!"

There was no firing, and a subsequent investigating committee closed the incident with a reprimand to both Senators.

The most rambunctious of such brawls broke out in the House in 1858 over legisla-

tion to admit bitterly divided Kansas. John "Bowie-Knife" Potter of Wisconsin seized William Barksdale of Mississippi by the hair, which promptly came off in his hand. As the victor waved the wig about, shouting "I've got his scalp," the tempest blew away in roars of laughter.

Inflammatory Speech Leads to Caning

There was no levity, however, in the caning of Charles Sumner, May 22, 1856, on the floor of the Senate.

A few days before, the Massachusetts Senator had delivered an abusive five-hour oration called "The Crime Against Kansas." In it he implied that the elderly Andrew Pickens Butler of South Carolina was one of a "depraved" band trying to force "a virgin Territory . . . to the hateful embrace of Slavery."

Sumner was writing at his desk in the Old Senate Chamber after adjournment, when Preston S. Brooks, a South Carolina Representative and cousin of Butler, walked up. Announcing that he was repaying insults to his state and his kinsman, Brooks beat the Senator from Massachusetts into bloody unconsciousness with a heavy cane.

Brooks resigned from the House, but was promptly returned by an almost unanimous vote. While still recuperating, Sumner was

HOUSEHOMES © U. S. CAPITOL HISTORICAL SOCIETY

Powerful Chairman of the House Committee on Appropriations, Clarence Cannon of Missouri has served 40 years in Congress. He and 49 colleagues handle all fund bills on the House side; they control the Nation's purse strings.

Most of Congress's work is done in committee. Here the Appropriations Subcommittee on Public Works weighs budget items on atomic energy, public power, flood control, and rivers and harbors. Left to right: Chairman Cannon; Michael J. Kirwan, Ohio; John E. Fogarty, Rhode Island; Joe L. Evins, Tennessee; Edward P. Boland, Massachusetts; aides Kenneth Sprankle and Carson W. Culp (standing); William H. Milliken, Pennsylvania; John J. Rhodes, Arizona; John R. Pillion, New York, and senior minority member Ben F. Jensen, Iowa. Absent: Jamie L. Whitten, Mississippi.

reelected as a free-soil martyr. It was a perfect example of the irreconcilable differences driving the Nation to Armageddon.

Yet the Capitol's pre-Civil War period also saw courageous leaders make heroic efforts to hold the Union together by sheer eloquence. Most of these speeches were heard in the Old Senate Chamber.

In visiting the Capitol, I like to return to the silent semicircular room near the Rotunda. Now closed to the public, the hall was the Senate's meeting place from 1810 to 1859.

Here, as early as 1830, Daniel Webster of Massachusetts defended the Union in his famous reply to the South Carolina Senator, Robert Young Hayne. The narrow galleries were packed, the floor invaded by fashionable ladies. Vice President Calhoun presided.

Hayne had impressively argued the South Carolina doctrine that any of the states, joined originally in a pact with equals, had the constitutional right to nullify acts of the Federal Government.

Webster, skilled in constitutional law, demolished his opponent in an avalanche of logic and oratory. The audience was spellbound as he ended his masterpiece. His words became classic: "Liberty *and* Union, now and forever, one and inseparable!"

But the argument went on. The curtain rose

Amid gold-dappled splendor of the Senate Reception Room, Senator Leverett Saltonstall of Massachusetts greets a constituent. Mary B. Davis (left) of his staff introduces Margaret C. Shaw of Boston. Much of a lawmaker's time goes into meeting citizens and committee work. Portraits of Senators Robert A. Taft, John C. Calhoun, and Henry Clay were selected in 1957, with Robert M. La Follette, Sr., and Daniel Webster, to fill panels left vacant by artist Brumidi.

Horsehair sofas and tightly stuffed chairs furnish the room in an 1873 engraving. Carpeting hides the intricately tiled floor.

in 1850 on a desperate effort to legislate the slavery problem away.

Congress then moved toward its most dangerous crisis yet as it prepared to cope with the question of slave or free-soil status for the vast Western lands lately acquired by war with Mexico.

Members in both houses were openly talking of secession when "the Great Triumvirate"—Clay, Calhoun, and Webster—met for the last time on the stage of the Old Senate Chamber. Though all were aging, and one near death, each followed his own star.

Concerned for the Union, Clay presented a series of compromise measures. Concessions offered the North included the admission of California as a free state, and a ban on the slave trade in the District of Columbia. The South was to be placated by a stronger law for the return of fugitive slaves, and agreement by Congress that it had no control over interstate slave trade.

Calhoun refused all bargains. Though mortally ill, he had risen from his bed to perform this last act of Southern leadership. Too weak to deliver his answer, he listened grimly as a colleague read it for him.

"The South . . . has no compromise to offer but the Constitution," he had written. If there was no accord, then "let the States we both

represent agree to separate and part in peace."

Webster supported compromise. "I wish to speak today, not as a Massachusetts man," he began his memorable Seventh of March address, "... but as an American." For more than three hours his majestic sentences rolled on, winning public support for compromise.

As Webster must have expected, his stand was called appeasement in the North and cost him the backing he needed to fulfill his long-deferred hope of the Presidency. Senators of slave-holding states, like Missouri's Thomas Hart Benton and Sam Houston of Texas, learned that defending the Union

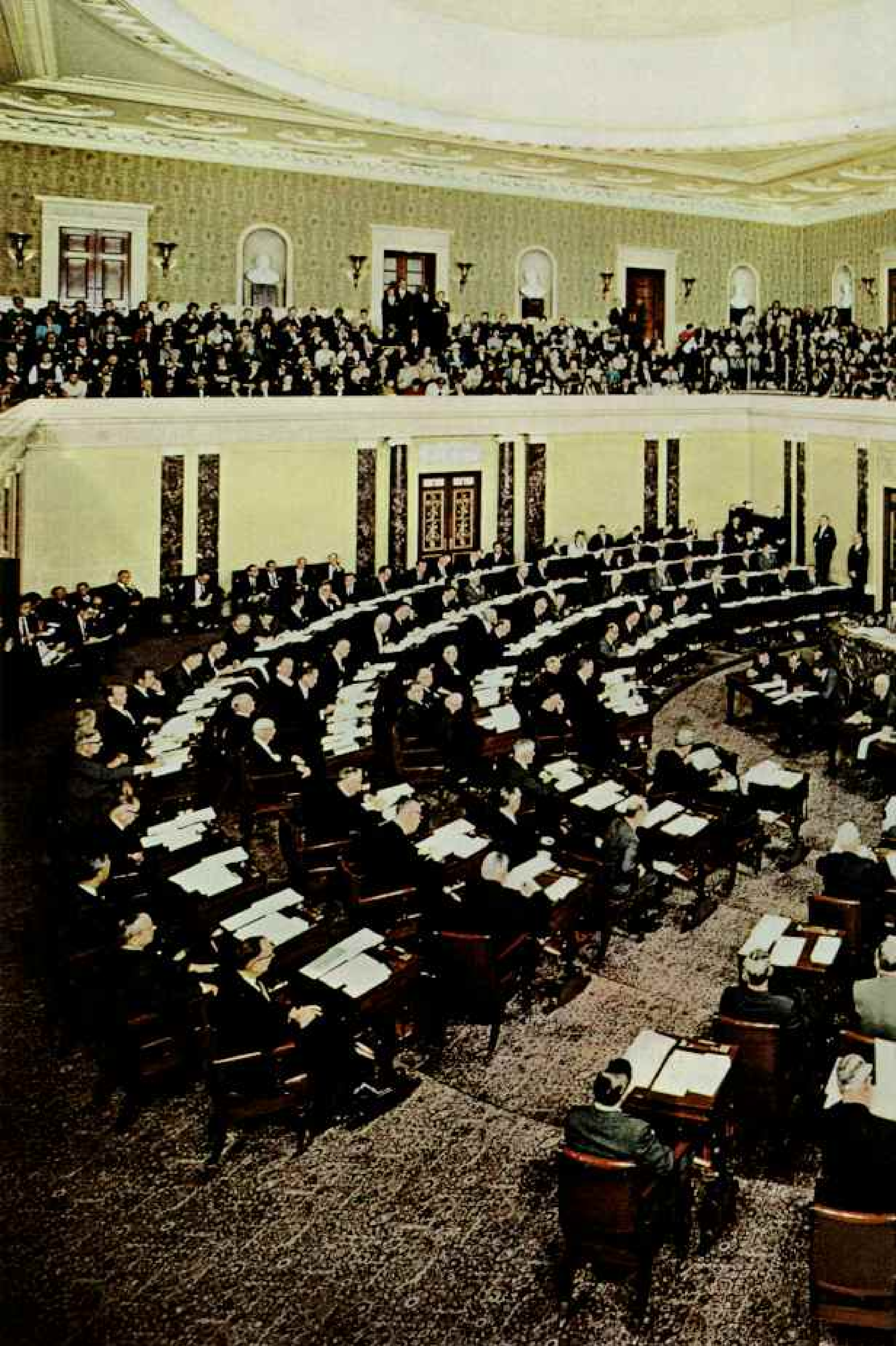
(Continued on page 43)

SUNLIGHTING AND EXTRA LIGHTING (OVERLEAF) BY NATIONAL GEOGRAPHIC PHOTOGRAPHER GEORGE F. MOBLEY © U. S. CAPITOL HISTORICAL SOCIETY

First official Senate portrait ever made, this color photograph shows a historic moment—ratification of the atomic test-ban treaty on September 24, 1963. After 12 days of debate, tension grows as the Legislative Clerk calls the roll. The vote: 80 to 19 in favor. All 99 who balloted appear in this photograph, which was made with the Senate's unanimous approval.

Acting for the Capitol Historical Society, a NATIONAL GEOGRAPHIC team labored all night to place cameras and lights for the picture. The Historical Society released it to all press media.

Seniority determines Senate seating from front to rear, although some Members prefer to retain original seats and not move forward. An identification key is on pages 42-3.



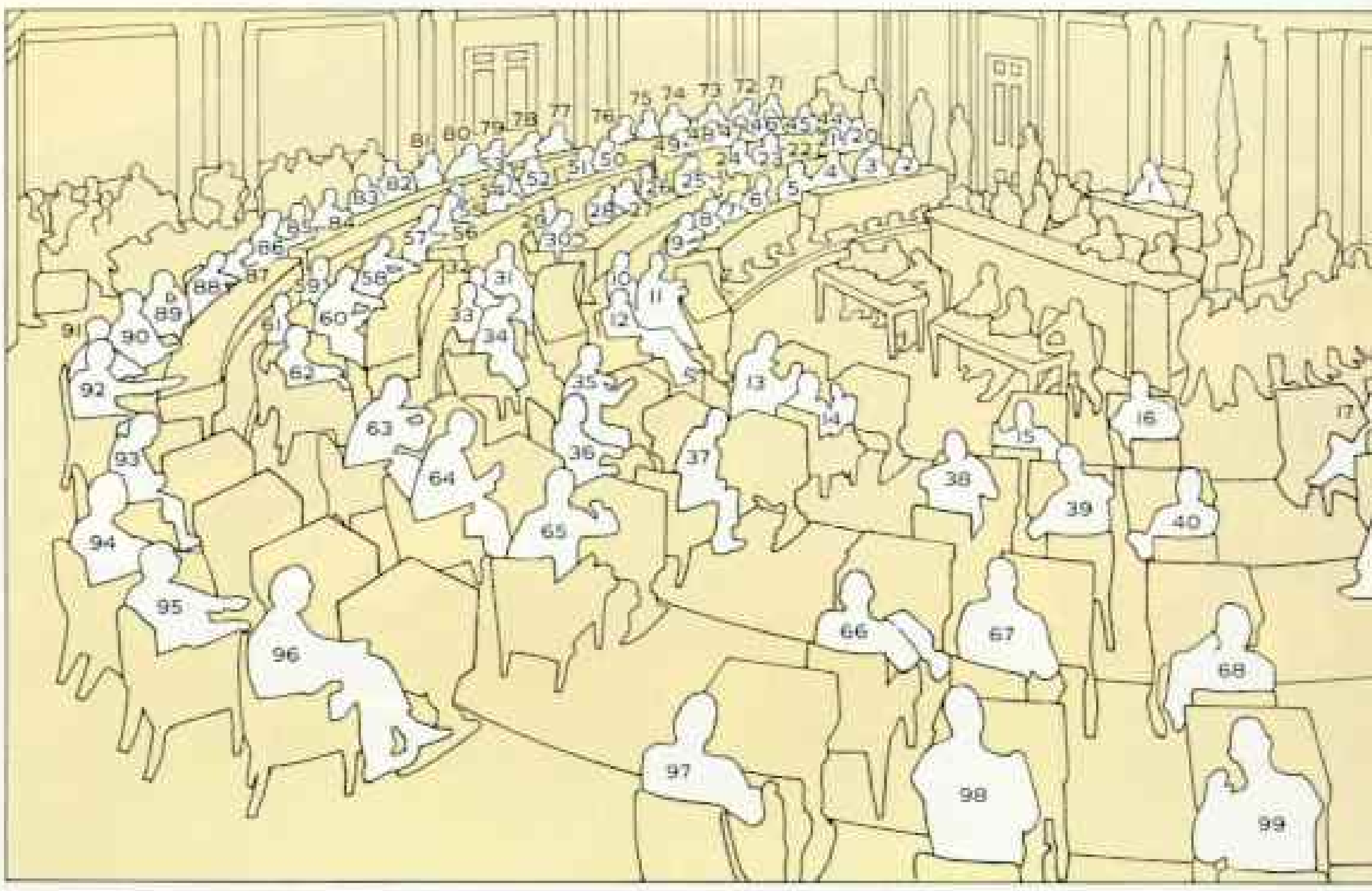
Candid photographs shot with telephoto lens capture action on the Senate floor moments before the treaty vote. Seated, left, Thomas H. Kuchel talks with Everett Dirksen. Facing the camera, left to right: Leverett Saltonstall, Kenneth B. Keating, and Hubert H. Humphrey.

President of the Senate Lyndon B. Johnson served two terms in the Senate and six years as Majority Leader prior to his election to the Vice Presidency in 1960. In event of a tie, he may cast the deciding ballot.

"Yeas" and "nays" ring out as Senators vote on the pact. Barry Goldwater (center) and his Republican colleagues sit on the right side of the middle aisle.

KEY TO SENATE SEATING

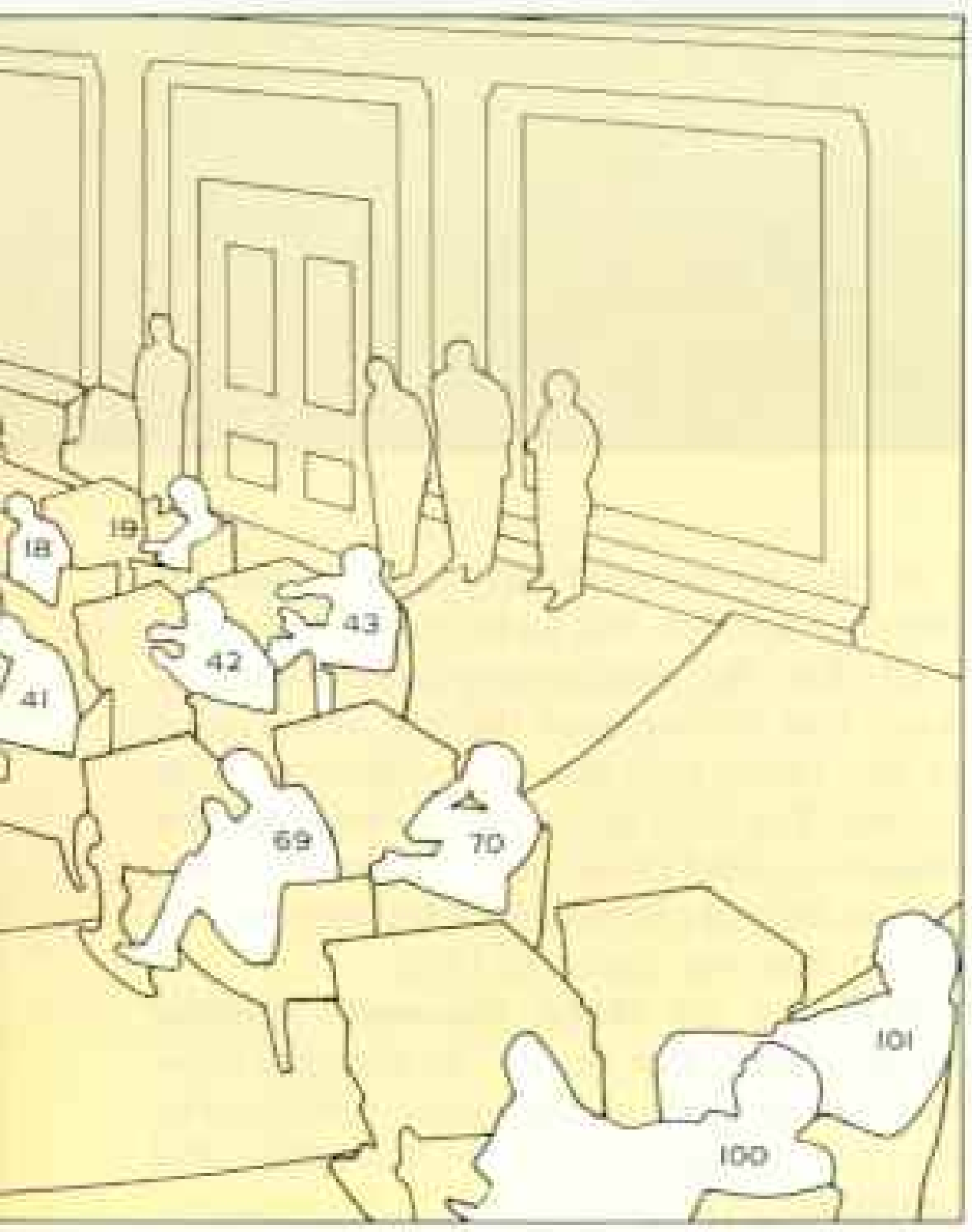
1 Vice President Johnson
2 Bible, Nev.
3 Anderson, N. M.
4 Morse, Oreg.
5 Holland, Fla.
6 Johnston, S. C.
7 Pastore, R. I.
8 Fulbright, Ark.
9 Ellender, La.
10 Byrd, Va.
11 Humphrey, Minn.
12 Mansfield, Mont.
13 Dirksen, Ill.
14 Kuchel, Calif.
15 Mundt, S. Dak.
16 Bennett, Utah
17 Hruska, Nebr.
18 Case, N. J.
19 Smith, Maine
20 Byrd, W. Va.
21 Young, Ohio
22 Engle, Calif. (absent, ill)
23 Lausche, Ohio
24 Ervin, N. C.
25 Walters, Tenn.
26 McNamara, Mich.
27 Jackson, Wash.
28 Sparkman, Ala.
29 Robertson, Va.
30 McClellan, Ark.
31 Hill, Ala.
32 Eastland, Miss.
33 Magnuson, Wash.
34 Russell, Georgia
35 Saltonstall, Mass.
36 Young, N. Dak.
37 Hickenlooper, Iowa
38 Aiken, Vt.
39 Cooper, Ky.
40 Williams, Del.
41 Morton, Ky.
42 Keating, N. Y.
43 Scott, Pa.
44 Inouye, Hawaii
45 Edmondson, Okla.
46 Bayh, Ind.
47 Ribicoff, Conn.
48 Brewster, Md.
49 Jordan, N. C.
50 Talmadge, Ga.



BY ENTACHROME BY VOLKMAR WENTZEL, NATIONAL GEOGRAPHIC STAFF © U. S. CAPITOL HISTORICAL SOCIETY

51 Gruening, Alaska
52 Dodd, Conn.
53 Pell, R. I.
54 Cannon, Nev.
55 Randolph, W. Va.
56 Yarborough, Tex.
57 Douglas, Ill.
58 Stennis, Miss.
59 Long, La.
60 Smathers, Fla.
61 Symington, Mo.
62 Hayden, Ariz.
63 Carlson, Kans.
64 Cotton, N. H.
65 Beall, Md.
66 Allott, Colo.
67 Javits, N. Y.
68 Goldwater, Ariz.
69 Prouty, Vt.
70 Pearson, Kans.
71 Nelson, Wis.
72 McGovern, S. Dak.
73 Kennedy, Mass.
74 Metcalf, Mont.
75 Neuberger, Oreg.
76 Long, Mo.
77 McGee, Wyo.
78 Burdick, N. Dak.
79 Moss, Utah
80 Muskie, Maine
81 Hart, Mich.
82 McCarthy, Minn.
83 Bartlett, Alaska
84 Clark, Pa.
85 Church, Idaho
86 Gore, Tenn.
87 Thurmond, S. C.
88 Hartke, Ind.
89 Williams, N. J.
90 McIntyre, N. H.
91 Proxmire, Wis.
92 Monroney, Okla.
93 Curtis, Nebr.
94 Fong, Hawaii
95 Boggs, Del.
96 Miller, Iowa
97 Tower, Tex.
98 Jordan, Idaho
99 Simpson, Wyo.
100 Mechem, N. M.
101 Dominick, Colo.

Senate officers sit just below the Vice President. Pages occupy bench to his left.



had destroyed their Congressional careers.

Into the forefront stepped Stephen A. Douglas of Illinois, who pushed the 1850 Compromise to passage. And the country gained a decade of respite before Confederate shells over Fort Sumter screamed an end to words and the beginning of war.

Today, as you roam the Capitol with tourists from Massachusetts or Mississippi, the Civil War seems far away. But evidences of that great conflict are always close at hand.

"I can show you the site of a bakery that fed Union soldiers," Representative Schwengel offered one day, "if you're willing to go down a manhole and under the West Front."

Several years ago the Congressman rediscovered this long-forgotten area after reading about it in an old magazine. The bakery was operated in 1861 and '62, when the War Department borrowed Congress's headquarters, first as a temporary barracks, later as an emergency hospital for wounded. After the war, the bakery was sealed off by stone terraces and new construction. Hence the manhole.

Carrying a flashlight and wearing old clothes, I followed Mr. Schwengel down a

Senate Foreign Relations Committee convenes to discuss the test-ban treaty. Seated left to right: Karl E. Mundt, South Dakota; John J. Williams, Delaware; Frank Carlson, Kansas; George D. Aiken, Vermont; Bourke B. Hickenlooper, Iowa; Chairman J. W. Fulbright, Arkansas; John Sparkman, Alabama; Hubert H. Humphrey, Minnesota; Wayne Morse, Oregon; Russell B. Long, Louisiana; Frank J. Lausche, Ohio; Stuart Symington, Missouri, and George A. Smathers, Florida. Absent: Mike Mansfield, Montana; Albert Gore, Tennessee; Frank Church, Idaho; Thomas J. Dodd, Connecticut.

Serving his fourth Senate term, Chairman Fulbright presides at a meeting of the Foreign Relations Committee, which acts on treaties, boundary lines, declarations of war, and U. S. business interests abroad.

steep ladder and along winding passageways to a series of brick-walled rooms. The oven space, once lined with fire bricks, was itself the size of a small room.

"They used to bake thousands of loaves a day here and deliver the bread to military camps," the Congressman told me. "But the amazing part is that they cooked with gas. I could hardly believe it when I first saw those nozzles sticking out over there. Then I found by research that the bakers really *did* use them. The gas was piped off from lines bringing gaslight to the extensions that had just been added to the original Capitol."

It was no accident that the Capitol was completed, much as it looks today, during the Civil War. Burgeoning population and new states had so increased the size of Congress by the 1850's that two huge additions were needed. The twin extensions dwarfed the low copper-covered dome of the central section, put up 30 years before. So a fittingly tall one of cast iron was begun in 1856.

Work on the dome proceeded whether the war went well or ill. The clanging went on over the heads of the young soldiers who marched in and out of the Rotunda—and sometimes were carried back to lie on narrow

ENTACHROME (ABOVE) AND KODACHROME © UNITED STATES CAPITOL HISTORICAL SOCIETY

white cots beneath John Trumbull's paintings of the Revolution.

"If people see the Capitol going on," Lincoln is quoted as saying, "it is a sign we intend the Union shall go on."

The dome was an ingenious piece of construction, weighing nearly nine million pounds. Like the extended wings, it was designed by Thomas U. Walter, an imaginative architect from Philadelphia. He planned it in the form of an inner and outer shell, to allow for metal contraction or expansion.

Between the two shells, Walter hung a narrow spiral stairway of 183 steps—by my personal count on several climbs to the top. The public is no longer permitted the harrowing fun of that steep ascent, but I found plenty of evidence of past visitors in initials and hearts, names and addresses carved on railings and sweeping curved surfaces.

It was at 12 noon, December 2, 1863, that the fifth and last section of the dome's crowning Statue of Freedom was raised. As the great bronze head—weighing nearly 5,000 pounds—was bolted into place, guns roared, flags fluttered, and spectators cheered the symbol of a united country.

But there was something odd about the

Following a session of the Senate Finance Committee, Chairman Harry F. Byrd (left) of Virginia and ranking minority member John J. Williams of Delaware exchange views about a proposal to reduce income taxes. They and 15 colleagues on the committee screen revenue legislation originating in the House. Approved bills go before the full Senate for a vote.

PHOTOGRAPHED BY NATIONAL GEOGRAPHIC PHOTOGRAPHER GEORGE F. MOBLEY
© N.G.S. (ABOVE) AND U.S. CAPITOL HISTORICAL SOCIETY

Youthful House Pages Perform a Happy Chore: Signing the Payroll

In blue suits, white shirts, and black ties, 76 Congressional pages spend the average day scurrying through Capitol corridors. The boys, selected by Members of Congress, run errands and distribute documents. Fourteen to 18 years old, they receive $315.45 a month. From 6:30 to 10:30 a.m. they attend school in the Library of Congress.

goddess's headdress that has led people since to confuse her with Pocahontas—or even to fancy that a big bird was roosting there. The truth is even stranger.

Sculptor Thomas Crawford had designed his "Armed Liberty" as a woman wearing the liberty cap of emancipated slaves in Roman times. In 1856 he changed her name to "Freedom" and her headdress to a helmet trailing eagle feathers because the official then in charge of Capitol architecture objected to the cap as "the badge of the freed slave" and "inappropriate to a people who were born free. . . ." The official was Jefferson Davis, future President of the Confederacy.

Prize: $500 and a City Lot

To a surprising degree, U. S. Presidents from Washington to Lincoln had a hand in the 72-year construction of the Capitol. Congress itself authorized their role in acts beginning with the selection of the Potomac area as the permanent seat of government.

George Washington approved the Capitol's hilltop site in 1791 on a horseback tour of the neighborhood with his city planner, the French engineer-genius Maj. Pierre Charles L'Enfant. In laying out the future metropolis in a rolling, wooded wilderness, L'Enfant called the Capitol's 88-foot hill "a pedestal waiting for a monument."

To obtain an architectural design for the monument, an open competition was advertised, offering a prize of $500 and a city lot. The winner was Dr. William Thornton—amateur architect, professional physician, and man of many interests, from poetry and painting to steamboats and techniques to help the deaf. His drawings pictured the future Capitol as a stately structure with a low domed center, flanked by two balancing wings for House and Senate.

President Washington's enthusiasm assured acceptance of Thornton's entry. It had just what was wanted, he wrote, "Grandeur, Simplicity and Convenience." It "captivated the eyes and judgment of all," agreed Thomas Jefferson, then Secretary of State.

Washington Watches Capitol Rise

The first President laid the Capitol's cornerstone in 1793 in an elaborate combination of civic and Masonic ceremonies, after the custom of the time. He approved Dr. Thornton's work as first architect of the Capitol, and watched over the building's trouble-strewn progress with the same devoted care he lavished on his "own Vine and . . . Fig tree" at nearby Mount Vernon. Washington, however, did not live to see the Capitol occupied.

On November 22, 1800, President John Adams addressed the first Joint Session of Congress to meet in the handsome Senate Chamber. Standing with plump dignity in long coat and knee breeches, he spoke to the young Republic's leaders on the peace and prosperity that then marked the "State of the Union." He congratulated the gentlemen of Congress "on the prospect of a residence not to be changed."

By 1801 the House, Senate, Supreme Court, and a Circuit Court had crowded into the one small building available to the lawmakers. But expansion soon began.

No President took greater delight in planning the Capitol than did Thomas Jefferson. The amateur architect of Monticello often favored his own ideas over protests of the professional, Benjamin H. Latrobe, who had become the second architect of the Capitol.

When the Hall of Representatives was under construction in the south wing between 1804 and 1807, Jefferson insisted on wedge-shaped skylights in the domed roof. Latrobe built it to allow for his own idea—a windowed tower in the center. President Jefferson substituted small square skylights.

"You and I are both blockheads," Latrobe once wrote his building superintendent, John Lenthall. "Presidents and Vice Presidents are the only architects and poets for ought I know, in the United States."

But Latrobe fully appreciated the brilliant mind of Jefferson, by whom, as he put it, "no field of art or science has been unexplored." And Jefferson greatly admired Latrobe's design for the House Chamber, with its 22 Corinthian columns carved by the imported Italian artists Giuseppe Franzoni and Giovanni Andrei.

"I considered you the only person in the United States," Jefferson wrote Latrobe, "who could have executed the Representative Chamber, or who could execute the middle building on any of the plans proposed."

Flame and Smoke Cloud Sky in 1814

To residents of Washington, the War of 1812 had seemed at first a remote and largely naval conflict. Then the victorious British were swarming into the undefended city and threatening the Capitol, before its

Celebrated for fine food, the Senate Restaurant serves 550 to 600 persons a day. Bean soup has been a menu "must" since 1907, when Minnesota's Senator Knute Nelson introduced it, with endorsement by the Senate Rules Committee. Another specialty is flaky-crusted Senate apple pie.

Members of the Senate's Post Office and Civil Service Committee confer over coffee. Left to right: Frank Carlson of Kansas, Olin D. Johnston of South Carolina, and Mike Monroney of Oklahoma.

"middle building" could even get started.

On August 24, 1814, the invaders set fire to the Capitol and other public buildings.

"I have never beheld a spectacle more terrible," said an awed eyewitness, "and at the same time more magnificent."

Congressmen later heard the tale that Adm. Sir George Cockburn had led his troops into the House of Representatives, that he took over the Speaker's chair and put to his men the mock question—"Shall this harbor of Yankee democracy be burned?"

However it happened, the harbor of Yankee democracy was a blackened ruin when the British withdrew from the city the next day. Though a violent rainstorm had saved the buildings from utter destruction, the House, Senate, and Supreme Court Chambers were a shambles. The wooden walkway between the two wings had gone up in smoke. Many of the books in the Library of Congress were burned.

Congress was homeless for five years. It met briefly in the Patent Office, formerly Blodget's Hotel, then moved into the "Brick Capitol," hurriedly built where the Supreme Court Building now stands.

Outside this building, on March 4, 1817, spectators watched President-elect James Monroe take the oath in the city's first open-air inaugural. It happened by compromise. Having disagreed on whether to sit on the Senate's "fine red chairs" or the "plain democratic" ones of the House, the legislators decided to build a platform outside and use neither.

From 1818, when the cornerstone for the long-postponed mid-section was laid, the Capitol grew by bits and pieces.

Congress moved back in December, 1819, to quarters that were stronger and handsomer than ever. True, Latrobe's redesigned House Chamber—with exquisite marble carvings and painted ceiling—produced worse echoes than the old one. But American visitors declared it "the most elegant legislative hall in the world," and rated the smaller but luxurious Senate Chamber its equal, at least in dignity and charm.

The original Capitol—built in three parts as Dr. Thornton had pictured it—was completed by the third Capitol architect, Charles Bulfinch of Boston. By March, 1829, Bulfinch's massive East Front was ready for the inauguration of Andrew Jackson, the "People's President." A motley crowd of backwoodsmen and bankers, laborers, clerks, women and children jammed the Capitol grounds and Plaza to see and cheer their hero.

"The Portico and grand steps leading to it, were filled with ladies," wrote Washington social news commentator Margaret Bayard Smith, in a letter to her sister. "Scarlet, purple, blue, yellow, white draperies and waving plumes of every kind and colour, among the white marble pillars, had a fine effect."

Administering the oath was Chief Justice John Marshall, who had performed the same act at every inaugural since Jefferson's in 1801. Though frail and old now, Marshall would conduct one more for Jackson before the end of a career in the Capitol's Supreme Court Chamber that had shaped the course of United States constitutional law.

East Front Echoed to Famous Utterances

From Jackson to John F. Kennedy, 24 Presidents have been inaugurated at the East Front. Here, Lincoln spoke the compassionate words, "With malice toward none, with charity for all . . ." Here, Franklin Delano Roosevelt told a people caught in a web of economic misery, " . . . the only thing we have to fear is fear itself." "Ask not what your country can do for you," said President Kennedy three years ago, "ask what you can do for your country."

For many a President-elect, Washington's capricious weather has made the outdoor ceremony an ordeal. On a raw March 4, 1841, elderly William Henry Harrison amazed Washington throngs by riding horseback and coatless to his inaugural. There he spoke for an hour and 40 minutes, the longest inauguration speech on record. But three weeks later he developed a chill after walking through slush. He died on April 4.

William Howard Taft, the only President who was also Chief Justice of the United States, was driven inside the building in 1909 by a blizzard that snowed under the elaborate plans for his great moment.

President Kennedy, on the other hand, faced the threat of fire on the platform set up for his ceremony. A short circuit under the speaker's lectern suddenly produced swirls of smoke, adding a thrill of alarm for TV watchers around the world.

Capitol a City Within a City

Behind such political dramas—often in offices with old-fashioned fireplaces and gilt-framed mirrors—buzzes a working Capitol the outsider never sees.

"In many ways this place is a self-sufficient community," said a research librarian in the architect's office.

To save the legislators time and to meet their needs, the Capitol has its own post offices, ticket offices, stationery stores, and barbershops. Besides its own law libraries, it has a Library of Congress station whose underground electric shuttle brings and returns requested books. Three physicians share duty in the building, in case of illness or accident to Members of Congress or employees.

A small army of some 7,600 clerks, secretaries, and administrative officers, under the Secretary of the Senate and the Clerk of the House, channels an ever-growing flood of bills. Most die in committee, having crossed "a parliamentary bridge of sighs," as Woodrow Wilson said, "to dim dungeons of silence . . . ." Of the 20,316 measures introduced in the last Congress, 1,569 became law.

Visiting House and Senate Document Rooms, I saw piles of new bills being card-indexed, summarized, and filed for current

Capitol Prayer Room Provides a Cloistered Retreat for Members of Congress

"Preserve me, O God, for in Thee do I put my trust," the first verse of the 16th Psalm, is etched on the stained-glass window around the kneeling figure of George Washington. Anonymous Californians donated the window as a "thank offering to this country." Freshman Senator Jack R. Miller of Iowa shows the massive Bible to his family.

Benjamin Franklin, familiarly peering over his spectacles—he designed them—and Christopher Columbus, toying with a globe—he believed the world was round—fill upper corners in the President's Room. Cherubs and frames, skillfully painted on plaster by Brumidi, deceive the eye into accepting them as three-dimensional.

President's Room, the Capitol's most ornate, rarely receives a visit from a Chief Executive. In earlier times, when both Presidential and Congressional terms expired simultaneously in early March, Presidents as a rule sat here at a mahogany table, signing bills into law, late in the closing minutes of their administrations.

Senator Carl Hayden, at 86 the senior legislator of Congress, talks with reporters on water problems of his native Arizona. Author Lonnelle Aikman takes notes beside him.

reference before joining older stacks in attic and basement storerooms.

"We get thousands of inquiries a week from Members and others," Gilman Udell, House Superintendent of Documents, told me between telephone calls. "They may ask about a law passed 50 years ago—or one debated today. We compile bills under such subjects as small business, public power, taxes, or social security.... Prison inmates often write for copies of crime laws."

Congress's liveliest employees are its boy messengers, the 76 pages. You see them darting like swallows along the halls, alighting to leave a note or pick up a document (page 46).

The first Senate page on record was a 9-year-old appointed by Webster and Clay in 1829. The pages are older now (14 to 18), but not too old to attend a Congress-supported school with classes starting at 6:30 a.m. They can study pre-college or business subjects there, then help make history by learning to jump when a Senator snaps his finger, or a light flashes on in the House.

The largest working group at the Capitol is made up of the 1,700 accredited news correspondents. These men and women reporters (outnumbering lawmakers three to one) are provided with press, recording, and transmitting offices, and with special gallery seats.

Theirs is the vital job of keeping the world informed of what goes on at the center of American Government. But even battalions of reporters can never hope to cover all the stories the Capitol knows.

On my own short-term assignment, I had a chance to wander about the building at midnight, something I had long dreamed of doing. I would hardly be alone, I learned in talk-

Quiet elegance pervades the Senate Marble Room, finished with stone from Tennessee and Italy. Here the legislators can relax from their duties and read home-state newspapers. These Senators are Margaret Chase Smith of Maine (left), Majority Whip Hubert H. Humphrey of Minnesota, Minority Whip Thomas H. Kuchel of California, and Maurine B. Neuberger of Oregon.

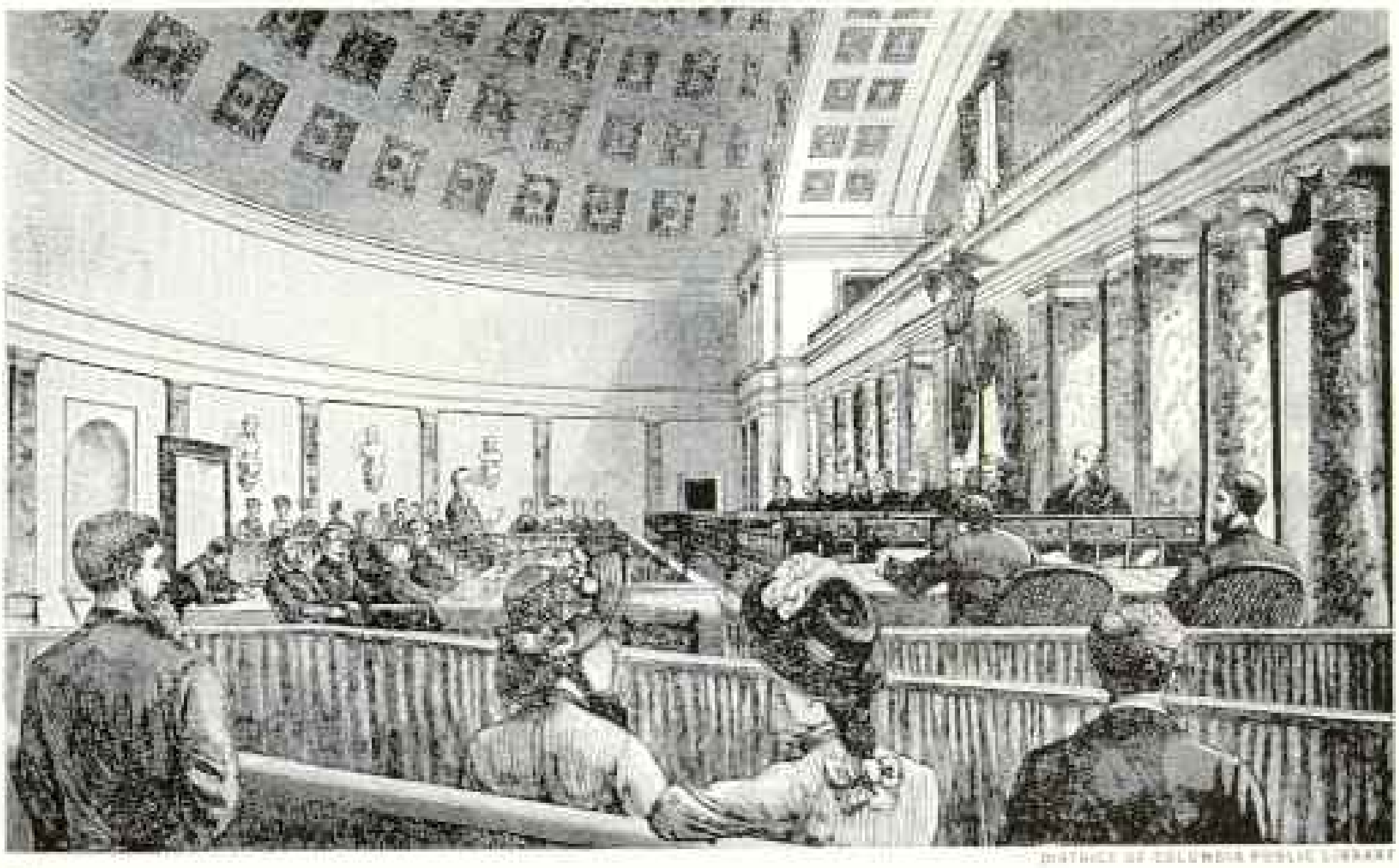
Glittering chandelier lights the Vice President's formal office adjoining the Senate's Reception Room. Beside the Vice Presidential Seal, Lyndon B. Johnson confers with Sergeant at Arms Joseph C. Duke.

Gilded eagle, a Capitol fixture since the 19th century, perches in the Old Senate Chamber (right), later the Supreme Court Room.

Voices of Calhoun, Clay, and Webster Echoed in the Old Senate Chamber

Colonnade of Potomac marble flanks the spot where Senate Presidents kept order from 1810 to 1859. Debates in the hall helped determine the course of the young Republic. Here sat Jefferson Davis, who later led the South in war against the Union. Stephen A. Douglas, Sam Houston, and William H. Seward served in this hall. Now it stands silent. Representative Graham Purcell of Texas visits the room with his family.

Supreme Court hears a case after moving into the vacated Senate Chamber in 1860. Justices sat here until 1935. This engraving, published in the book *Picturesque Washington* (1887), shows the Court, visitors, lawyers, and the busts of three former Chief Justices.



ing with Capt. Leonard H. Ballard of the Capitol Police in his basement quarters. Of his 215-man force, 90 are on night patrol.

"Do your night men ever see any ghosts?" I asked the captain.

"One claimed a statue spoke to him," he admitted. "I told him not to worry until he started talking back to the statue."

It's a strange experience to walk through a great building when daytime's throbbing noises have died away to silence.

The deserted Senate Chamber, with its rows of small wooden desks, was like an abandoned classroom. I found the desk Jefferson Davis used, and felt the mended scar on its side where a frustrated Union soldier jabbed his bayonet, venting his fury against the Confederate leader, then safe in the South.

A tradition-loving body, the Senate still keeps two small snuffboxes filled, on either side of the rostrum, with the nose-tickling stuff the early Senators fancied. Bottles of blotting sand from the quill-pen era stand on every desk. Polished spittoons beneath recall the tobacco-chewing lawmakers whose habits were so deplored by Charles Dickens.

From Reconstruction Days to Space Age

In the midnight quiet of the House Chamber, I saw its 435 close-packed seats as mute witnesses of the country's growth and development since Reconstruction. Then progress was railway expansion; now it's space travel. Not long ago, this room was filled with Washington's great, attending a Joint Meeting of Congress to hear John Glenn speak as America's first astronaut to orbit the earth.

No statues whispered to me that night. But ghosts of the past seemed, indeed, to lurk in every shadowy corner. For this building has always been a very human place.

When Washington was a village, with few

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER GEORGE F. MOBLEY © U. S. CAPITOL HISTORICAL SOCIETY

recreations, Congress's library was a popular spot for visiting and flirting. The Rotunda resembled a county fair, with merchants selling wares and inventors exhibiting models for Congressional attention. Church services and funerals were long held in the House Chamber. It was also the scene of a wedding between two members of a choir that often performed there. After the ceremony, the bride sang "The Star-Spangled Banner."

A building janitress gave birth to a son in the Capitol in 1947, and a story persists that another boy was born to a visitor 60 years earlier. And employees still recall the ex-newspaperman who set up housekeeping in the sub-basement while cataloguing old records. He entertained guests, and often attended summer band concerts in Capitol Plaza.

But for most Americans, Congress itself is the heart of the matter. Not all of the 10,000 men (and since 1916, a few dozen women) sent here by their constituents could be giants of oratory and makers of history. Yet each in his way represents the workings of democracy.

When I think of the descriptive nicknames attached to certain grass-roots Congressmen of the past—"Sockless Jerry" Simpson, for instance, "Cyclone" Davis of breezy speeches, and "Pig-iron" Kelley, defender of industry—I recall what Alexander Hamilton said of the Congress that would sit here:

"After all, sir . . . the true principle of a republic is, that the people shall choose whom they please to govern them." THE END

Marble-and-masonry Masterpiece Rises Where Indians Once Camped

One of the world's most photographed structures, the Capitol stands in a 131-acre park. Facing east, it looks out on a complex of stately Government buildings. At extreme left, a handsome Corinthian portico distinguishes the Supreme Court Building. Directly across East Capitol Street, a green copper dome and cupola cap the gray granite Library of Congress, which, together with its Annex in the rear, contains 43 million items. White marble block to the left of the Annex is the privately endowed Folger Shakespeare Library.

To the south, stretching along Independence Avenue, are three House Office Buildings named, from left to right, for Speakers Joseph Cannon of Illinois, Nicholas Longworth of Ohio, and Sam Rayburn of Texas. Dwarfing its predecessors, the Rayburn Building will cost more than $70,000,000. Almost ready for occupancy, it provides three-room suites for 169 of the 435 House Members, as well as additional committee rooms. A subway to the Capitol is here being dug under the south lawn.

Same scene 34 years ago: A view from a dirigible shows only the Capitol, Library of Congress, and Cannon Building atop the Hill. The Capitol appears the same except for the roof area over the East Front, which has since been pushed forward 32½ feet in a major alteration. First published in the NATIONAL GEOGRAPHIC of September, 1930, the photograph points up the striking changes of the past three decades.

Home to Lonely Tristan da Cunha

OUR LUCK HELD through the night. "There's God's hand in this," said a Tristan woman as dawn broke above a smooth sea. To her and the 50 other men, women, and children of oddly Victorian habits aboard the *Boissevain*, the change in weather was a good omen. It meant that in moments they would be in the longboats. After 18 months of exile they would set foot at last on their lonely island home.

For five days before, ever since the Royal Interocean Lines motor ship *Boissevain* sailed from Rio de Janeiro, the news had been bad. High seas and higher winds had been lashing our destination, the South Atlantic isle of Tristan da Cunha. Should foul weather

RETURNING EXILES *approach Tristan da Cunha, from which they fled to England when a volcano erupted in 1961. Two lobster boats and* Boissevain, *the Dutch liner that carried them back, lie half a mile off the remote island.*

Article and photographs by JAMES P. BLAIR

National Geographic Staff

Cloud-capped ramparts two thousand feet high loom forbiddingly above the new volcano's ash-gray cone. During the eruption a smoking, hissing wall of cinders and boulders pushed into the sea. The flow spared the Settlement (right) but buried Tristan's main landing beaches and destroyed its only cash industry, a spiny-lobster freezing plant. Refrigerator ship *Tristania* stands offshore as a longboat heads seaward to pick up homecoming Islanders.

prevent our landing, we would have to continue on to Cape Town and try again on a westbound vessel.

But on the night of April 8, with bare hours separating us from our lonely landfall, calm abruptly descended. Now Tristan lay, green and inviting, only half a mile away across glassy and unruffled seas. Home.

Islanders Prefer Their Own Little World

In October, 1961, a volcanic eruption had forced the evacuation of Tristan's 264 inhabitants, seemingly ending their rough-hewn way of life.* But after 18 unsettling months in England, amid the glitter and gadgetry of modern civilization, they had delivered an implied rebuke to the 20th century by electing to return to their harsh and timeless island.

Boissevain's 51 passengers were a vanguard, and they had come a long way round—8,000 miles from London to Rio de Janeiro to Tristan (map, page 70). Tristan-bound voyagers must take their transportation where they find it, and *Boissevain*, sailing out of Rio, offered the only transport to the island before the onset of the southern winter. The returning exiles had sailed to Rio on March 17 aboard the Royal Mail liner *Amazon*. I had flown down to Rio from Washington to join them for *Boissevain*'s April 3 departure. It would be seven months before the remainder of Tristan's exiles arrived from England.

As *Boissevain* felt her way cautiously over the bottom, uncharted since the tremors, I studied the island through binoculars. In the dawn's light, wispy clouds clung to Tristan's 6,760-foot peak. I could make out the thatched

*Tristan's administrator, P. J. F. Wheeler, described the exodus in the May, 1962, GEOGRAPHIC.

Carrying boxes and bags, Islanders stride toward homes they last saw 18 months before. Distant rocks strew slopes beyond the Settlement, which is hidden by terrain in this telephoto view. The boulders cascaded from cliffs during earth shocks that foretold the eruption (pages 66-7).

Strip of burlap shields Ernest Green at a neighbor's thatching bee (right).

Biting winds assail thatchers working to waterproof the home of Tristan's elected chief, Willie Repetto, before rain damages the interior. Using twine and 15-inch needles, they lash down bundles of New Zealand flax.

Rain-soaked roofers claim a reward: tea and sandwiches. Meals are traditional payment for Islanders who help a neighbor. Timber from wrecked sailing ships is used in many cottages. The American bark *Mabel Clark*, whose nameboard decorates the Repetto home, ran aground in 1878. People of Tristan sheltered her crew for six months.

Kodachromes by National Geographic Photographer James P. Blair © N.G.S.

cottages of Edinburgh, the island's only village. Perched on a broad sloping ledge about 150 feet above the surf, it is known to Islanders simply as "the Settlement."

Smoke still coiled faintly out of the new 250-foot volcano jutting up to the east of the houses, and a thick black finger of lava had wiped out a spiny-lobster freezing plant*—pre-eruption Tristan's only cash industry—and probed a full third of a mile out into the sea. A raw 1,500-foot scar on the mountainside marked the site of a landslide set off by the volcano's birth pangs.

Soon two longboats put out from Garden Gate Beach, the landing site, and maneuvered into position alongside *Boissevain*. The 12 men handling the oars—brothers, sons, and fathers of those waiting to disembark—had arrived several months before as an advance party. For them, as for their kinsmen waving down from the deck, the reunion was joyous. But the Tristan character leans strongly to reticence and reserve. There was no laughter, no weeping; just a calm exchange of greetings in the Islanders' vaguely archaic English:

"How you is?"

"I's fine. How you is?"

As the passengers clambered down a Jacob's ladder, I marveled anew at the curious stigmata of civilization they bore: Young men who had left the island in baggy breeches and long stockings now affected the sharply pointed shoes and pipestem trousers favored by London swells. Girls whose finery had run

*See "New Life for the 'Loneliest Isle,'" by Lewis Lewis, National Geographic, January, 1950.

Homecomers Find Their Fields Strewn With Boulders Fallen From the Cliffs

Tristan's eruption did little damage to the 60 stone cottages, but weather and long neglect ruined the roofing. Stands of New Zealand flax, growing close

to the houses, provide ever-ready thatch and form windbreaks against frequent gales. The Settlement, as Islanders call their village, takes its real name, Edinburgh, from a duke who visited the island in 1867. Rocky outcrop in left foreground bears the initials of a recent visitor.

White "kappie" shades Jane Repetto, here nibbling pink cake frosting. Children have worn such Afrikaans-style sunbonnets more than a century.

Hanging out morning wash, Mabel Laverello resumes life on lonely Tristan. She is descended from American whaling captain Andrew Hagan, who settled on Tristan in 1849. After a long hunt that produced no whales, the captain quit the sea and sent his vessel home by the first mate. He married a daughter of the Settlement's founder.

Sacrificing part of his imported food for the sake of a harvest to come, Norman Swain puts aside the best of his potatoes for planting.

Islanders stroke the feathers of a black australope. The rooster and three hens, gift of a passing South African survey ship, will be the nucleus of a flock for the Settlement.

to kerchiefs and long shapeless skirts clutched bright party dresses. Several young people cradled portable phonographs and transistorized tape recorders. And I knew that the 60 tons of cargo that *Boissevain* would off-load on Tristan ran a gamut from prefabricated roofing to jazz records. I wondered if the island would ever really regain its old isolation, its old tranquillity.

With its small satellite islands of Inaccessible, Nightingale, Middle, and Stoltenhoff, Tristan da Cunha lies far from shipping lanes, approximately midway between South America and Africa. Discovered in 1506 by the Portuguese admiral who gave it his name, Tristan remained uninhabited until 1811 when an American, Jonathan Lambert, landed on the 37-square-mile island and proclaimed himself king. Lambert's three-man colony soon withered away, and in 1816 Great Britain took possession.

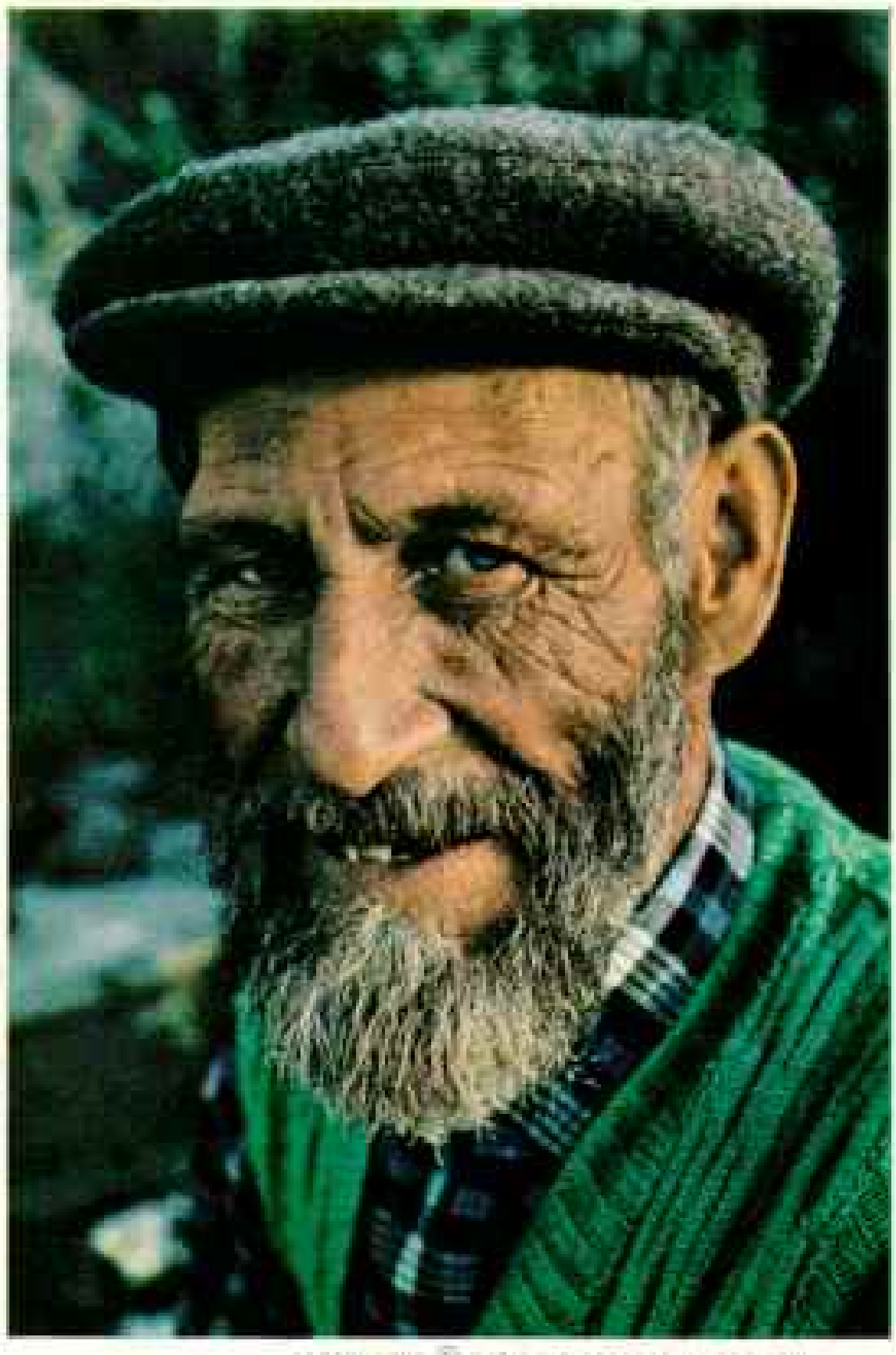
Island Families Share Seven Names

British troops occupied Tristan for a year. When the garrison departed, Corp. William Glass received permission to remain behind with his family. Shipwrecked sailors gradually swelled the colony, and in 1826 five women arrived from the island of St. Helena, 1,500 miles north of Tristan. By 1961, this nucleus had grown to a population of 264—all related through intermarriage and with only seven family names among them: Glass, Green, Hagan, Rogers, Swain, Laverello, and Repetto, the last two bequeathed by Italian seamen wrecked on Tristan 70 years ago.

Bobbing shoreward in the first boat, I gazed at my fellow passengers. All, from eight-year-old Ann Swain to 66-year-old Mabel Laverello, stared impassively at their island. Yet I knew that each stoic face masked an inner jubilation. For in all Tristan's history, this was the happiest and most dramatic moment.

To port, the island's new lava promontory smoked sullenly in the early grayness. Ahead, despite the calm sea, breakers foamed angrily against the black boulders of Garden Gate Beach. Steering through that volcanic jumble would be a supreme test of seamanship.

Perhaps a hundred crewmen of the fishing vessels *Tristania* and *Frances Repetto* awaited us ashore. The ships, both out of Cape Town, prowl Tristan waters for the spiny lobsters that grace dinner tables throughout the world. Although the crews had been at sea since before Christmas, they had postponed their homeward voyage to be able to assist the returning Islanders. Now they waited to haul our boat—and the others to follow—to safety.



KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Power-plant operator Frank Glass traces his origins to William Glass, a Scotsman who founded the Settlement. In 1816 Britain took possession of Tristan and garrisoned it for a year. When the troops withdrew, Corporal Glass remained with his family.

As the fishermen stood ready, our boat inched ahead, awaiting the swell that would sweep us past the savage rocks. There was a second of absolute silence, then someone cried, "Smooth time, Johnny! Come on!"

A flick of the steersman's arm, several pulls on the oars, and suddenly a giant swell sent us skimming up onto the beach. The keel groaned against the rocks but stoutly took the beating it was built for and gained purchase as the wave collapsed and receded. In a blur of movement, the fishermen swarmed about the boat, took our line, and heaved us free of the clutching sea.

Once out of the longboat, the women trudged wordlessly inland toward their old homes, while the men set to work on the beach. All day, boats shot up through the rocks—first with people, then with supplies. Sweating, swearing, straining, the men wrestled the cargo ashore—7,000 pounds of seed potatoes,

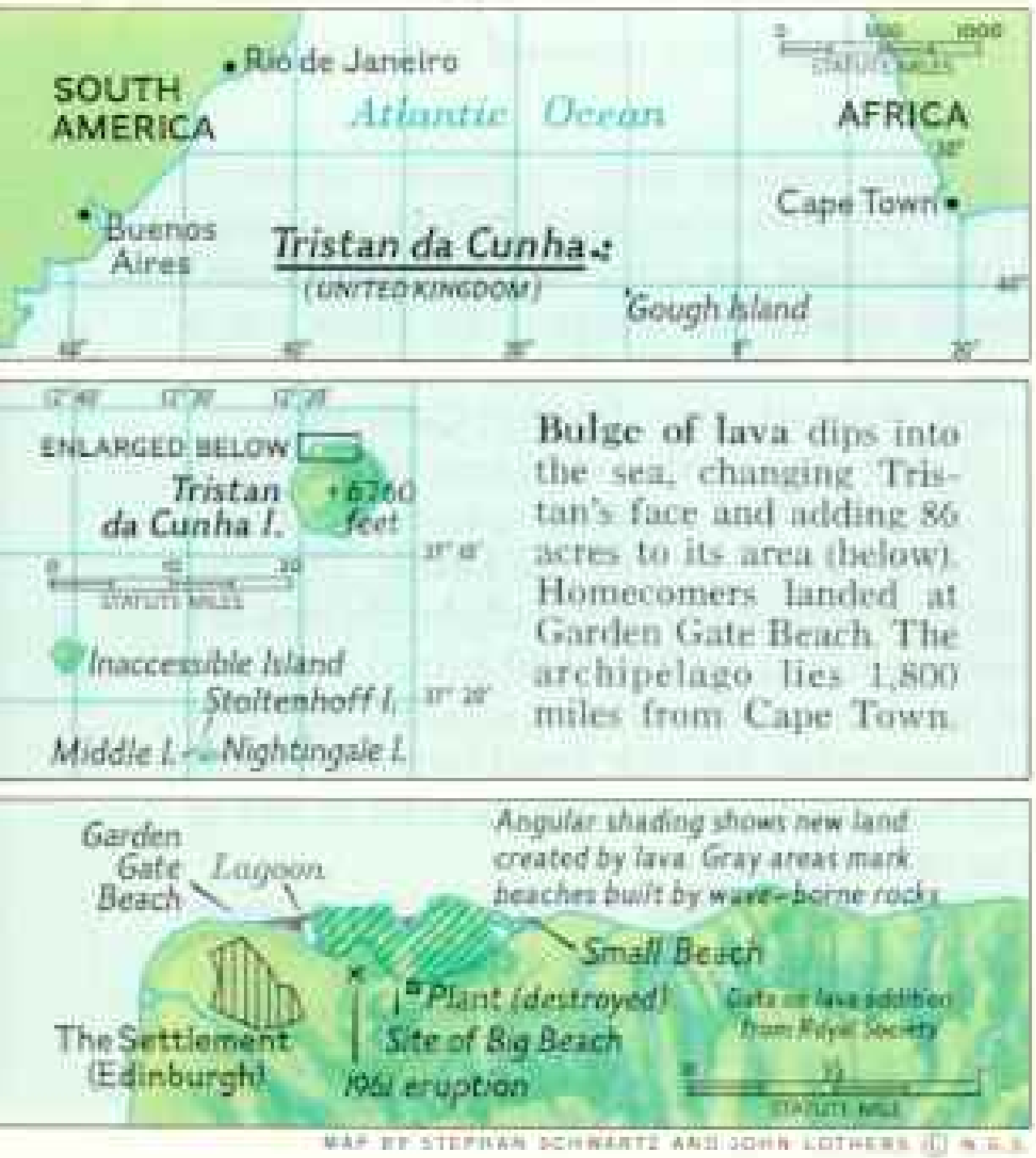
1,500 pounds of sugar, 300 pounds of candles, 100 panes of window glass, lumber, toothpaste, bedding—all the varied items necessary to sustain the newcomers through six months and enable them to rebuild their lives. The really massive shipment of supplies was not due until November.

Rats had overrun the abandoned island. Once an enormous sleek specimen streaked from the rocks toward a sack of potatoes. Quickly regaining an old skill, a Tristan youth lashed out with his foot. Scratch one rat.

Freedom Fatal to Dogs and Sheep

By sunset the long day's work was done. The cargo, all 60 tons of it, strewed the beach. With a farewell hoot of her whistle, *Boissevain* disappeared toward the east. In the deepening dusk, I walked toward the Settlement with Frank Glass (page 69), a rugged leader of the community. For the first time since October 9, 1961, kerosene lamps lit the windows of some 20 cottages, and tea brewed upon stoves. "Aye," Frank said quietly, "'tis a fine treat to be back on Tristan."

The two days that followed saw the slow, laborious transfer of supplies from Garden Gate Beach to the village. Rounding up the livestock they had left on the island—most of the sheep had apparently perished, but the cattle had multiplied—the men hitched



MAP BY STEPHAN SCHWARTZ AND JOHN LOTHERS (C) N.G.S.

Jagged volcano still smolders a year and a half after thrusting a bubble of molten rock out of the

earth. On the crater's lip, Tristan's British administrator gestures toward smoking lava; the agricultural adviser peers into the pit. In the steamy heat, an Islander carries his coat.

Pick-and-hammer Gang Cuts a Vital Road Across Lava

Eruptions that obliterated two beaches spared an unused strand. Returning Islanders, who named the spot Small Beach, regarded a trail to the new landing place as essential to survival of the Settlement. The British administrator quickly organized crews to span this formidable tongue of debris. Every man did road duty. Longboat at left was abandoned during the 1961 exodus.

Muscles strain, and a boulder yields grudgingly to the crew.

bullocks to wooden-wheeled carts. Nervous in the traces after their long freedom, the bullocks skittishly jerked the creaking carts across the sand and up the crude road the advance party had chopped out of the bluff that loomed behind the beach. At the top, a working party switched the cargo to Tristan's only motorized vehicle, a small farm tractor, for the final leg of the journey.

Our fourth day on the island, Good Friday, was devoted to rest and worship. Just before 10 o'clock the bells of St. Mary the Virgin, Tristan's Church of England chapel, tolled across the Settlement. Somehow, despite the chaotic state of the houses, the women had managed to launder clothing. In shirts, ties, and neatly pressed trousers, the men sat in the first pews; the women took their traditional places in the rear of the tiny church their fathers had fashioned from volcanic rock and wood salvaged from crates. The people of Tristan take religion seriously; the island has never needed a policeman, a judge, or a jail.

In the absence of a chaplain, administrator Peter Day—Great Britain's representative on the island—conducted the simple yet moving service. It concluded with a moment of silent prayer for friends and relatives still waiting to come home from England.

Early Saturday morning, three young men hied themselves to the mountain to hunt mollymawks, or yellow-nosed albatrosses. They returned with 36 of the outsize birds, whose wingspread may span seven feet or more. Now every family in the Settlement could celebrate Easter Sunday with the traditional Tristan dinner.

On Monday work began in earnest to restore dwellings and gardens. Almost daily men joined forces to rethatch a neighbor's roof, using bundles of the New Zealand flax that grows thickly in every dooryard.

On a particularly stormy morning, I lent a hand to the crew working on Willie Repetto's house. Gusts of 20 to 30 knots bit off the tops of the breakers dashing against Garden Gate Beach and spat them into the almost horizontal rain. As I stood high on Willie's ridgepole, I could taste salt in the drops that pelted me mercilessly.

Labor Repaid With Food and Drink

The Chief, as he is called in deference to his elected position as island headman, was anxious to finish the job before the rain and wind caused serious damage. Bundles of flax were tossed up to George Swain and Basil Laverello whenever either shouted "Bundle!" (page 65). One by one, they set the bundles in place, lashing them together with wicked-looking 15-inch steel needles threaded with stout yarn. In the end, we required some 800 bundles to cover the roof.

Finally, sodden and dead tired, we went inside to find a table loaded down with sandwiches, cheese, biscuits, and cups of "drink"—hot, milky Tristan tea. This is the traditional neighborly way of repaying labor.

As we talked and ate, my eyes fastened on a plank that adorned a living room wall. It was the nameboard from the sailing vessel *Mabel Clark* (page 64), wrecked in 1878 below Molly's Gulch on the west side of the island. Wood has always been scarce on Tristan,

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Twirling his partner, a youth dances at a resettlement celebration, where country rhythms alternate with the twist. Garb reflects influence of the stay in England.

and in the old days more than one island girl prayed for a ship to founder "so's Johnny and me can build our house." A house has always been a prerequisite of marriage among the Islanders, and as I watched strong backs and sure hands raise one such structure, I felt that —despite the transistor radios and the twist and the nylons brought back from exile—the old ways would survive after all (opposite).

Road Vital to Island's Future

The morning after Easter, I joined Peter Day, agricultural adviser Jerry Stableford, and Dick Swain on a two-mile hike to Big Beach. Our route traversed the tongue of hardened lava—some 30 million cubic yards of it—that had swallowed both the lobster plant and Tristan's finest landing site. One look told the three men that Big Beach had welcomed its last boat. The November supply shipment would have to land elsewhere.

Peter Day decided that the first major project would be to build a road across the lava to a newly chosen alternate landing site on Small Beach. Work soon began. In rotating gangs of 12, the men trooped out daily to shift huge boulders (pages 72-3). Then they crushed the lava into cinders to form a relatively smooth track. The community tractor might have to haul more than 300 tons of essential supplies across this road in November if it should be impossible to land the cargo at Garden Gate Beach.

"If we can't get the cargo ashore," said Peter Day, "the island may well have to be evacuated—permanently."

So every man laid to with a will.

At the same time, the administrator had determined to convert Tristan's late disaster to at least one good end. The ridge of lava jutting into the sea acted as a natural breakwater. If a channel could be cut through the rocky beach to a large inland pool created by the eruption, Tristan would gain a tiny but usable harbor. In time, employing it as a base, the Islanders could set forth in their own dories to join the lucrative hunt for the spiny lobsters that swarm in surrounding waters. So the men went to work there too—again determined to get the job done.

Ship Visit Sets Stage for Heroism

One morning I took my cameras and trudged up the lava ridge to the edge of the smoking volcano. The stone there was hot to the touch, and the stench of sulphur pervasive.

As I maneuvered to photograph the volcano with the village and sea in the background, I spotted a ship to the northeast. Half sprinting, half sliding, I rushed down to the Settlement with the news.

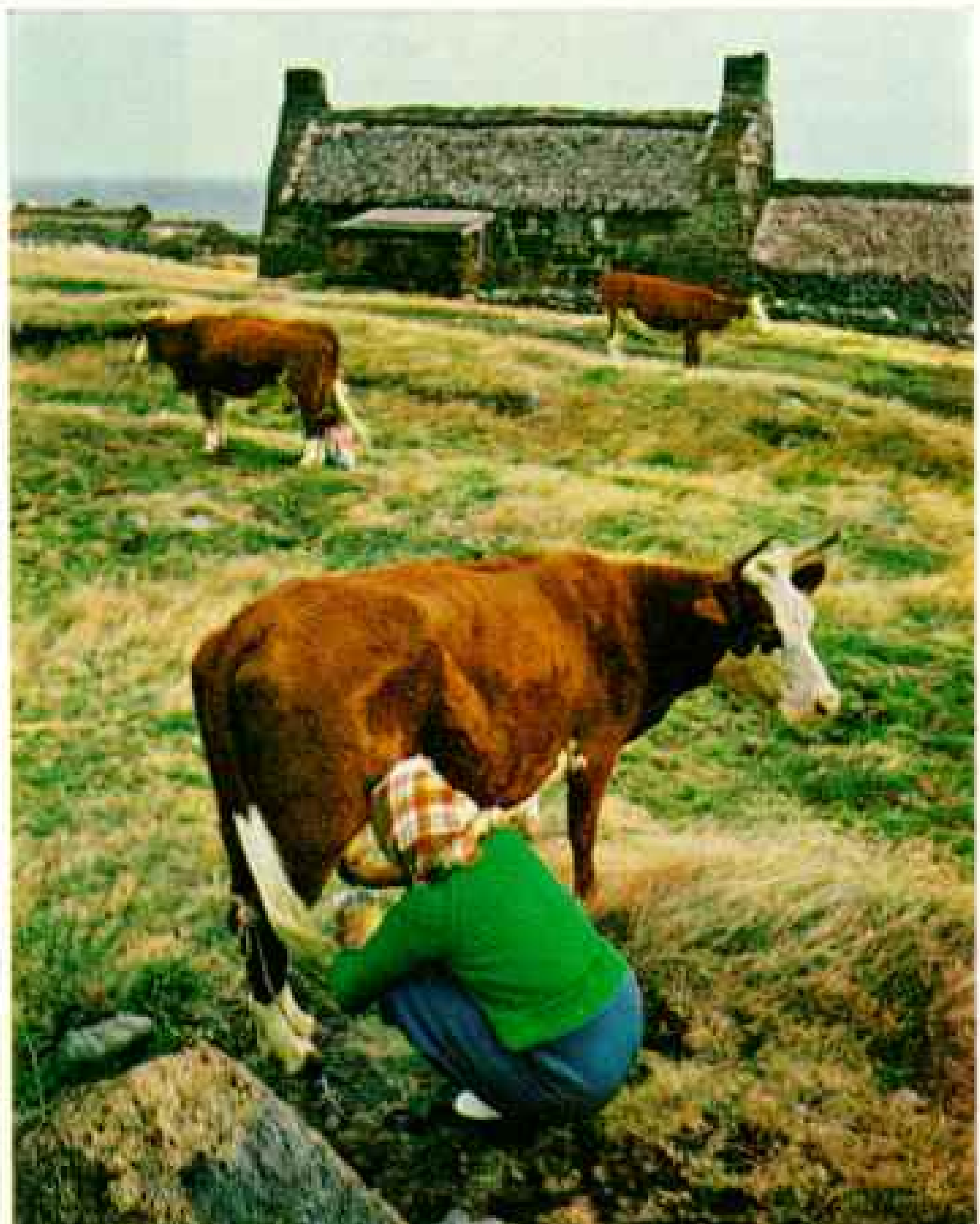
The vessel soon steamed into view of the village. She proved to be the research ship *RSA* en route from the Republic of South Africa to Gough Island, 230 miles to the southeast. Winds of near-gale force still whipped the sea, and *RSA* approached warily. Standing with Peter Day near the island's radio shack, still not restored to use, I jumped with alarm as a voice, amplified by a bullhorn, boomed across the water: "If you can hear me, go and stand by the radio antenna."

The wives and children of the administrative group ran to the mast and stood at attention. Then the voice blared: "We have mail for you. If you can send a boat out to the ship, walk around the antenna."

The arrival of mail always sparks a holiday mood. Laughing and joining hands, the women and children skipped around the antenna as if it were a Maypole.

Oxcart Brings Hewn Rock for a Honeymoon Cottage

Following tradition, engaged couples build a home before marrying. These men unload a gable stone for the house of Albert Glass and Rose Repetto, who planned a Christmas wedding. The builders have erected side walls of molded cinder blocks; years ago they would have used nothing but quarried volcanic stone. With the exception of one tractor, oxcarts are the island's only vehicles.



Half-wild cows, left behind during the exile, experience the almost forgotten touch of milkers' hands. Hobbles discourage bolting and kicking. Cattle found ample pasturage during their owners' absence, but most sheep vanished, possibly killed by wild dogs, which died out in turn.

A hero saves the mail

TO THE PEOPLE OF TRISTAN, Joseph Glass (above) brought a special gift: a day they will long remember. Standing on the rock-bound beach, Glass watched as two other young men tried to launch the dinghy at right and row out to the South African research ship *RSA*, lying half a mile offshore with mail. A breaker smashed the boat broadside, and the oarsmen dived out and swam for their lives.

Righting itself, the empty boat tossed

Kodachromes by National Geographic photographer James P. Blair © N.G.S.

and drifted (opposite) as the drenched oarsmen scrambled ashore. Glass, stripping off his outer garments, ran into the beating surf. Ignoring pleas to return, he swam to the dinghy, boarded it after a struggle with the waves, and rowed to the ship.

Two hours later he was back with the mail—always cause for celebration—and gifts from the *RSA*, first vessel to call after the resettlement.

Fishermen cast weighted lines for plump "five-fingers," a fish named for five finger-width black stripes on either side. Although the harsh sea challenges the Islanders, it yields a bountiful harvest in its quieter moods.

PHOTOGRAPHED © NATIONAL GEOGRAPHIC SOCIETY

The men had already assembled on the beach. When the surf subsided for an instant, a fishing dory skidded into the water and two Islanders strained at the oars. Just as they seemed free of the rocks, a wave smashed against the boat and threatened to engulf it. The oarsmen leaped for their lives. A short, hard swim brought them back to the beach.

The dory, apparently doomed, danced in the heaving sea. Suddenly young Joseph Glass knifed into the surf and struck out for the boat. Just as he pulled himself aboard, another huge wave scooped the dory up at a sickening angle. Joseph dived, disappearing behind the wave. He was lost to sight for an endless moment, then I spotted him back in the half-swamped boat, scrambling for the oars. As he pulled desperately, the boat wallowed out beyond the breakers.

Home With the Mail—and a Bonus

Forty-five minutes of bailing and rowing brought him across half a mile of stormy sea to *RSA*. There, in addition to the precious mail, his heroism earned a set of dry clothing, half a dozen sacks of potatoes, three perky hens, and a rooster (page 68).

Joseph Glass's deed that day was rash, even foolhardy. But through it he passed into island history: Generations to come will honor him as the man who met the first ship to call after resettlement (pages 76-7).

On Tristan, the measure of a man is courage and seamanship. Today's urbanized world, built upon words and machines, rewards other skills. While they were in England, Joseph's father, George, had been a plumber's helper; Norman Swain, 48 years old and a good boat handler, had been a dustman—a garbage collector. Only here, back in their own world, could they prove themselves against the changeless values of their forebears.

The expense of resettling Tristan was being met, oddly enough, by the sale of postage stamps. Collectors covet the Tristan postmark, and almost $20,000 worth of stamps had come to the island on *Boissevain* to meet the demand (opposite, upper).

I dropped in to visit Jerry Stableford who,

Moccasin Maker Practices a Craft That May Become a Labor of Love

When a suitor sews cowhide shoes for a Tristan girl, he shows serious intentions. If she responds by doing his washing and knitting him socks with colored rings, a wedding is assured. Walter Swain (far left) shears hide for his own footwear. Drawstrings complete the shoes. A sailor's palm (beside ruler) is used to push a needle through the hide. Moccasins shape quickly to the feet and last for months.

Stamped envelope, commemorating resettlement, is a memento for Rear Adm. John A. Tyree, Jr., commander of the U. S. Navy's South Atlantic Force. Island chief Repetto (left) presented the first-day cover to the admiral, who with an aide visited Tristan by helicopter from *Spiegel Grove*, first U. S. naval vessel ever to call there. Rain has splattered the officers' uniforms. Collectors bought almost 5,000 of the commemorative covers.

Helicopter lifts off, leaving supplies. Rain driven by the rotors buffets bystanders. This craft ferried the departing author out to *Spiegel Grove*.

Rare bird, the starchy thrush exists only on the Tristan da Cunha group. In addition to *Nesocichla eremita*, the archipelago harbors a flightless rail and two species of finches found nowhere else. Ornithologists believe the remote ancestors of these birds came from South America.

Atop the cliffs, an Islander hunts yellow-nosed albatrosses among stumpy tree ferns above Hottentot Gulch, one of many gullies grooving Tristan.

Far below, rubble from the 1961 eruption rears a dark gray mound near the Settlement. Faintly visible on its slopes, the new road winds toward Small Beach, out of picture at right. A lava-dammed pool at the tip of the flow will shelter longboats if a link can be dug to the sea.

in addition to his agricultural duties, served as postmaster. I found him surrounded by stacks of envelopes, all first-day covers celebrating the resettlement of the island.

"How many requests did you receive for these?" I asked.

"Almost 5,000," he answered, running a weary tongue across his lips, "and blimey, that's a lot o' licking to do."

I stopped at Mabel Laverello's cottage, too (page 68). She is the granddaughter of an American whaling skipper, Andrew Hagan. According to Mabel, when Captain Hagan left his home port in New England in the late 1840's, the owners of the ship told him not to come back without a full cargo of sperm oil. After fruitlessly combing the Southern Ocean for two years, Captain Hagan brought his empty ship to Tristan for fresh water. Taking the owners at their word, he turned the ship over to his first mate for the homeward voyage and went ashore.

With a laugh, Mabel said, "He was the last American to come and settle on Tristan, so's they call me 'Yank.'"

Leaving Tristan is as chancy as landing

there. As the Southern Hemisphere winter came on, tightening its grip on the island, I began to wonder if I might not be Tristan's next "settler." One ship called, but stormy seas prevented the launching of a boat. Had it not been for the good offices of the United States Navy, I might be on Tristan still.

But one morning, looming high and gray in the beating rain, the U.S.S. *Spiegel Grove*, a landing ship dock, hove to off the island. Two helicopters noisily shuttled an unexpected windfall of food and supplies to the Settlement. Then one of them lifted me out over the raging surf, toward the ship and toward home (page 79).

From the helicopter I looked down at the island, drab and hostile in the chill rain, and I wished the good people of Tristan well. Through the open hatch I saw the ridge of lava—black, smoking, repellent—that snaked into the sea. And I recalled a conversation with Lars Repetto. "I know for certain," he had said, "that if another volcano ever happened to Tristan, they wouldn't get the people off, not so easy as what they did before. We won't leave again in a hurry." THE END

Island of Faith in

St. Catherine's Monastery, spoke to Moses from the burning bush,

By GEORGE H. FORSYTH

SHADOWS OF MOUNT SINAI *lengthen above St. Catherine's. Far beyond, Egyptian soldiers camp in the wasteland trod by the wandering children of Israel.*

KODACHROME © N.G.S.

the Sinai Wilderness

built 14 centuries ago to hallow the traditional place where God shelters a unique collection of Christianity's early art

Illustrations by National Geographic photographer ROBERT F. SISSON

MOUNT SINAI stands, stark and forbidding, amid landscape as wild as the surface of the moon. Yet people of three faiths —Christianity, Judaism, and Islam—call it holy ground.

Near Mount Sinai, God called to Moses, the Old Testament records (Exodus 3:1-10), charging him with delivering the children of Israel out of Egypt; His voice issued miraculously from a bush which "burned with fire, and the bush was not consumed." Later, on Sinai's summit, Moses received the Ten Commandments: "tables of stone, written with the finger of God" (Exodus 20:1-17, 31:18, and 34:1, 28, 29).

Generations of pious pilgrims had journeyed to this sacred peak on Egypt's scorched Sinai peninsula, as we were doing now. But ours was a pilgrimage of science, its destination the Monastery of St. Catherine, near the foot of the brooding mountain.

The Byzantine Emperor Justinian the Great erected the monastery in the sixth century as a combination fortress and shrine on the traditional site of the burning bush. Now, after 14 turbulent centuries, St. Catherine's stands as Christendom's most vivid link with the past. Ancient manuscripts in its library and works of art blazing on its walls form a continuous bridge from its founding to the present.

Our desert truck, wallowing in deep sand or pounding on bare rock, lurched along the 250-mile route from Cairo, skirting the Gulf of Suez as far as Abu Rudeis, then plunging into ragged mountain ranges.

With the truck's gears grinding, we jounced among ridges of red granite heaved in tumultuous waves against the sky.

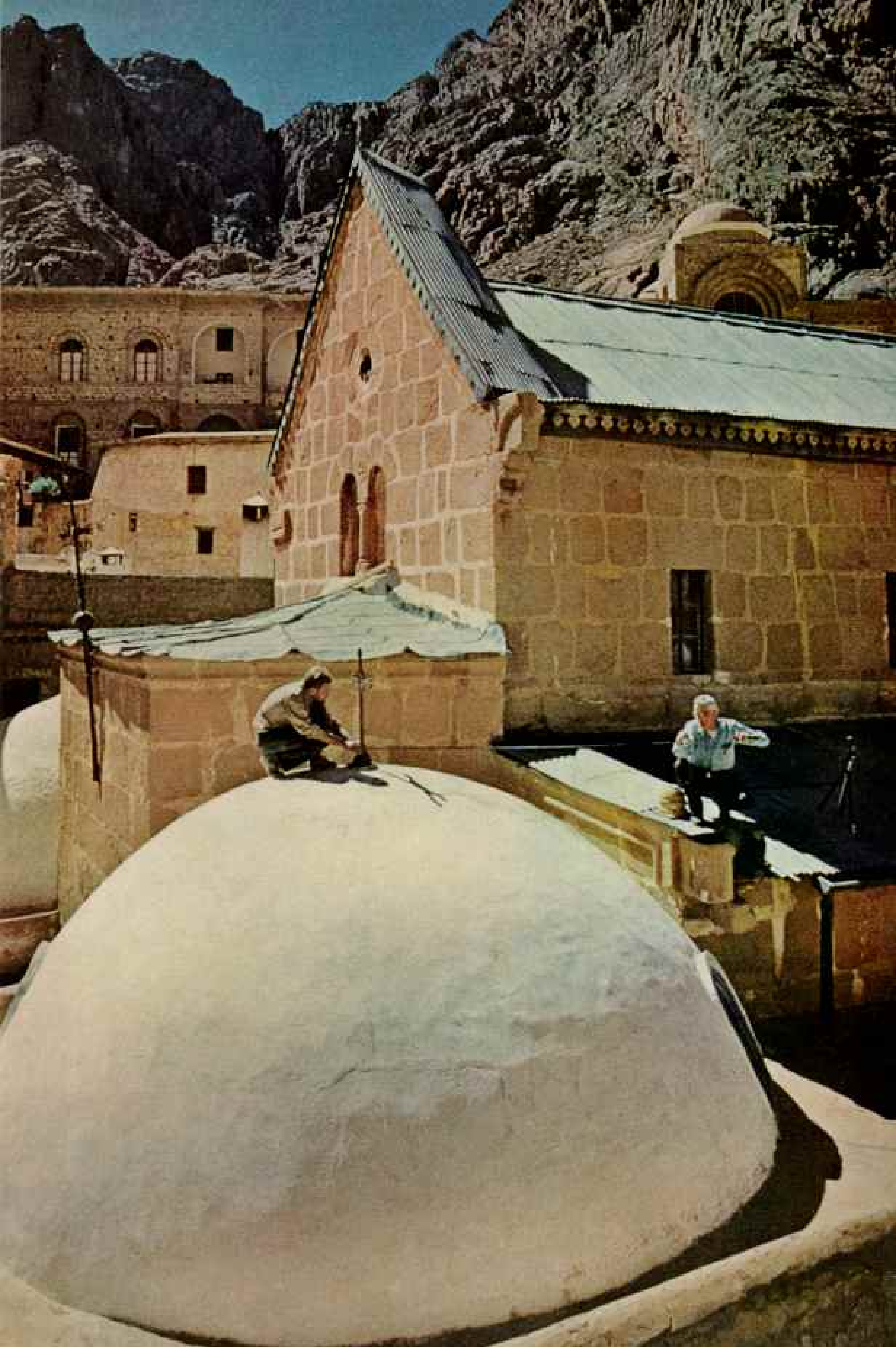
The three of us—Dr. Kurt Weitzmann of Princeton University, Fred Anderegg, Supervisor of Photographic Services for the University of Michigan, and I—searched the horizon for a glimpse of our goal.

The truck rounded a spur, and suddenly the Monastery of St. Cath-

Within the monastery gate, American scholars measure the white-washed dome covering a chapel of the sixth-century church at Mount Sinai. Bare granite walls and corrugated iron roof give no hint of the rich interior (page 90). Robert Van Nice (right) helped the author in his study of St. Catherine's architectural history.

St. Catherine's nestles beneath Mount Sinai, where Moses received the Ten Commandments. Moslems, who also revere the prophet, know the peak as Gebel Mûsa—Mount of Moses. It lies 250 miles from Cairo, the last 70 across rock and sand. As these articles were edited, authors Forsyth and Weitzmann (page 109) were once again at work in Sinai. Camel-borne couriers brought their final corrections across the desert to a message relay station beside the Gulf of Suez.

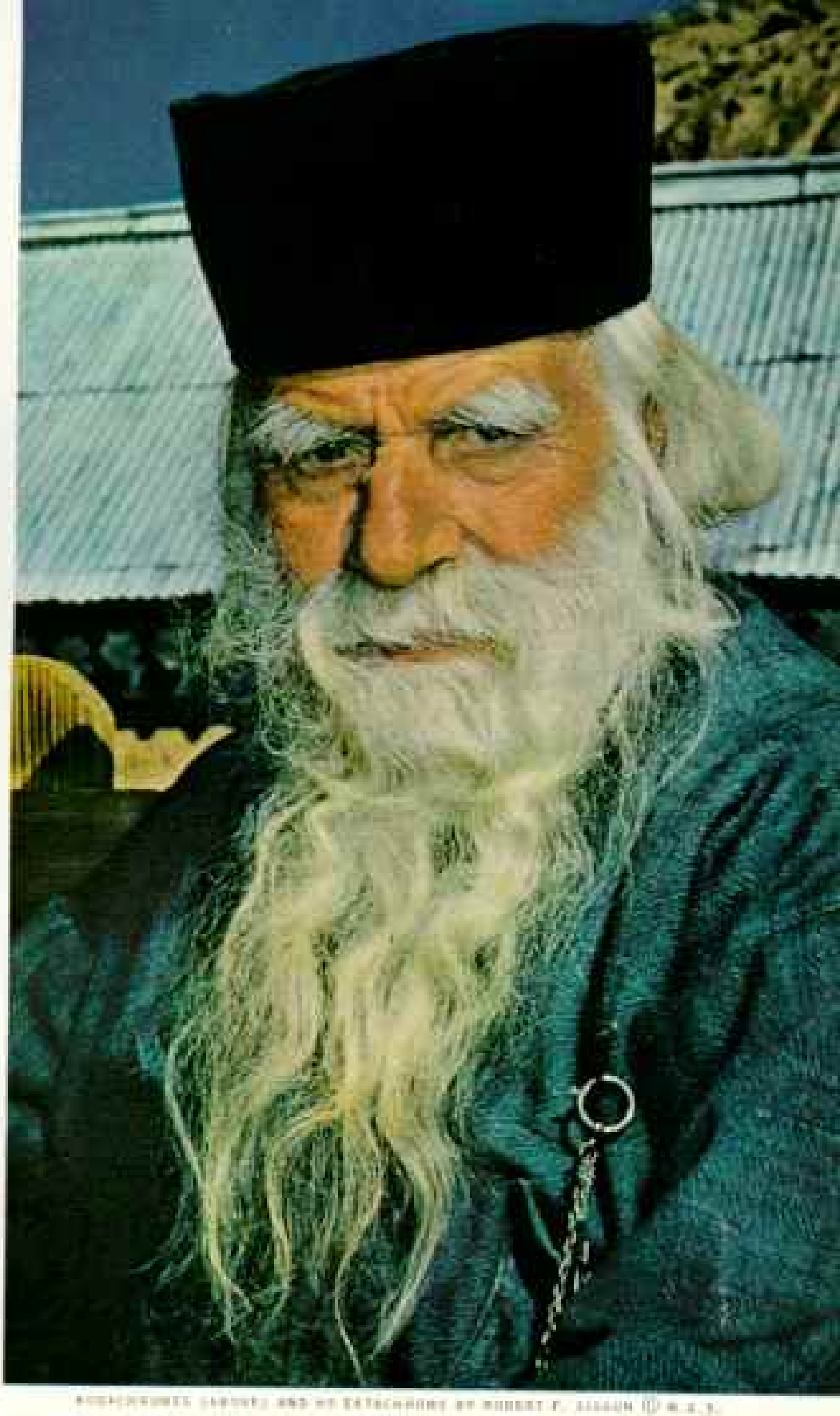
MAPS BY ISAAC ORTIZ AND JOHN P. WOOD; ECHACHROME BY ROBERT E. GIBSON © N.G.S.



Twinkle-eyed Deacon Makarios smiles behind a beard. Like others in the little band of monks, he is of Greek descent.

Aproned Novice Demetrios cooks in his private kitchenette. He wears the customary black, high-crowned hat and fastens his unshorn hair into a neat bun.

White-bearded Father Elias enjoys the sun beside the church. The picture was made in silence: The photographer spoke no Greek, and Father Elias no English.



erine stood before us—so beautiful, so unexpected, so lonely. I caught my breath. Dr. Weitzmann sighed: "At last, after 25 years of hoping, I am here."

The monastery, a starkly isolated bastion the size of a city block, lies against one slope of a steep-sided wadi that enfolds it like a cupped hand. Its weathered wall, built of the same granite as the surrounding peaks, seems to defy them. Behind the monastery's ramparts a small band of monks, today fewer than a dozen, continues the tradition of retirement from this world and preparation for the next. St. Catherine's is one of the oldest active monasteries in existence—a strange, timeless survival of another age.

With Fred Anderegg, I was completing a two-month tour of the Near East for the University of Michigan. My goal: to find a site for an archeological expedition. Dr. Weitzmann of Princeton, a specialist on Byzantine art and an old friend, had joined us in Cairo to help decide if Sinai should be chosen.

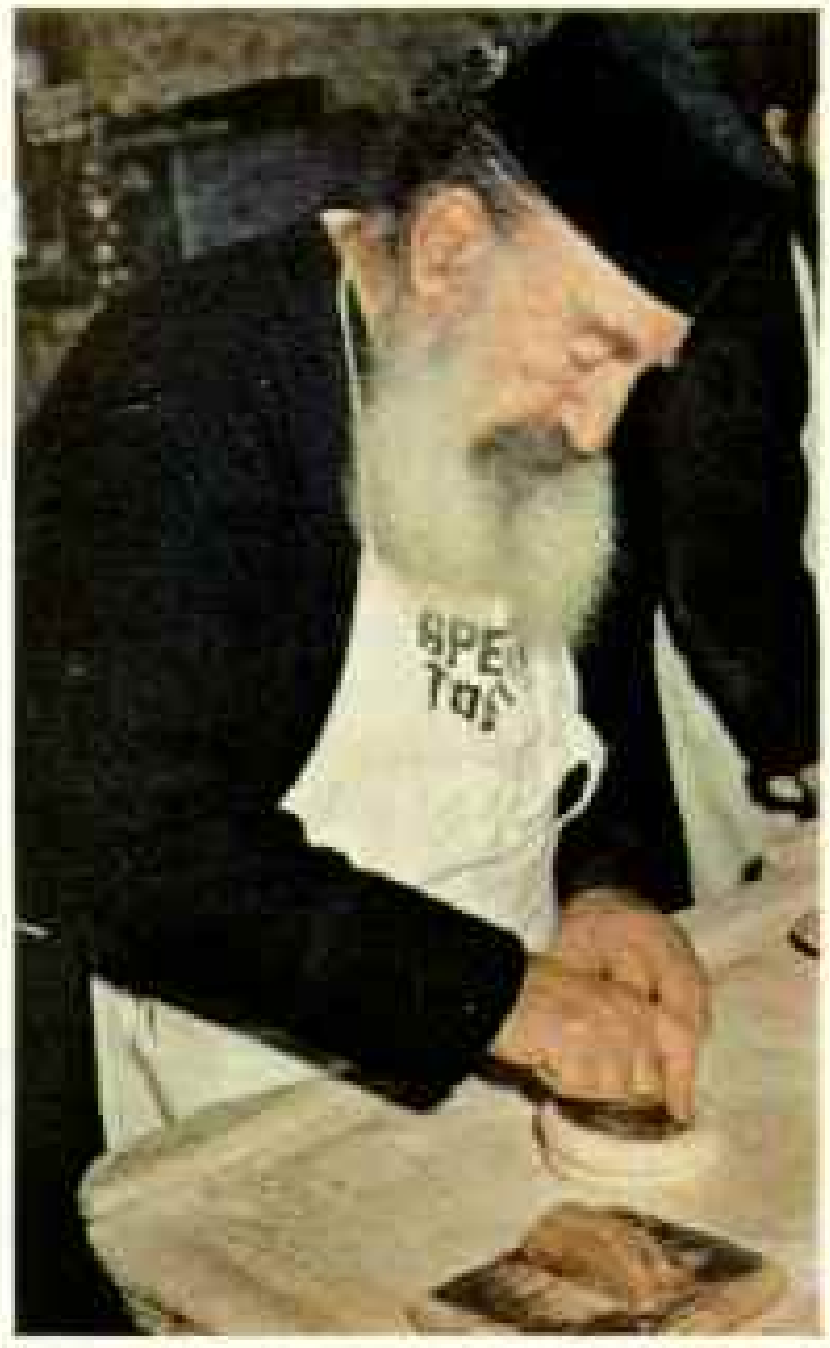
When we halted beside the monastery, a welcoming knot of monks surrounded us. Thanks to word sent by His Beatitude Porphyrios III, Archbishop of Sinai, they had known we were coming. Indeed, this learned and saintly man, who only rarely visits Sinai from his official residence in Cairo, became the "patron saint" of our whole project.

The monks helped us unload our precious photographic equipment. We passed through a tunnel-like sally port—the only entrance—and when I raised my head at the inner end, I blinked with astonishment.

I stood in a miniature town with narrow paved streets, small courts, covered passages, and whitewashed buildings piled one on another. Outwardly, fourteen centuries had little altered St. Catherine's. Seeing it was like glimpsing the vanished world of Byzantium.

Searchlight of desert sun bursts through a loophole into the monastery kitchen. Camel's-thorn fagots at left fuel the stove where Moslem cooks prepare food for the Christian monks.

88 **Bakers push dough** into an oven as in the days of Byzantium.



AND LOWER LEFT) AND KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Father Germanos stamps a design onto bread prepared for religious rites.

Holy bread pictures St. Catherine (upper) and Mary, mother of Jesus.

The monastery's guest wing provided excellent accommodations; since our strenuous day had begun in Suez at 4 a.m., we soon fell into a sound sleep. But an extraordinary sound brought us bolt upright in our beds. A rapid, insistent tattoo—metal upon metal—vibrated through the darkness.

"Is that the fire alarm?" asked Anderegg.

"It's the semandron," replied Weitzmann. "A metal bar beaten with a hammer. It has called monks of the Eastern Church to service since monasticism began."

"But it's only 3:30 a.m."

"No matter. The monks' day has started."

This was our first insight into the rigor of monastic discipline. The daily morning service lasts from 4 to 7 o'clock. The fathers, many of them elderly, stand through most of it. They eat their single meal at noon, and spend most of their day in prayer. Sundays call for even longer hours in the church. Yet the monks of St. Catherine's have maintained this austere round of services for 1,400 years.

Morning found us eager to explore. Father Christophoros, in charge of the library and picture gallery, joined us after church service. His untroubled eyes bespoke a life devoted to meditating on eternity. The bunch of keys he carried gave him the appearance of an amiable St. Peter. With one key he unlocked the iron gate which protects the new library, an airy fireproof hall on the top floor of a modern building.

Father Christophoros led us to a room at the far end. "Here," he said, "we have collected about a hundred of our choicest icons." The walls glowed with rich colors, unearthly harmonies.

Dr. Weitzmann was beside himself with excitement.

"In all the world," he said, "only this monastery gives us an adequate idea of Greek icons of the seventh and even sixth centuries."

Strangely enough, we can thank Mohammed for their preservation. When Islam conquered this area, the monastery became a Christian island severed from Byzantium. Later, at the time of the iconoclasts, the Byzantine emperors ordered all icons destroyed, on the ground that their use in Church rites constituted idolatry. But Sinai's monks, cut off from imperial authority, chose to ignore the fiat.

Scholars Solve an Old Mystery

Better known, however, than the collection of early icons is the extraordinary wealth of manuscripts—some 3,000 ancient works—making this the world's richest monastic library, not only in terms of numbers but also in antiquity. Texts in Greek, Arabic, Syriac, Georgian, Slavonic, Ethiopic, and other languages recall more than 1,500 years of Christianity.

The most remarkable single manuscript of the collection—the Codex Sinaiticus—no longer graces the monastery library. The Codex, dating from the fourth century, is one of the three oldest extant manuscripts of the Bible. A German scholar, Konstantin von

Burnished Chandeliers Blaze
in the Church of the Transfiguration

On St. Catherine's Day Deacon Makarios holds the Elements aloft before the archbishop's throne. In a moment he will disappear through the door of the distant iconostasis, a carved screen containing the icons, and celebrate the Liturgy away from the eyes of the congregation. Rich rugs cover the tesselated floor; ostrich eggs ornament the candelabra above his head. Monks with tall candlesticks stand before the screen. Father Elias bows reverently.

Tischendorf, found it at Mount Sinai in 1844 and recognized its value. He took it to Russia, where it remained until the British Museum purchased it in 1933.

For a century scholars have debated whether Tischendorf stole the Codex or, as he claimed, honestly bought it from the monks. In the course of our work at Sinai, we managed to solve this "whodunit" of the academic world. One of the monks produced an original letter from Tischendorf, written in Greek and dated in September, 1859, promising to return the Codex to the monastery after completing his study of it.

Professor Ihor Ševčenko, of Columbia University, the paleographer of our expedition, translated the letter. Now the original and the English translation hang on the library wall without comment. None is needed.

Church Dates From Justinian's Day

Having gained some idea of the monastery's wealth of icons and manuscripts, we next visited the church. As the architectural specialist of our team, I was impatient to inspect this controversial building. In the 18th century an adventurous English bishop, Richard Pococke, visited it and reported that its roof beams bore inscriptions "to the honour of Justinian and his Empress Theodora."

Later travelers confirmed the existence of the inscriptions but gave different readings of them. All agreed, however, that they were hidden above the church ceiling—an odd place for a dedication. I had long wondered if the beams had been preserved from a previous structure, now destroyed. Pictures, none very good, showed an edifice with a steep roof sometimes found on churches of a later period. Would this prove to be a sixth-century church in a miraculous state of preservation, or just a medieval replacement?

The answer had to wait for our full-scale

Swinging a censer, Father Germanos chants over bread that commemorates Jesus' miracle of the loaves; Deacon Makarios holds a lighted candle. Emperor Justinian, the monastery's founder, might have viewed such a scene. Use of incense traces back to ancient Egypt; splendid robes derive from those worn by Roman emperors.

Brocade-decked altar carries a row of metal-bound lectionaries giving the Gospel readings for every day of the year. Embroidered stoles for the officiating priest hang on columns of the baldachin, or canopy. Deacon Makarios prepares for worship services.

expedition of 1960. Then we were able to establish through careful study that the ceiling panels hiding the sixth-century inscriptions were much later additions; and that the present church is indeed the original, built between A.D. 548 and 565. With the single exception of Hagia Sophia in İstanbul, it is the best preserved survivor of the countless churches erected by Justinian.

Faiths Unite at Sinai

I paused to look at the bell tower in front of the church. To my surprise, only a few paces away stood a similar tower at the corner of a square white building. Was this another church?

"No," explained the monk. "This is the minaret of the mosque."

"What!" I exclaimed. "A mosque inside the monastery?"

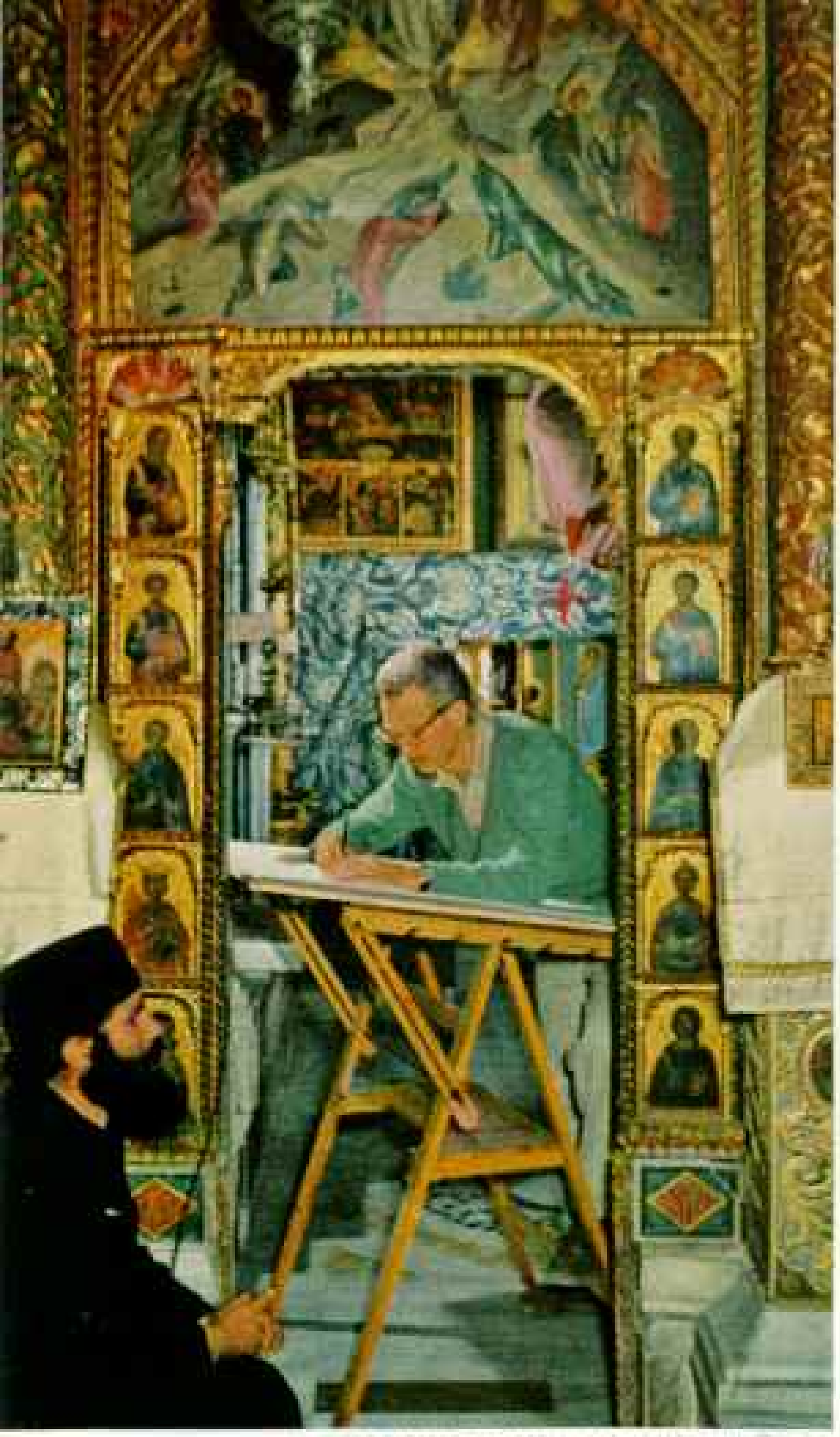
"Why not? The site of the burning bush is sacred to Moslems too; they revere Moses as a great prophet. They, too, have always come on pilgrimage. In the Middle Ages a vizier of the caliph built a mosque for their use."

Looking to the tops of the two towers that pierced the sky in such friendly proximity, I thought that the cross topping one and the crescent atop the other must seldom have joined forces so happily.

As we entered the nave of the church—marble floors agleam beneath a red-and-gold ceiling—a shaft of morning sun, sloping down from a high window, fell like a spotlight on the archbishop's throne. In a painting just above it, dated 1778, the Virgin held a veil depicting the entire monastery—including the mosque I had just seen.

Slowly advancing, Dr. Weitzmann and I arrived at the huge gilded screen which stands athwart the church. Called the iconostasis, it not only displays sacred icons but also shelters from profane eyes the celebration of the Liturgy beyond its three doors.

We passed through the side door to the foot of the holy altar. There, in an imposing marble tomb, rest the remains of the monastery's patroness, St. Catherine of Alexan-



The Author: Prof. George H. Forsyth, Field Director of the Mount Sinai Expeditions and head of the University of Michigan's Kelsey Museum, works on his architectural survey of the church. Deacon Makarios keeps watch.

Latex molds of church beam and lintel are examined by Dr. Ihor Ševčenko of Columbia University. Greek words ask mercy for Stephanos of Aila, the architect, and mention "our most pious Emperor" Justinian and his "late Empress" Theodora. Since Theodora died in 548 and Justinian in 565, scholars conclude that the church must have been built between those years.

dria, who was martyred in the fourth century.

Our gaze wandered up into the great half-dome arching above the altar like the vault of heaven (pages 107–9). Appropriately, the curving surface showed a majestic celestial scene, the Transfiguration of Christ on Mount Tabor. Executed in mosaic, it is a triumph of early Byzantine art—indeed, of all art.

Candles Flame on Site of Burning Bush

Descending three steps beside the altar, we passed into a large domed chamber.

"Here we enter the Chapel of the Burning Bush," said our guide, Father Ieremias, whose white beard swept to his waist. "The chapel stands behind the sanctuary and is most sacred because it occupies the site of the burning bush seen by Moses. Since God commanded him to remove his shoes because he stood on holy ground [page 110], we and all our guests do likewise before entering."

After taking off our shoes, we stooped through a low door into a small, dim shrine richly furnished with rugs, wall tiles, and icons. A simple marble slab, surmounted by an altar, marked the traditional sacred spot where God commissioned Moses to "bring forth my people the children of Israel out of Egypt." Red vigil lights flicker eternally in that room, honoring the bush which once burned with divine fire.

Later, relaxing in the comfortable quarters assigned to us, I leafed through the monastery guest book. Page after page revealed vis-

itors from every quarter of the globe, their names inscribed in every imaginable alphabet. Once I even met four Chinese Franciscan monks there.

Pilgrims journeyed to this wilderness long before Justinian erected his fortress-monastery. More than 100 years earlier, a devout Gallic lady, one Etheria, visited Mount Sinai. She recorded her impressions in a journal which has, miraculously, survived the centuries. She found "many cells of holy men . . . and a church in the place where the bush is, which same bush is alive to this day, and throws out shoots. . . ."

In later years, however, the holy men suffered bitter persecution from raiders who slaughtered them mercilessly. At length, Justinian learned of their plight and dispatched an architect to construct a fortress. According to one account, however, failure to build the fort atop the mountain so displeased the emperor that he had the architect beheaded.

Evening of that first day at the monastery found us high on the fortification wall, looking down a valley to a plain bathed by the setting sun. Called El Raha, this is the very plain, tradition tells us, where the children of Israel camped while Moses communed with God on the mountain.

I pondered the long sweep of events in this forbidding valley: hermits crawling from the caves opposite us to tend the site of the burning bush . . . their successors fleeing for their lives from marauders who, in their turn, melted away before the fortress that the emperor in far-off Constantinople planted in their midst like a mailed fist.

I imagined the endless flow of medieval pilgrims streaming up the valley from all of Europe and the Levant—knights, monks, priests, and simple believers who came to pray at Sinai. Later centuries brought travelers of another sort—scholars and artists who recorded the history and beauty of the monastery, its treasures, and its surroundings.

Specialists Converge on Monastery

What better place, I thought, to plumb the past of Christianity? Dr. Weitzmann heartily agreed. After two years of intensive preparation, we returned in 1958 with our first expedition, sponsored jointly by the University of Michigan, Princeton University, and Egypt's University of Alexandria. On these later visits, I was fortunate in having the help of Robert Van Nice, who had previously completed a monumental study of that other great Byzantine showplace, the Hagia Sophia in İstanbul. A stay of three months at Sinai produced a rich harvest of pictures, architectural drawings, and bulging notebooks.

The year 1960, however, witnessed our major effort at Sinai. Our expedition numbered eight specialists, including Dr. Ahmed Fikry of the University of Alexandria, who with his colleagues undertook to study the wealth of Islamic antiquities at St. Catherine's.

As expedition leader, I was dismayed by the logistical problems of so large a scientific safari with its specialized equipment. In the end, our supplies filled 57 large packing cases

In the Sinai library, Dr. Ševčenko compares tattered parchments to fix their age. Illuminated manuscript preserves sermons of a fourth-century church father.

Jeweled reliquaries, Church tradition holds, enclose the hand and skull of St. Catherine, martyred for upbraiding the fourth-century Roman Emperor Maximinus over his persecution of Christians. After he had her tortured on the wheel and beheaded, angels carried her body to Mount Sinai. Father Germanos guards the precious relics.

Chapel atop Mount Katherina, highest peak of the Sinai peninsula, marks the spot where monks believe St. Catherine's body was discovered centuries after her death. Heavy stones hold the roof lest fierce mountain winds rip it away.

and weighed four tons. I double-checked every item, from our four-story aluminum scaffolding down to shoelaces and a watchmaker's tool kit. To provide electricity for photographic lighting, we brought two gasoline generators. Since Fred Anderegg planned to process color film on the spot in order to compare his results with the subjects, he packed a complete photographic laboratory. Last, but far from least, were the ingredients of 3,000 dehydrated meals—including such delicacies as packaged pizza mix.

In the Sinai peninsula an expedition so encumbered faces a horrendous problem of transportation. A 15th-century pilgrim burdened with only a saddlebag and riding a donkey complains of sand drifts that "the beasts sank into . . . as into deep snow." Overloaded trucks are even more likely to bog in the sands, often camouflaged by a hard crust.

However, we placed all our convoying in the hands of Pericles Caranicolaou of Suez, a Greek desert guide. To this day, I am not certain which of his qualities I most admire: his knowledge of desert routes, his ingenuity as a mechanic (I once saw him plug a hole in a crankcase with a bar of soap), or his command of invective in five languages. But that 1960 season introduced Pericles to a new desert danger—he almost drowned.

Driving through an arid gorge en route to the monastery with some high officials of the

University of Alexandria, he gaped in sudden astonishment at a wall of water roaring toward him. A cloudburst had drenched distant inland mountains; funneling through the narrow valleys, the water had been concentrated into a lethal torrent.

Pericles frantically gunned his car up the steep side of the gorge. As the vehicle teetered in precarious balance, the water raged past, plucking at the tires. But they held, and Pericles's passengers suffered only wet feet.

Bedouin Seem to Spring From Desert

Normally, the eight-hour drive from Suez is a fascinating experience.

Still, I have always thought that a principal fascination of this desert is the Bedouin. To the eyes of a newcomer, this corner of the Near East appears virtually uninhabited. Actually, Bedouin dwell on all sides, but they and their habitations blend into the scenery; travelers often penetrate the outskirts of a village before becoming aware of it. Should a car break down, however, robed and turbaned figures on camels—men with fierce, hawklike faces—soon surround it. Despite their menacing aspect, immediate offers of assistance reveal the hospitality that Bedouin ordinarily show strangers.

The tribesmen we came to know best are Gebeliyah, or Men of the Mountain, hereditary retainers and servants of the monastery.

An 18th-century visitor reports: "These vassals take care of the monks' gardens and do other affairs for them as they have occasion."

Recalling medieval times, the Gebeliyah owe the monks service, and the monks owe them maintenance and protection. We ourselves participated in the system. The ten or twelve Gebeliyah assigned to us as cooks, waiters, and general assistants showed a devotion to their jobs and a gentle protectiveness toward us. We reciprocated by a personal interest that seemed more important to them than the moderate wages they received.

As time passed, we relied more and more upon our Bedouin assistants. They soon learned to erect and dismantle our intricate scaffolding, and to help with our cameras and our lighting equipment. Most remarkable of all, our Bedouin friend Sa'ad became an excellent photographic assistant. Although unable to read a word of English—not even the figures on timer and thermometer—he was soon processing color film with perfect aplomb.

After the initial confusion of installing ourselves, life rapidly settled into a daily routine. It always reminded me of life aboard ship. The completely isolated monastery, caught in its valley as in a trough between two granite waves, seemed to steer a course across endless seas toward some unattainable port. The monks moved to and from church services with nautical precision, almost as if changing the watch.

Our own way of life was equally regular. Work commenced as soon as the sun surmounted neighboring mountains; it ended as dusk suffused the valley.

One morning a crucial experiment began in the best-lighted room we could find. We set up a laboratory for preservation of the monastery's precious icons, many so ravaged by time, revarnishing, and candle smoke that their subjects were hardly recognizable.

We had persuaded the Fogg Museum at Harvard to assign conservation expert Carroll Wales to the expedition. Not only was Carroll a sociable addition to our party, able to speak Greek with the monks and soon equipped with an elegant black beard that rivaled theirs, but he performed near-miracles on the icons. Wearing an eyeshade and high-power lenses, he patiently lifted the dark films which, like cataracts, dimmed the clear-eyed intention of the artists. The brilliant reds, blues, greens, and golds that emerged convinced one monk that Carroll was actually repainting the icons (page 114).

At the same time, we pushed forward on an architectural

Subterranean arches supporting four floors show the skill of sixth-century engineers. A Bedouin, Sa'ad, holds the end of a measuring tape for Professor Forsyth.

Gift of wheat to neighboring Bedouin, a St. Catherine's custom, occupies Novice Demetrios. Bedouin work for the monastery but hold apart from the Gebeliyah, or Men of the Mountain, traditional servants here, who supposedly came as slaves in Byzantine times.

Bedouin girl wears coin in hair. Selema's father is Sa'ad (opposite).

Surprised by the photographer, Selema's mother hastily pulls a cloak over her head to hide her face. With a quern, a primitive mill, she grinds wheat into flour.

survey. In this respect, the monastery presents staggering problems. In the course of 14 centuries, changing practical and religious needs have caused constant building, rebuilding, and alteration—almost like the efforts of a growing thing to adapt itself within the rigid box of the outer walls.

The resulting jungle of architectural forms virtually defies accurate description. There are ruined chapels, unused corridors, collapsed stairways, subterranean vaults choked with debris, rooms without doors, and doors without rooms.

On one occasion Fred Anderegg and I set out to search for a lost underground aqueduct. I had noticed stone rainspouts running down the outside of the church. In recent years rain at Sinai has been a problem only through its

Bedouin Serving the Monastery Live Beneath a Threatening Avalanche

Invited to Sa'ad's summer home, the author found him camping serenely at the foot of a slope covered with house-size boulders. Here Sa'ad, dressed in white, walks to his "apartment," the overhang at left between two balanced stones. Other Bedouin dwell beneath the lip of the monolith. Women grind grain in the lean-to at right. In winter everyone moves to similar quarters across the valley with a southern exposure.

This desolation typifies the Sinai wilderness, where Bedouin who do not work for the monastery must eke out a living by grazing goats and camels on the desert's scanty vegetation.

Gold and silver coins on her beaded veil proclaim the wealth of a desert dweller. She allowed the photographer to see part of her face—contrary to Bedouin practice of complete concealment.

absence. But if rains had once been so heavy as to require spouts, the monastery also needed a drainage system. Otherwise its walled enclosure would have filled like a reservoir.

Fortunately, in 1960 I witnessed a rainstorm—the only one I saw during my entire six months in residence—and could trace the ancient drainage scheme in operation. Terraces, courts, and passages which had seemed level proved to be gently inclined, so that rivulets formed and joined together like arteries. All finally converged at—of all places—the laundry; there all the rainwater that fell within the monastery disappeared through iron bars into a hole in the floor. A flashlight thrust through the grille revealed only a long shadowy tunnel.

Eager to follow the tunnel, I borrowed

from Father Nikephoros—the red-bearded, energetic monk in charge of all visitors—a huge key which opened an adjoining door. Swinging back on complaining hinges, the door disclosed a dungeonlike basement room. A shaft of sunlight fell on an ancient stone oil press—proof of Sinai rainfalls once heavy enough to irrigate olive groves.

After some exploration we located a low opening in the farther wall. Crawling through, we penetrated the very bowels of the old fortress. Here nothing had changed since the time of Justinian.

Ahead loomed the inner face of the fortress wall, pierced by an original loophole. Though blocked at the exterior, it remained exactly as when a long-dead officer of the guard had peered through it at the hostile world. In the tomblike silence I could almost hear the heavy tread and clanking weapons of his men. To left and right, arches cast eerie shadows as our inquiring flashlights traversed them.

We crawled over mountains of debris to the extreme corner of the fortress wall, and there, finally, we found the object of our search. A deep and well-made channel—we nearly fell into it—issued from a tunnel and disappeared under a tiny arch leading through the massive wall. I readily understood the smallness of that arch. Many a castle has fallen to a lone man who crawled through a drain and flung gates open to waiting besiegers. Justinian's architect had taken no chances.

Our subterranean explorations revealed fascinating features of everyday life in the original monastery. We found an oven far older than the primitive one in use today (page 88). Though blackened with the grime of 14 centuries, it stood intact, ready for new fires and fresh bread for baking. Monumental in size, the oven has a vault four feet high by eleven feet wide; a man can crawl through its door.

In one of the dark, cavernous rooms adjacent, we found a large open hearth, doubtless for roasting. In another stood an ancient mill for grinding grain. The millstone had been turned, through a train of wooden gears, by donkeys walking in circles.

Skeleton in vestments keeps endless vigil in the monastery's charnel house. In life, the monk Stephen guarded the way up Mount Sinai (opposite) and expressed the wish that he might always do so. But after he died about A.D. 580, his comrades set up his body beside the thousands of skulls in the ossuary.

More Secrets Lie Hidden by Debris

Although we have learned much about the design of the monastery, we would like to know much more. Excavations are not possible within the monastery walls. So much of the original structure is still standing, however, that our general plan of it should have great historical importance, for of all the fortresses with which the Emperor Justinian ringed his hard-pressed empire, remote St. Catherine's is the best preserved.

Justinian chose his Sinai site well, and down to modern times the monastery has remained an important strategic outpost. When Napoleon invaded Egypt, his deputy commander, Gen. Jean-Baptiste Kléber, sent a corps of masons to repair its defenses. As late as World War I it played a military role, one of the monks told us. During the

savage desert campaigns, he said, an advance unit of the Turkish Army surrounded the monastery, demanding supplies and food.

"When the monks hesitated, the Turks announced that they would storm the walls if their demands were not met in 24 hours. Fortunately the builders of our monastery had provided for just such an emergency. Perhaps you have never noticed a small wooden door, looking like the door to a cupboard, just inside the portal. It opens into a secret passage which comes out in the lower garden.

"At night a messenger slipped through the passage to a friendly local sheik who owned a famous racing camel. By daybreak the sheik, pushing his mount to her utmost, had traversed the desert and mountains all the way to a British camp at Abu Zenîma on the Gulf of Suez. A detachment arrived at the monastery just in time to save it."

Byzantium Lingers in Desert Fortress

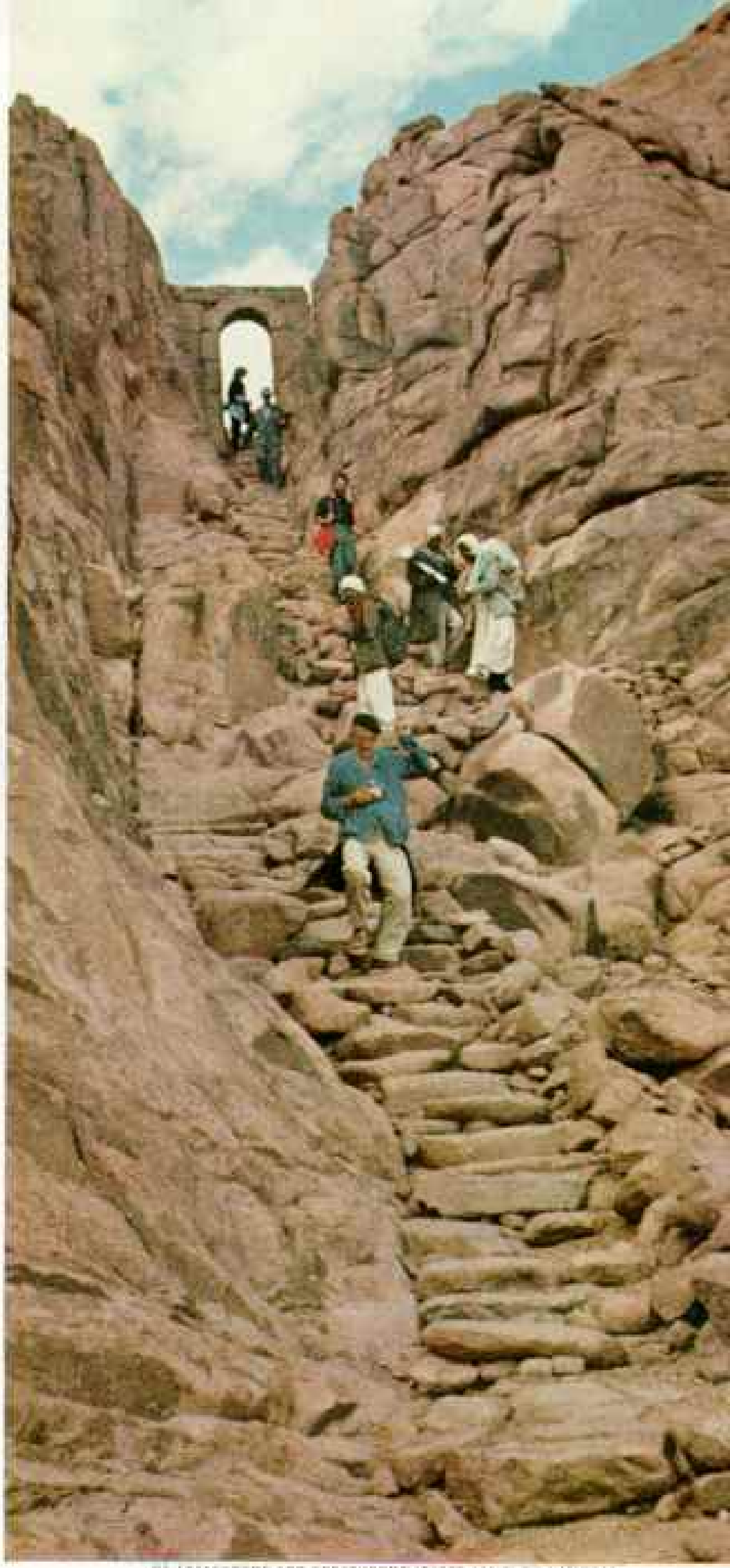
This story, together with many others, I heard during moments of relaxation with the monks on the terrace or on the little porches before their rooms. The lives of these dedicated men are not as communal as in most other monastic orders. Each has his own small apartment and each leads a life apart—recalling the lives of the hermits who first tended this holy spot.

It is a moving thing to witness the continuity of devotion that has spanned so many centuries. On one of our last Sundays at Mount Sinai, the Metropolitan of Kavalla in Greece officiated at a service in the church. Attending priests wore the monastery's finest vestments, and jeweled sacramental objects decked the altar. Incense, fragrant and haunting, billowed upward in clouds, and with it rose chants of immemorial age and prayers as old as Christianity itself.

The ceremony that unfolded before us was liturgical drama. The priest came and went through the door of the iconostasis in front of the altar. And, at the climax, he carried the Eucharistic Elements past the deeply bowed heads of monks to left and right. As he raised the Elements aloft, his evident exaltation combined with his brilliant red-and-gold vestments conveyed a splendor—an imperial splendor. Here, before me, was the Byzantium of old.

I felt a surge of emotion as I thought of the continuing fulfillment, through age after age, of the will of the great emperor who founded this fortress of God in the wilderness.

* * *



Three thousand stone steps lead to Sinai's peak. In times past, monks guarded the path. Stephen (opposite) is said to have kept watch in the distant arch.

THREE-PAGE FOLDOUT FOLLOWS

What Moses saw when he climbed Mount Sinai: saw-toothed mountains, eroded slopes, desolate valleys. Yet man persists even here, as evidenced by the small white patch on the crest of the hill at lower right —a chapel. St. Catherine's Monastery lies hidden in the fold of mountains behind Father Nikephoros.

ΤΗΛΙΑΣ

ΤΜΩΥΣΗΣ

ΤΙΩΑΝΝΗΣ

ΤΙΑΚΩΒΟΣ

ΤΠΕΤΡΟΣ

ΤΟΙΚΟΝΟΜΑΤΗΣΘΕΟΤΗΚΑΙΤΟΠΑΝΑΓΙΟΠΝΕΥΜΑΤΟΣΕΓΕΝΕΤΟΤΟΠΑΝΕΡΓΟΝΤΟΤΟΥΠΕΡΤΩΝΘΑΥΜΑΣΙΩΝΚΑΡΠΟΦΟΡΗΣΑΙΤΕΠΛΟΓΗΣΟΝΤΟΥΤΟΝΟΣΙΟΥΠΑΤΕΡΑ

Mount Sinai's Holy Treasures

By KURT WEITZMANN, Ph.D.

Photographs by FRED ANDEREGG

Of the Mount Sinai Expeditions sponsored by the University of Michigan, Princeton University, and the University of Alexandria

I SHALL ALWAYS RECALL with a sense of horror that day in 1958 when Professor Paul Underwood of the Byzantine Institute of America climbed with me to the top of our four-story scaffold in the Church of St. Catherine's Monastery at Sinai. As he cautiously tapped the great mosaic of the Transfiguration that arcs above the altar, it yielded beneath his fingers.

"The figure of Christ is detached from the wall," he told me. "It could collapse at any time."

My heart sank. For 14 centuries this priceless artistic legacy from the ancient world had glowed like a vision of heaven in the wilderness of Moses. But seeping water had finally eroded the mortar behind the figure of Christ, leaving it suspended like a veil. The slightest jar could have reduced it to a rubble of meaningless colored cubes.

Professor Underwood, who has long supervised the cleaning of the mosaics in the Hagia Sophia and Kariye Camii of İstanbul, had been invited to St. Catherine's to help us appraise the condition of the Transfiguration. Upon our request, he assigned two of the Institute's staff to save the mosaic. Working carefully, they opened 56 tiny holes, through which they forced mortar to rebind the scene to the wall. In seven of the more critical areas, copper pins were inserted to reinforce the mortar.

Once the safety of the Transfiguration scene was assured, Ernest Hawkins—another veteran of the Hagia Sophia—painstakingly removed the grime and varnish that dimmed its glory. Now this magnificent work of art shines with the same splendor as in the age of Justinian, as shown in the foldout at left.

Transfiguration's original brilliance glows once more above the principal altar of St. Catherine's Monastery, following restoration that saved the priceless mosaic from collapse.

At God's command, Moses takes off his sandals before the burning bush.

ALTHOUGH THE ART of setting first pebbles, then stone cubes, and finally glass cubes in a plaster bed had developed on a large scale in the Greco-Roman world, early mosaicists generally confined their efforts to the decoration of floors. Not until the Christian Era did the mosaic reach its full potential as a covering for the walls and vaults of the new churches that sprang up throughout the Roman Empire.

In their mosaics, Christian artists chose to elaborate upon dogmatic or liturgical themes. Frequently, vivid episodes from the life of Christ served to instruct the illiterate. Technique also advanced apace, and the use of golden cubes as a background imparted a radiant inner light, a kind of mystical quality, to the work.

Covering vast surfaces with mosaic required efficient teamwork. A master artist, advised by a learned cleric concerning the theological accuracy of the subject matter, first sketched an entire scene. Assistants helped to design a series of cartoons; these determined the preliminary lines to be drawn on the wet plaster. Then, in descending order of ability, the best of the mosaicists executed the heads of figures, others filled in details such as draped garments, and still others the plain background.

Since successful workshops relied on long traditions and complex skills, only great artistic centers could maintain them. For centuries Constantinople dominated the world of mosaic art. Cadres of craftsmen journeyed to distant realms to decorate ambitious buildings. In about 715, the Moslem Caliph of Damascus requested that the Byzantine emperor

Transfiguration's Glory Draws Eyes Heavenward

Gazing upward, visitors feel awe at the grandeur of Christ. Though only slightly larger than life-size, He seems monumental. Flanking Him are Elijah the prophet (left) and Moses the lawgiver, of the Old Testament. Disciples John and James kneel and gesture in astonishment while Peter, still heavy with sleep, lies on the ground.

For the Christian, this moment demonstrates the two natures of Christ—human and divine.

Medallions that frame the Transfiguration show the 12 apostles, 16 prophets, King David, and two donors of the mosaic. Spandrels bear medallions of the Virgin and John the Baptist. Moses appears in two scenes beside the windows above.

The Chapel of the Burning Bush, which tradition honors as the precise spot where Moses stood below Sinai, lies behind the apse.

Though many visitors had seen the Transfiguration, its artistic greatness went unappreciated until the recent Sinai expeditions cleaned it and photographed it.

Face in the mosaic is cleaned with a dental tool. Restorers used solvents sparingly lest they damage the surface.

RE-EXPOSED BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON (ABOVE) AND FRED ANDREWS, MOUNT SINAI EXPEDITIONS © N.G.S.

dispatch artists to decorate the great Omayyad Mosque. A few decades ago archeologists discovered some of those very mosaics beneath a thick coat of plaster.

With the Christianization of Russia, Byzantine mosaicists spent generations working on the great churches of Kiev. The Norman Kings of Sicily entrusted the decoration of churches in Cefalú, Palermo, and Monreale to a headmaster from Constantinople, who then trained local assistants.

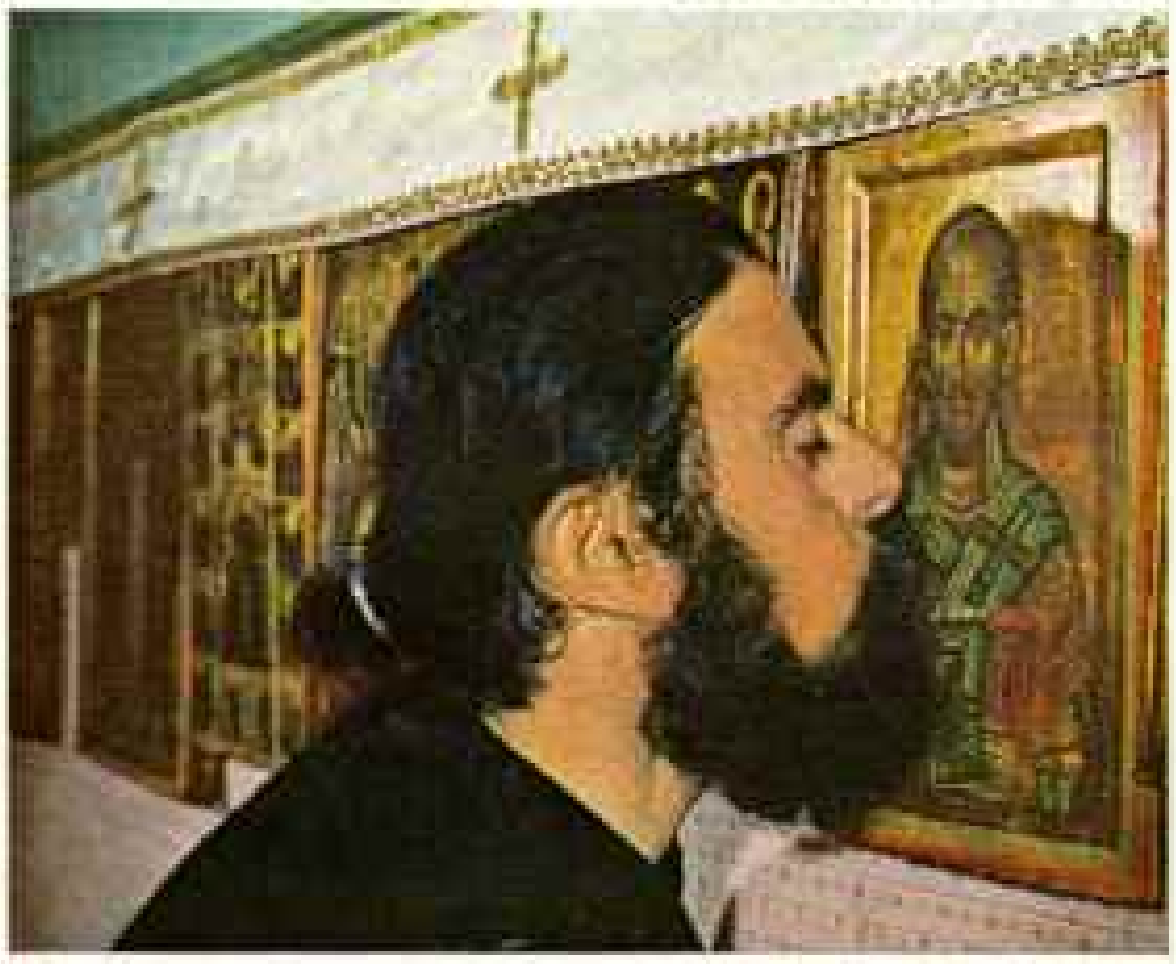
It would seem likely that Justinian sent artists from his capital to execute the Transfiguration at St. Catherine's (above and pages 107-9). Later, in the time of the iconoclasts, all figurative mosaics were destroyed wherever Byzantium's authority existed; thus the Sinai work is one of the very few surviving figure mosaics from the most flourishing period under Justinian. In this lies its historical value.

The author, at work in the former library, now a storeroom for icons, analyzes the monastery's collection of antique panel paintings. Father Germanos dozes, remaining close by to give information. Dr. Kurt Weitzmann, Professor of Art and Archeology at Princeton University and a member of the Institute for Advanced Study, is editor in chief of forthcoming publications devoted to St. Catherine's artistic treasures.

Thoughtful St. Peter (opposite) holds the keys to heaven and his cross-staff. This seventh-century masterpiece is "perhaps the most beautiful icon in existence," says Dr. Weitzmann. Medallions above the niche that forms the background show Christ flanked by the Virgin Mary and probably John the Evangelist.

The monastery's early icons show a technique similar to those employed by painters of Egyptian mummy portraits and used briefly for Christian icons.

Father Andreas kisses an icon of St. John Chrysostom, a fourth-century archbishop of Constantinople.



MY FIRST VISIT to St. Catherine's in 1956 had been for the primary purpose of studying illustrated manuscripts. I was then unaware that the monastery also harbored the most important collection of icons extant. As with any casual visitor, the monks had shown me through a room lined with some 100 icons. Not until the day before my departure did I learn that these were only a fraction of the collection which, as my own checklist indicates, numbers more than 2,000.

In the courtyard that day I met a monk who asked if I had visited the old library.

"Why should I?" I replied. "All the books have been removed." They had, in fact, been transferred to a new concrete building with fireproof storage facilities.

"But now we store icons in the old library," the monk said. When he unlocked the door, I saw to my great astonishment two rooms lined with shelves on which icons—the most outstanding I had ever encountered—were stored upright like magazines. Then and there, I determined to devote myself to the study of this unrivaled treasure.

To the Orthodox, an icon is more than an object of reverence. It stimulates the worshiper to apprehend the spiritual value portrayed—and it performs a definite function in the Liturgy of the Orthodox Church. At the beginning of a service, the priest and deacon bow before and cense the icons of Christ, of the Virgin, St. John the Baptist, the saint of the church, and of the saint of the day.

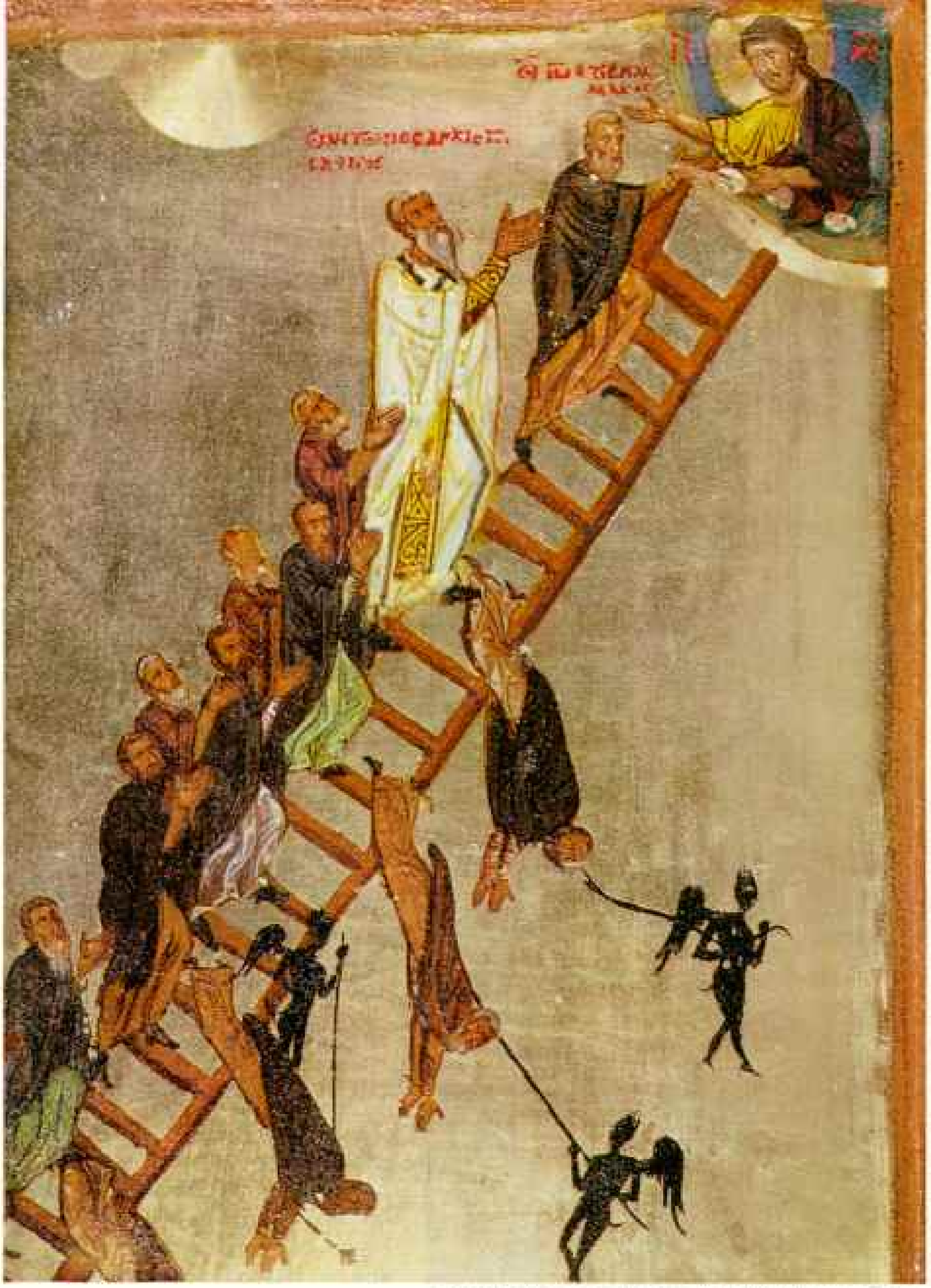
In the eighth century, the issue of whether or not the veneration of icons constituted idolatry erupted into a civil war that shook Byzantium. Imperial decrees ordered the smashing of every holy image—hence our word "iconoclast"—icon smasher. The rising tide of Islam, however, had isolated St. Catherine's from Constantinople, and the monastery's precious collection escaped destruction.

One of the Sinai icons that survived—and perhaps the most beautiful anywhere in the world—is a seventh-century portrait of St. Peter (opposite). The saint firmly grasps a bundle of keys in one hand, a cross-staff in the other. His thoughtful, penetrating expression contrasts sharply with the whirling tuft of hair on his forehead and wavy strokes of his beard—subtle devices used by the artist to convey Peter's restless temper. Here is no poor fisherman, but rather the intellectual prince of the apostles. An artistic creation of this stature proves anew that the so-called Dark Ages never existed in the Greek East.

Endangered iconostasis beam is saved. Restorer Carroll Wales carefully removes varnish and glue, revealing the brilliant colors. He reattaches loose paint by injecting glue beneath its surface.

Before and after restoration: Uncleaned icon at upper right is dark and discolored. Removal of many coats of varnish reveals sensitive color and delicate line.

Hypodermic needle in Wales's hands injects gelatin glue to reattach blistered paint to the wood.



Monks and an archbishop in white climb a ladder to heaven. Devils catch the fallen.

AMONG THE GREAT VARIETY of icons at St. Catherine's, several offer intimate glimpses into the long history of monasticism at Mount Sinai. John Climacus, an abbot at the Sinai monastery in the seventh century, wrote a treatise for the guidance of monks that attained wide popularity and influenced the course of Byzantine monasticism for centuries.

In it, the abbot advised his fellows on how to enter heaven. John wrote 30 chapters, in which he enumerated the vices and their corresponding virtues. He employed the analogy of a ladder with 30 rungs—an image so vivid that it earned him the name John Climacus—John of the Ladder.

An 11th- or 12th-century icon of a most sensitive style, of which a detail is reproduced above, depicts eager monks climbing the ladder. But some, falling victim to vice, stumble; little devils quickly drag the sinners down.

At the very top of the ladder, the monk about to attain the last rung is none other than the author, John Climacus. Christ reaches from heaven to receive the holy abbot, who is assisted by an archbishop named Anthony.

THE GREAT VALUE of the Sinai icon collection lies in the fact that it spans the history of this art form. Not only is the monastery the great repository of pre-iconoclastic works, but it also possesses icons of every century thereafter—even of that dark period in the eighth and ninth centuries when imperial orders forbade the fashioning of holy images.

Apart from furnishing a valuable index for the monastery, the full photographic record of Sinai's 2,000 icons will provide the basis for an accurate history of icon painting. As long as the Sinai material remained unknown, the evolution of icons—particularly in their early phases—stood as the most obscure chapter in the history of Byzantine art.

One may also read the checkered history of the Near East in the Sinai collection. The 12th century saw Byzantium wane, and icons executed by French and Italian painters reached St. Catherine's from the Crusader kingdom in Palestine. But 100 years later the resurgence of Constantinople is reflected in a new flowering of Byzantine art.

The view of John the Baptist (opposite) is a characteristic example of this renaissance. The artist stressed the saint's spirituality by a strong dematerialization of flesh-and-bone aspects of the human body. Fleeting highlights play across the loose garments, creating an almost phantomlike appearance. The same sketchy strokes prove equally effective in the face, where they develop a highly emotional quality—in this case a sense of sorrow.

The grieving figure of John the Evangelist (left), the only survivor of a Crucifixion group that once included Christ and the Virgin, conveys the same deep sadness. Such expressions of emotion, rigorously avoided in early Byzantine art, became a powerful factor in this late phase.

The fall of Constantinople in 1453 by no means spelled the end of icon painting. Indeed, on the island of Crete—where St. Catherine's Monastery still possesses properties—it reached a new height in the era of Venetian domination (1204 to 1669); Byzantine elements fused with those of the Renaissance and the baroque to shape a dynamic and life-like religious art.

Not all of St. Catherine's icons, however, originated beyond Sinai. The monks had cultivated icon painting within the walls of the monastery, and the practice survived to our own day.

In 1958 we attended the funeral of Father Pachomios, the last icon painter at Sinai. With his death a great tradition had come to an end. Although he had painted with inspiration and devotion—which had always been considered prerequisites of a good icon artist—the Western influences reaching the monastery had destroyed the purity of his Byzantine style, a style that had been passed down from monk to monk for some 1,400 years.

John the Evangelist weeps at the Crucifixion.

DE STEPHENSON BY THE ARMENIA, MOUNT SINAI EXPEDITION © M.S.E.

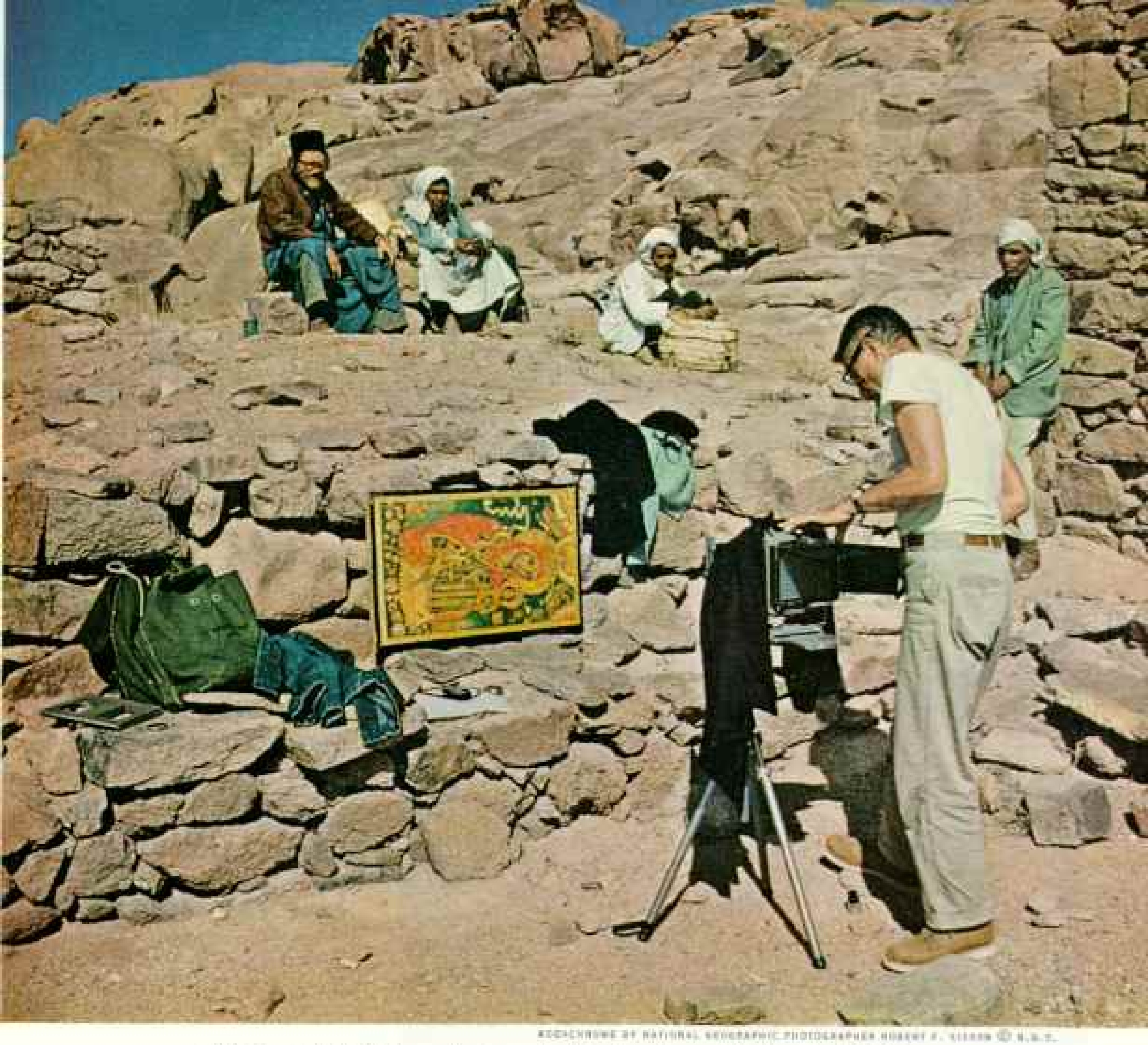
Disheveled John the Baptist shows deep sorrow. Early Byzantine art avoided emotion, but this icon was painted after the resurgence of the Eastern Empire in the 13th century under the Palaeologan dynasty. St. Catherine's, isolated in the seventh century by the spread of Islam, had by this time re-established its connections with Constantinople, to which it had long looked as the fountainhead of the Orthodox faith.

The young Virgin is presented at the Temple.

Transfiguration's divine light awes apostles.

John baptizes Christ in the River Jordan.

The Saviour raises Lazarus from the dead.



KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON © N.G.S.

Virgin and Child are photographed in desert sunlight by Fred Anderegg, whose camera has captured the color and vibrancy of many Sinai masterpieces.

WHEN THE ORTHODOX worshiper stands before the iconostasis, or picture wall, that conceals the altar in an Eastern Church, he gazes upon four icons: Christ, the Virgin, St. John the Baptist, and the saint of the particular church. Raising his eyes, he beholds a series of smaller icons that remind him of the great feasts of the ecclesiastical year.

The church at Sinai teaches us, however, that in the early Eastern Church these feast pictures were not individual icons but were painted on beams. In all the Orthodox world, only St. Catherine's has preserved examples of this ancient usage.

From a 12th-century beam comes the Presentation of the Virgin in the Temple (opposite). The scene depicts Mary twice—as a child with her parents before the high priest, an event told in the apocryphal gospel of James, and on a throne receiving bread from an angel. The Transfiguration of the Saviour, also on a beam, differs markedly from the magnificent mosaic in the apse of the church. In the mosaic, the divine light represents an inner experience to which the apostles react with astonishment; here the light is physical, blinding their eyes.

A similar beam from the 13th century presents dramatic, animated versions of the Baptism of Jesus by John the Baptist and the Raising of Lazarus. In sharp contrast to the enamel-like tints used on the 12th-century beam, the artist here employs highly individual color combinations and applies them in thin, delicate layers.

© EXHIBITIONS BY FRED HUFFORD, MOUNT SINAI EXPEDITIONS © NATIONAL GEOGRAPHIC SOCIETY

Robed in imperial purple, the enthroned Virgin is guarded by soldier saints Theodore (left) and George. Attendant angels, looking toward heaven, suggest the faces in Pompeiian wall paintings of the first century and show how Byzantium carried on the classical heritage bequeathed by Rome. This sixth-century Sinai icon, done in wax mixed with pigment, appears to have been produced in Constantinople.

AMONG THE EARLY ICONS at St. Catherine's, perhaps the only one to rival the haunting portrayal of Peter (page 113) is the one above, depicting the Virgin enthroned, flanked by the two soldier saints, Theodore and George.

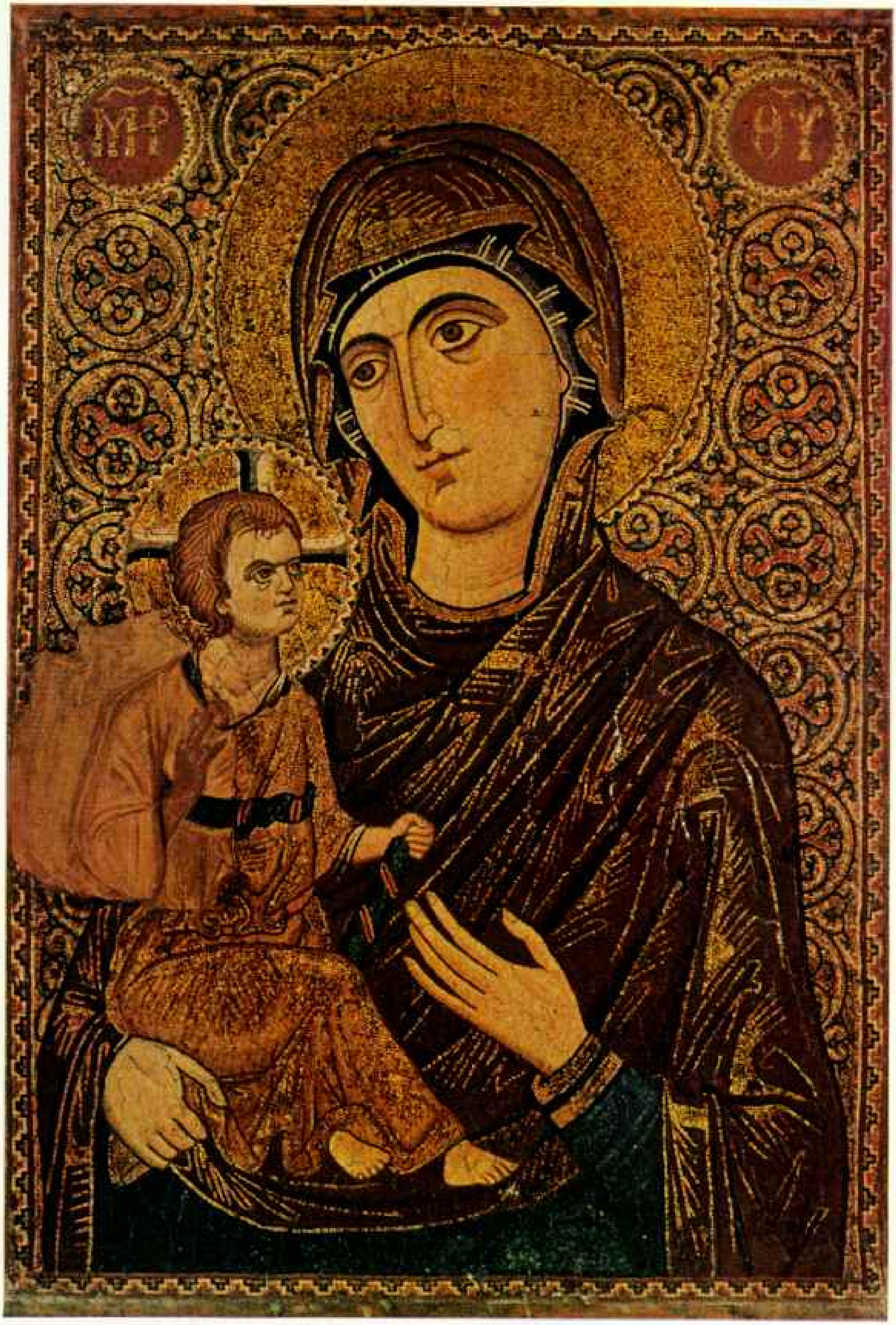
This icon, most probably from the sixth century, shows the Virgin in a garment of imperial purple. The artist has given her some freedom of movement, in contrast to the soldier saints who, uniformed as officers of the Imperial Guard, stand at stiff attention. The Virgin looks not at the beholder but to her left, while her knees turn slightly to her right.

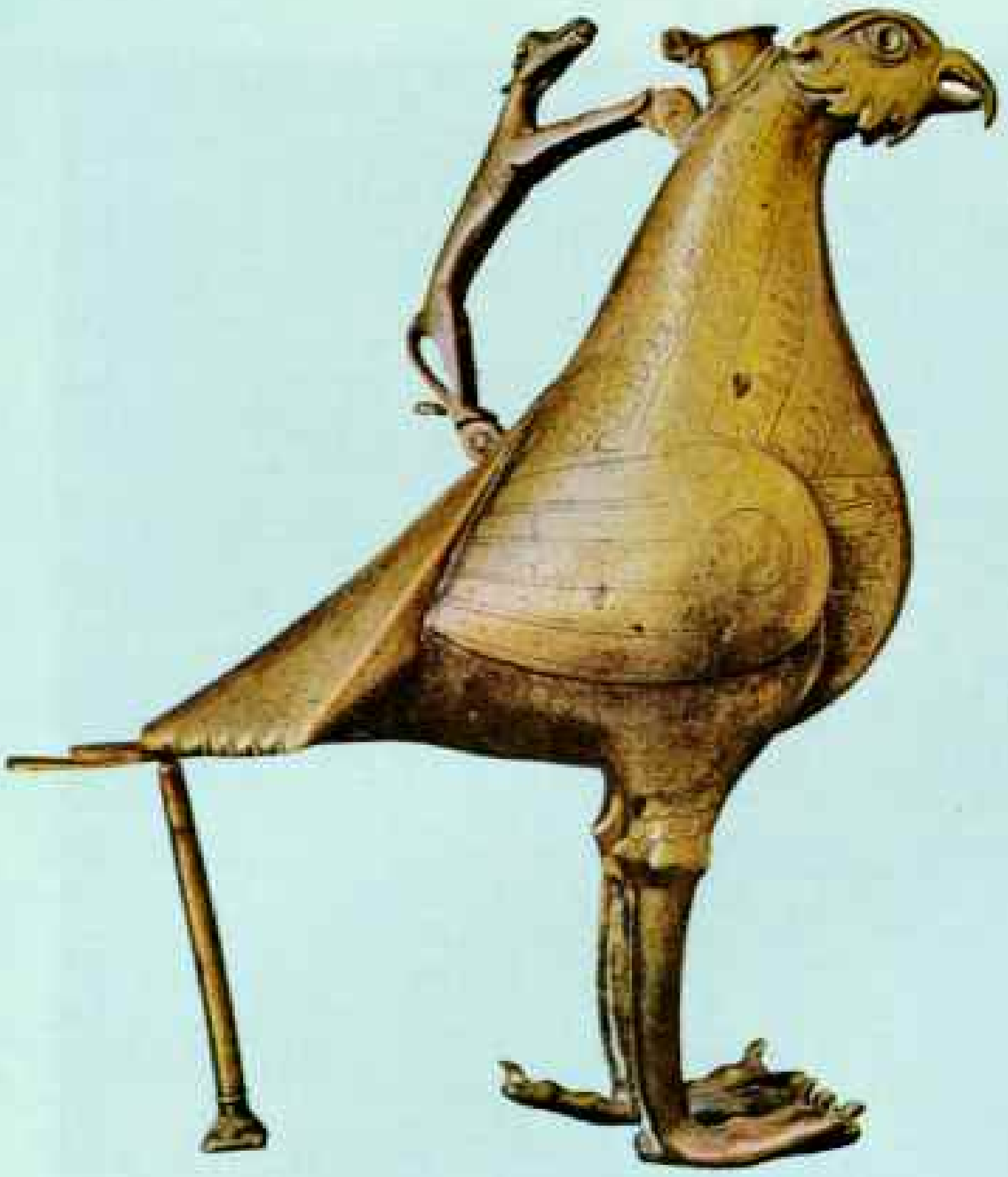
The absolute center of the icon is, of course, the Christ Child, and the artist has used His figure to teach a theological truth. The legs appear relaxed and babylike, but the head with its oversized forehead bespeaks great intellect. In this fashion the Byzantine artist pictorially expressed his belief in the human and divine natures of Christ.

In the Virgin, he also subtly emphasizes the divine aspect by using olive shadow over the eyes—a color unrelated to that of human flesh. This tone achieves even greater effect when contrasted to the sunburned face of St. Theodore—a weather-beaten, seasoned soldier—and the pallor of the youthful, untried St. George. God's hand looses a beam of light as the symbol of divine inspiration upon the Virgin, while two angels look toward heaven with expressions of great pathos.

The desire to improve on the material splendor of icons led to use of various techniques in addition to wax and tempera paint. Sometime around the outset of the 13th century, the mosaic, hitherto used almost exclusively to decorate vast wall spaces, was adapted to icons. A splendid example shows the Virgin and Child (opposite). So minute are the cubes with which the artist modeled the sensitive face of the Virgin that only closest inspection reveals individual pieces.

Cubes set in wax form Virgin and Child in this portrait of around A.D. 1200, when the mosaic began to be used for icons. Paint replaces cubes fallen from the Child's arm.





Dove-shaped vessel of bronze, its handle a leaping dog, typifies Islamic art of the Fatimid period (10th to 12th centuries). The monastery at Sinai has so few *objets d'art* that scholars suspect many such treasures have disappeared.

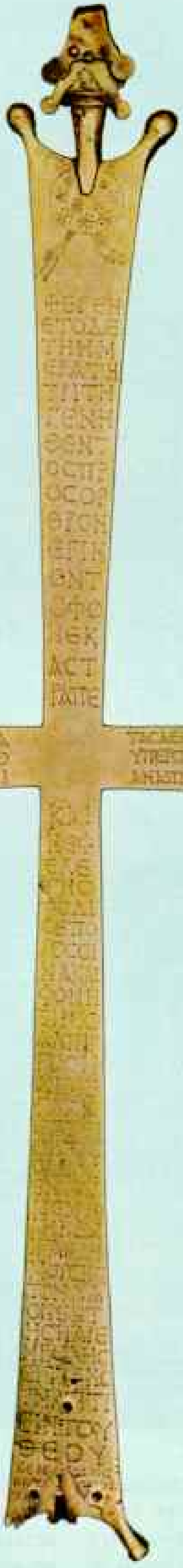
Pearl-bordered cameo of St. Catherine testifies to the wealth that poured into Orthodox monasteries after the 17th century from the Tsars of Russia.

Artists shaped rare treasures for the worship of God

Elaborate book cover holds a lectionary used in the Orthodox Liturgy. This metal cover consisted of six sides, enclosing the book like a box. On the front, Christ raises Adam and Eve out of Hades; plate covering the fore-edge carries medallions of the four Evangelists. Georgian monks appear to have brought the cover from the Caucasus. Curiously, all the lectionary covers in the monastery are newer than the parchment texts they contain.

During the Orthodox service, the priest solemnly carries a lectionary through the church, raises it, and utters the Greek word *"sophia"*—"wisdom"; he then deposits the volume on the altar, its permanent place.

Large bronze cross bears Greek inscriptions. The right arm contains a dedication by a certain Theodora in honor of Proclus and Dometia, perhaps her parents. The left arm and two vertical bars carry Exodus verses (19:16-18) telling of God's descent upon Mount Sinai. Incised sketches show Moses receiving the tablets of the law and loosening his sandals in obedience to God's voice from the burning bush. Moses appears with and without a halo, the difference between man and prophet. Dr. Weitzmann believes the cross was made about the time the monastery was founded and occupied the center of the original iconostasis.



Four Evangelists fill the arms of a cross honoring Virgin and Child. This hollow object contained a piece of wood supposed to have been taken from the true Cross. Such crosses were made in Jerusalem for centuries, and pilgrims have placed them in many Orthodox churches.

Four-legged stand for the Koran has a carved inscription enumerating other gifts by its donor, who lived some 850 years ago. A mosque stands within the walls of St. Catherine's, and on great Moslem feast days the Bedouin come to pray. Scholars from the University of Alexandria, collaborating with Western experts, study the Moslem antiquities.

DELICATE DESIGN and coloring unite in the decorative splendor of these miniatures from an early 12th-century manuscript. Framed by a church shown in ornamental cross-section, an ascetic, spiritualized St. Gregory of Nazianzus writes homilies. The central dome houses a Virgin, who is depicted enthroned as if in a mosaic within an apse; the stylized decor of the sides represents the marble of a church interior.

AGAINST A SETTING of almost carpet-like quality, the Harrowing of Hell illustrates the first homily to be read on Easter; Christ, trampling Hell's broken gates, lifts up Adam and Eve. The theme repeats in the initial letter, alpha or "A," of the text. Christ forms the right stem of the letter, Adam and Eve the left, and the arms of Christ and Adam the cross bar. Another view of this book appears in the foreground of page 95.

Stately Virgin fills a full page in a manuscript of about A.D. 1000

SCHOLARS of previous generations journeyed to Sinai almost exclusively to study the monastery's famous collection of ancient manuscripts. The monks received as gifts—or wrote themselves—books in Greek, Arabic, Syriac, and other languages, and the dry climate helped to preserve them. Probably the most noted single work discovered in the library, a fourth-century Biblical text known as the Codex Sinaiticus, now rests in the British Museum in London.

In 1950, an American expedition sponsored by the Library of Congress microfilmed the most important of some 3,000 manuscripts still within the monastery. Now, scholars throughout the world have ready access to every major work represented at Sinai.

Our own efforts in regard to manuscripts focused on the hitherto little-known illustrations. At St. Catherine's we studied some of

the finest extant examples of Byzantine book illumination. Among them was a striking, millennium-old lectionary, composed of selections from the four Gospels to be read during the services.

Several full-page miniatures precede the text, including one of a stately Virgin (opposite). In spite of its small scale, this portrait strikes the viewer as monumental. The Virgin's graceful stance reflects the classical heritage of Greece and Rome. The unusually tall proportions and the unapproachability expressed in the face are Byzantine. The golden background increases the element of unreality—hence of spirituality.

Tradition says this striking manuscript, which can be dated about A.D. 1000, was a gift from the Byzantine throne. Its superlative workmanship makes this seem more than likely. If so, it constitutes but one more irony in the fate that erased Byzantium and its emperors from history but preserved a remnant of their greatness in a far and lonely fortress.

THE END

His Holiness Athenagoras I, Ecumenical Patriarch of Constantinople (center), and His Beatitude Porphyrios III, Archbishop of Sinai, carry St. Catherine's relics on her feast day.

Photographing the Night Creatures of Alligator Reef

By ROBERT E. SCHROEDER

Illustrations by the author and WALTER A. STARCK II

WHAT COULD BE more mysterious than the sea at night? Offshore, its restless surface rolls and heaves under the stars; in the blackness of its depths night creatures come to life and sprinkle the reefs with starlight of their own. But what happens to the day creatures—the great schools of brightly colored parrot fishes, the fierce barracudas, the grunts, snappers, and surgeonfishes?

Until recently, no one really knew. A few divers had done some cautious exploration—but that was all. A coral reef by day teems with life; it is the metropolis of the sea. Would it be the same at night, or would it, like a land city, look deserted and quiet in the darkness?

As marine scientists, two colleagues and I decided to find out. But when we told friends about the plan, they warned us against it.

"You would be crazy to go diving at night," said one experienced diver. "Nobody knows what goes on in the sea after dark."

"You'll be eaten alive!" said another. "Sharks feed at night. They'll sneak up behind you and grab you!"

It was not surprising, therefore, that all kinds of unpleasant possibilities occupied our thoughts one beautiful evening as we set out from Lower Matecumbe Key, 70 miles south of Miami, and steered a course for Alligator Reef.

My companions were Walter A. Starck II and William P. Davis. All of us are graduate students at the University

JET-PROPELLED *six-inch squids prowl for small fish. Chameleonlike,*

they change colors when disturbed. Plankton gleam like fireflies in the photoflash.

KODACHROME BY ROBERT E. SCHROEDER © N.G.S.

SCHOOLS OF GRUNTS mill about the reef by day. With nightfall the crowd will

GARB OF THE SPANISH GRUNT undergoes a dramatic change between day (left) and night. The fish's neat striped suit becomes mottled in the dark, and the yellow line on the back vanishes. Many reef fishes change colors at night, presumably to make themselves hard to see. Tiny pigment cells expand or contract to reveal or hide their color.

KODACHROMES BY ROBERT E. SCHROEDER (OPPOSITE PAGE, LOWER RIGHT) AND WALTER A. STARCH (I) © N.G.S.

disperse as members go foraging. Soft coral sea fans sway with the currents.

INK-STAIN BLOTCH on the side of this butterfly fish appears only at night (right). Dot near the tail serves to draw the attention of would-be attackers to the wrong end of the fish, making escape easier; a bold stripe on the head helps obscure the eye. These fish derive their name from their flitting, butterflylike movements.

of Miami, working for advanced degrees in various branches of marine biology. First-hand observation would give us the best possible material for our dissertations. It was also to teach us that night diving *can* be dangerous, though not necessarily in the ways we expected.

The sun was setting as we came abreast of Alligator Reef Light, five miles offshore, and anchored our 19-foot twin-outboard skiff in 20 feet of water. For a starter, we planned a shallow dive on the landward side of the reef.

New Shift Takes Over Reef by Night

With the broad beam of the lighthouse swinging over us, we checked our cameras and put on our Aqua-Lung diving gear. Then, in the gathering darkness, we slipped over the side and sank into the inky ocean. Our lamps—ordinary automobile spotlights, waterproofed and fastened to our heads—cut narrow swaths through the blackness. Another light, hung under the boat to guide us, faded to a dim glow as we descended.

Settling to the bottom, I cast my light along a coral ledge, seeking the schools of fish that congregate there during the day. To my surprise, the reef appeared deserted; the great schools were gone.

Feeling a qualm or two about the problematical nocturnal habits of sharks and barracudas, I swam closer to the reef. Then I saw that the area was not deserted after all. Forests of bright little eyes reflected our lights. The day shift had retired; the night shift had taken over.

A coral reef is to sea creatures what caves and forests are to land animals. Here is shelter from the restless tides and currents; here are niches, holes, and crannies where the small can hide and the voracious seldom enter; here are homes, rooms, nests.

As we finned along above the rough ledge, our light picked up great spiny lobsters, which hide in the coral by day, but now prowled freely on the open bottom. Droves of large red shrimp scooted about nervously in the unaccustomed light. Big blue-and-green parrot fishes slept in every nook and cranny of the reef, and smaller shrimp ran over their bodies. What at first appeared to be a soft

LIVING CORAL REEF, only one of its kind in U. S. continental waters, lies a few miles off the curving Florida Keys. Night-diving scientists explored off Alligator Reef Light.

coral sea fan turned out to be a basket star, its magnificent spread of branching arms fishing for plankton (pages 144-5).

The sea urchin, *Diadema*, whose long black spines penetrate the skin at a touch, was out in force. *Diadema* hides in the reef by day, but occupies every prominence at night.

Nibilia, the big herbivorous crab so secretive by day, grazed in the open. Smaller predatory crabs, claws akimbo, stalked the corals in search of an unwary fish or shrimp.

Gobies Choose Strange Bedfellows

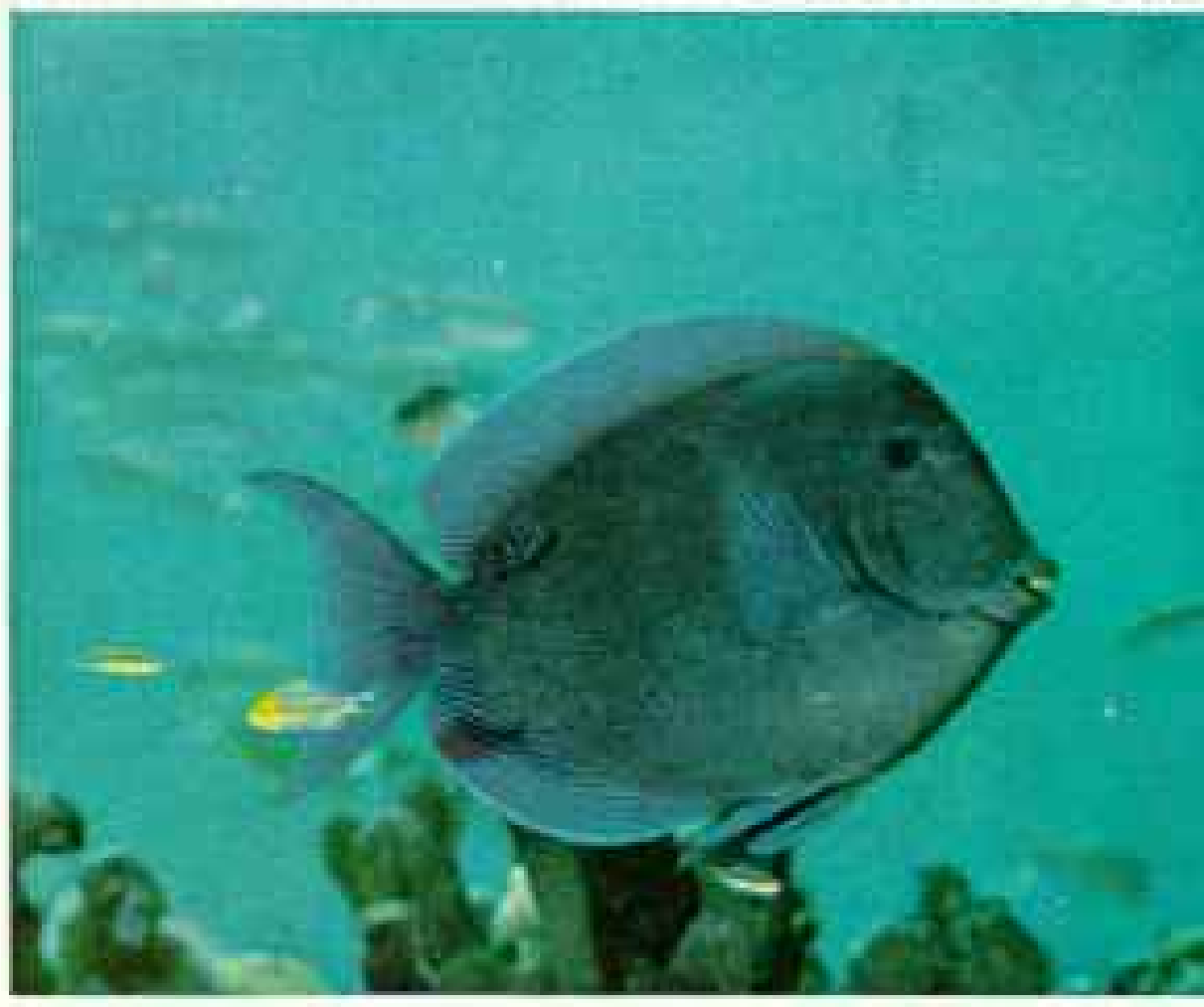
The corals themselves appeared strangely different. Tentacles extended, they fed avidly on small swimming worms and other planktonic creatures unfortunate enough to encounter them. When I touched a coral head, a wave of contraction spread over it. In a few seconds all the tentacles withdrew, then gradually expanded again.

Sleeping among the coral polyps, and apparently immune to their sting, were tiny blue-striped neon gobies, so active during the day. They nestled among the stinging tentacles as if to seek their protection from possible enemies (pages 142-3).

From time to time darting schools of finger-

BAR JACKS FLASH ABOUT THE AUTHOR AS HE SINKS IN A TRANSLUCENT SEA

For defense against sharks, Schroeder carries a "bangstick," a six-foot aluminum pole loaded with a revolver cartridge. Fired by jamming the end of the stick against the target, it kills by concussion as well as by bullet. In more than fifty night dives, the author and two colleagues never encountered an attacking shark.



LIKE A CELEBRITY trailed by admirers, a surgeonfish enjoys the company of three species of parasite pickers as it swims by day. Blue-head wrasses (left and below), porkfish (at the tail), and jewel fish—all juveniles—hover close to nibble parasites from their host's skin.

NIGHT BRINGS a transformation: Pearly-gray bands stripe the blue jacket of a surgeonfish as it snuggles down in the reef after dark. Sponges and algae spread a colorful quilt of life across the rock.

length silversides abruptly congregated in our lights like swirling pools of quicksilver, and then, as suddenly, were gone.

I moved along the ledge, looking under shelves and into grottos. At every turn I found something new. A bright red creature, much like a boiled Maine lobster but with long slender claws, peeped from a cavern. This fellow belonged to a little-known group of crustaceans, the axiids. I had never seen one like this before, and I suspected he was new to science. I tried to catch him, but he slipped away.

A hermit crab with scarlet legs came scrambling over the reef. I recognized this one and caught him. The species originally was known from a single specimen taken in the Lesser Antilles. My diving partner, Walter Starck, had captured a second one right here on Alligator Reef in 1959. The crab in my hand was number three.

Elongate sea cucumbers had extended themselves from the reef and lay limply across the bottom. A slipper lobster, *Parribacus antarcticus*, came lumbering along and patiently allowed me to pose him (page 145).

From the sand at the reef's foot, a graceful sand-burrowing anemone raised its tentacles. In appearance, this creature differed so markedly from the scientific descriptions I had read as to be almost unidentifiable. This is because most descriptions are necessarily based on preserved, contracted specimens in museums—few scientists have seen them alive.

Across the sandy bottom below the ledge, a large pair of shining green eyes suddenly reflected the glare of my lamp. Unsure of the owner's identity, I approached cautiously and saw that they belonged to *Urolophus*, a round sting ray no larger than a dinner plate. He fluttered uncertainly in the light and settled to the bottom in a cloud of sand, invisible except for his eyes.

Camera Flash Startles Moray Eel

When I returned to the ledge, a six-foot green moray eel, jaws agape, lay half hidden in the coral. He was motionless, his small beady eyes staring blindly at the light. I took his picture, and he started at the flash but made no attempt to escape. As with so many sea creatures, a bright light at night was beyond his comprehension.

Horrendous tales have been told of morays attacking men, but this one, when prodded, withdrew meekly into his lair.

A pale, translucent little fish swam past,

high above the ledge. He was new to me, so I looked closer. Under my light, he gradually changed from white to bright orange-red, and I recognized him as a cardinal fish. These fish spend the day hiding in the shadows, far back under the reef. At night they lose their color—presumably to make themselves harder to see when they come out to feed.

Other fish also lose their bright coloring at night and hence become less visible as they move over pale-colored bottoms. The rapid color changes of squids and numerous fishes are caused by myriad small pigment cells—chromatophores—each of which is expanded or contracted by a tiny muscle.

Many fishes and invertebrates change their colors in a striking fashion at night. Some are so changed that they are almost unrecognizable. Grunts, brightly colored in the day, are almost white, or white with black blotches, at night (pages 130-1). The electric blue of the surgeonfish is barred with pearly gray after dark (opposite page).

Butterfly fish acquire dark patches (page 131), and the porkfish's dorsal fin turns from yellow to black. While the cardinal fish, red by day, fades to silver translucency (page 149), the goatfish, pale in daylight, acquires red spots (right) at night. The little black shrimp, which dwells among the spines of the spiny urchin, is translucent white at night.

Night Diving Calls for Ingenuity

When film and air ran out, we returned to the boat to find that our beacon had drawn a host of organisms. We ascended among schools of silvery herring, jacks, and squids.

Walter and I had been diving by daylight for several years in the Florida Keys, the Bahamas, and the Virgin Islands, collecting and photographing reef creatures.* All of this was part of a major study of reef ecology being made by the University of Miami under a research grant from the National Geographic Society. I had also made a few night dives in the Virgin Islands, and Walter had been down at night off Florida.

Bill Davis was new to diving of any kind, and may possibly become the only diver in the world with more time under water at night than during the day.

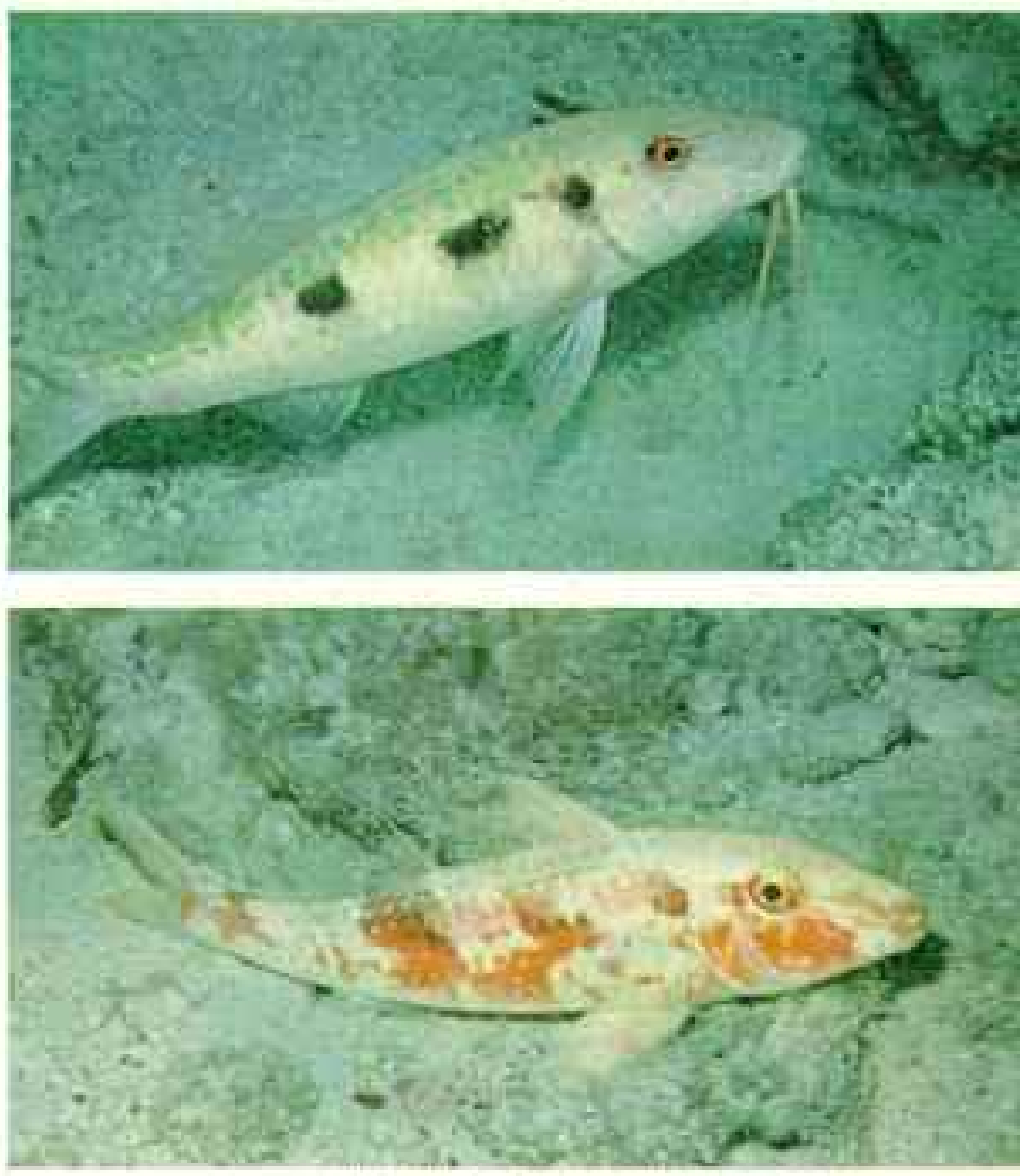
The project presented many problems. What kind of lights should we use? Could we take underwater photographs at night? How does a night diver find his way back to the boat? Are sharks and barracudas really more dangerous at night? Since little night diving had been done, there was almost no data on the subject, and we were forced to develop our methods as we went along.

Our first lights were automobile spotlights, sealed with plastic and paraffin. Long extension cords led to a battery in a six-foot plastic boat, which we towed behind us on our dives as we ranged hundreds of yards up and down the reef.

This system was inconvenient. Aside from the nuisance of having to launch and retrieve the battery boat and its attendant cords, there was danger the boat would be swamped, dropping the heavy battery on our heads.

Individual nickel-cadmium battery packs in watertight cases, with smaller spotlights, proved more satisfactory. To leave both hands free, we mounted the lights on our heads, miner-fashion. They had a maximum range of about 50 feet.

In daylight the reef ledge was visible



PREDOMINANTLY WHITE by day, the spotted goatfish breaks out in reddish blotches at night. Not chin whiskers but barbels—two long, tactile growths—distinguish the fish, which uses them to probe the sand during daytime hunts for food. When resting on the bottom at night (lower), it pulls the feelers under the throat.

*The first successful natural color photographs of life beneath the sea were made in 1926 and appeared in the NATIONAL GEOGRAPHIC, January, 1927.

UNDERWATER BY ROBERT L. STEARNS © N.G.S.

from the boat. Not so at night. At first we tried marking it with a buoy, but the buoy was almost as hard to spot as the ledge. Taking bearings on shore lights helped us find the buoy, but this was time-consuming. Ultimately we found it easiest to anchor before sundown and wait for dark.

Underwater camera cases are expensive, so we designed and built our own out of clear Plexiglas sheets fused with ethylene dichloride. We used neoprene gaskets to seal joints where camera controls protruded.

Our apprehensions about the possible danger of sharks led us to develop an effective underwater gun, light enough to be carried conveniently and powerful enough to kill a large shark instantly. This weapon is an aluminum pole six feet long, with a sealed barrel mounted at its end. Loaded with a .357 Magnum revolver cartridge and fired by jabbing the muzzle against the target, it kills by concussion as well as by the effect of the bullet (page 132).

We were never attacked by any animal larger than little isopods which, apparently mistaking us for fish, bit viciously. These parasites, about a quarter-inch long, often are seen clinging to fish. They didn't quite draw blood, but their sharp, unexpected nips gave us a few bad starts.

None of our real emergencies involved dangerous animals. As in daylight diving, all our troubles resulted from equipment failures or carelessness. Twice we had to search for our skiff, once when a squall set it adrift and another time when the boat beacon went out, but we recovered it both times after some anxious moments.

The night the beacon failed, only Walter and I were diving. Rather than search in the dark, we headed for Alligator Reef Light to phone Walter's father, who operates a charter fishing business on Lower Matecumbe.

After an eerie swim in breaking seas, we reached the lighthouse and knocked on the door. "May we use your phone?"

The look of astonishment that came over the lightkeeper's face made the long swim worthwhile.

Night Sea Glows With Life

We found a surprising amount of light in the ocean at night. It came from a combination of sources, including the moon, stars, and luminescent organisms beneath the sea.

Even without our lights there was much to see in the ocean. Once our eyes adjusted to the darkness, we were rewarded with a dazzling display of luminescent life. Thereafter, we often doused our lights to watch fish and divers swim in cascades of green sparks, and to see corkscrews of fire left by swimming worms and jellyfish.

These luminescent organisms are the most beautiful phenomena on the reefs. On moonlit nights there is enough light to dive without head lamps, and the luminescence of many creatures becomes apparent. Any disturbance

RAINBOW PARROT FISH, resting by night, wedges into a coral crevice, its dorsal fin pressed tightly against the sponge-encrusted rock. Two red coral shrimp are at upper left.

OUT OF ITS BOUDOIR, the parrot fish rests docilely in the author's hands. As long as Schroeder holds the fish firmly but gently, it remains passive. With release of pressure, it darts into the depths. Scientists believe some fish actually sleep, becoming quite dormant, while others merely rest. Fishes' eyes, having no lids, always remain open.

Some parrot fish produce "sleeping bags" of mucus (pages 146-7).

AQUARIUMS BY WALTER A. STARCK || © N.G.S.

results in a shower of sparks from luminous dinoflagellates, and swimming worms and jellies glow with periodic brilliance. Lights race up and down the arms of plankton-fishing brittle stars, and the underside of an overturned rock sparkles like the embers of a dying fire.

Sometimes luminous microscopic organisms concentrate in such numbers that fish and divers are outlined in cool green fire. The crest of each breaking wave and the wake of the boat are bathed in ghostly light, and the swirling of the surge around the coral is marked in trails of luminescence.*

Very little is known of the reef fauna, compared to that of other environments. In the past five years, Walter Starck has collected more than 300 species of fish near Alligator Reef. Nearly 20 species were entirely new, and an additional 30 had not been known to occur in Florida waters.

The reef in daytime is a busy place. Colorful parrot fishes, surgeonfishes, and angelfishes swim among the corals and gorgonians. Blue-and-yellow wrasses catch plankton or pick parasites from the skins of larger fishes. Schools of grunts and snappers loaf along the ledges, resting in the shelter the reef offers from surge and tide.

Everywhere there is movement, color. Each moment brings something new, something different, something beautiful. At night, most of these fishes forage elsewhere, or sleep in the cracks and holes in the reef face.

Little is known about the sleep of fishes. Because they have no eyelids, they must sleep with their eyes wide open. Are they really asleep in the sense that mammals sleep? Many appear to be, even allowing the diver to approach and handle them. Others rest at night, remaining in one place, but are alert enough to attempt to avoid the light.

Big Eyes Mark Nocturnal Foragers

The eyes of fishes that sleep at night, such as the wrasses and parrot fishes, are noticeably smaller than those of the groupers, snappers, and other night-active forms. It appears that adequate daylight vision does not require the large eyes needed for seeing at night.

Nocturnal fishes appear to do without sleep entirely. Snappers and grunts, for example, roam away from the reef at night to feed. By day they are found amid the reef in large schools, less active but in no sense asleep. Cardinal fishes and squirrelfishes hide in the reef in daylight but remain alert. At night, they come out to forage.

Other fishes do sleep, or at least rest, after dark. Some parrot fishes build cocoons of mucus in which to spend the night; others simply wedge into the coral (opposite page). The smaller wrasses burrow into sand. Goatfish and scorpion fish may be found lying on the bottom, apparently asleep.

(Continued on page 152)

*See "Sailing a Sea of Fire," by Paul A. Zahl, NATIONAL GEOGRAPHIC, July, 1960.

EVENING CLOUDS *pile up on the horizon as Bill Davis (left) and author Schroeder go over the boat's side on the first dive of the night.*

SUBTROPIC SEAS BLAZE *as biologist Starck illustrates night-diving technique with a time exposure. After setting up a camera on Alligator Reef Light, Starck swam in darkness to the skiff, climbed aboard, and switched on his head lamp. In the boat, he tests the flash equipment of his underwater camera. As he jumps overboard, his head lamp leaves a golden track in the gloom. Three times he stops to photograph fish; each time his flash produces a dome of light.*

SARGASSUM CRAB, *head down and moving fast, propels a three-inch body with paddlelike legs. Most of its life is spent clinging to sargassum weed.*

KODACHROMES BY WALTER A. STARCK II

LOGGERHEAD TURTLE *becomes a sea taxi for Terry Starck, brother of the photographer.*

Its powerful jaws could sever an arm, but the huge reptile submitted tamely, then streaked away when the diver released it.

EIGHT-INCH *flying fish, rarely photographed beneath the water, displays its lacy "wings."*

REDTAIL PARROT FISH *rests quietly in a diver's hand.*

KODACHROME BY ROBERT E. SCHROEDER

COMMON JELLYFISH *ranges the entire Atlantic coast. Four loops outline the reproductive organs in this life-size portrait. Scalloped edges encircle a pulpy blob of flesh. Fringe of tentacles, barely visible, inflicts a slight sting.*

KODACHROMES BY ROBERT E. SCHROEDER (ABOVE) AND WALTER A. STARCK II © N.G.S.

LIVING JAVELIN, ***an 18-inch needlefish lies just below the surface, blinded by the photographer's light. Five-foot adults, leaping into the air, have seriously injured boatmen.***

KODACHROMES BY WALTER A. STARCK II © N.G.S.

BY DAY, STAR CORAL seems as dead as a boulder on the floor of the sea. Neon gobies swim close to its tightly closed polyps, while a cardinal fish and pair of striped drums rest near the sandy bottom.

AT NIGHT, STAR CORAL comes vibrantly alive. Expanded polyps, tiny mouths waiting to be fed, stretch tentacles to grasp drifting plankton. A few closed polyps have captured morsels and are digesting them.

FEEDING AT NIGHT, brain coral polyps extend their tentacles. Small worm at left, trapped moments ago by the tentacles, will be slowly digested. Neon gobies rest safely amid the serpentine maze.

RUST COLORED BY DAY, the brain coral's mountains and valleys appear clearly defined when the polyps remain closed. Neon goby uses the coral head as a station where he waits to pick parasites from visiting fish.

KODACHROMES (ABOVE AND BELOW) BY WALTER A. STARCK II © N.G.S.

EXPOSED TO LIGHT from the photographer's head lamp, the basket star, or Gorgon's head, slowly collapses into its daytime posture, resembling a tangled heap of trash.

ONLY IN DARKNESS does the basket star unfold its lacy trap. Finely branched arms reach out for food particles and bring them down to the mouth underneath. Common in tropic waters, the creature usually adheres to coral heads or clings to sea plumes. It spreads as much as two feet in width.

SWARM OF PLANKTON, attracted to the lamp like insects, swirls around Walter Starck. Blinded by the light, a trunkfish bumbles about in front of his face mask. Quarter-inch-long parasitic isopods frequently mistook the divers for fish and bit them on hands, necks, and ears.

SLIPPER LOBSTER, rarely found in Florida waters, was taken on Alligator Reef. It bears little resemblance to its relative of Maine and other northern coasts. Diver holds the tail down to keep it from flipping. Glistening eyes dot the shell near the stubby, paddle-shaped antennae.

WHEN NIGHT COMES, this parrot fish prepares for bed by secreting a gelatinous cocoon

IN ITS TRANSPARENT NIGHTGOWN, a striped parrot fish sleeps through the night. A hole in the front of the gelatinous envelope allows the fish to breathe; exhaled water escapes by an opening behind the caudal fin. The fish may spend a half hour or more secreting mucus from its beak. Scientists have not learned the purpose of the covering.

CLOWN FACE OF THE REEF, the rainbow parrot fish wears an eternal smile. Chisel-sharp beak of fused teeth scrapes the fish's diet of plant and animal substances from the reef, often crunching off bits of coral in the process. Pharyngeal mill, or "teeth in the throat," crushes roughage. Edible bits are digested; the residue is voided in clouds of sand. White mark near the left eye is a nostril.

KODACHROMES BY WALTER A. STARCK II © N.G.S.

of mucus around its body.

WEARING NIGHT'S PALE COLORS, a cardinal fish appears almost translucent, but exposure to the photographer's lights (right, below) induces a shift to the reddish hue of day.

"The change is rapid but not instantaneous," says Starck. "The pictures were taken about one minute apart."

SPOTTED LOBSTER assumes a king-of-the-mountain pose. Though lacking the big claws of its northern relative, the 10-inch-long crustacean would provide delicious eating. Paired specks of light on the rock wall at upper right are reflections from the eyes of two almost invisible shrimp.

BLOOD-RED SPONGES encase coon oysters growing on the skeletal branches of a dead gorgonian. A mound of star coral rises at lower left.

KODACHROMES BY ROBERT E. SCHROEDER (OPPOSITE) AND WALTER A. STARCK II © N.G.S.

KODACHROMES BY ROBERT E. SCHROEDER (ABOVE) AND WALTER A. STARCK II © N.G.S.

SNAKE EEL slithers like a serpent across the sea floor. Dorsal fin starts just behind the head and extends the full length of the slender body. Strong tail enables the fish to burrow into the sand. Small snake eels, swallowed by large groupers, bore through the stomach walls into the body cavities; there they die and become mummified.

RED CORAL SHRIMP, once believed rare, is common on the reef, divers discovered. "Reflecting our head lamps, their eyes flashed pinpoints of light," reports the author.

"HOW CHEERFULLY he seems to grin . . . and welcomes little fishes in, with gently smiling jaws!" This green moray eel, whose sharp teeth spell quick death to unwary fish, brings to mind the lines from *Alice in Wonderland*. But the moray's intentions are entirely benevolent toward the banded coral shrimp that picks parasites from its jaw. The little crustacean may even enter the eel's mouth. More than two dozen known species of fish and at least six species of shrimp find their food by cleaning other marine organisms.

FLAME SCALLOP, hiding in coral, inadvertently reveals its whereabouts each time its shell opens and shows the scarlet flesh. In open water the mollusk proves a surprisingly good swimmer; it moves by clapping shells together to force water out of the body cavity.

(Continued from page 137)

The numerous parrot fishes we found sleeping in the reef at the time of our first dive swam away when sufficiently disturbed. Blinded by our light, they blundered into any obstacles in their paths. Experiment revealed that they could be handled, if held carefully at pelvic and dorsal fins. This was especially true of the beautiful large rainbow parrot, *Scarus guacamaia* (page 137).

We delighted in photographing each other holding the big green-and-orange fish. The blue parrot and most smaller species were less trusting, although we could sometimes handle them by exercising extreme care.

When we finished posing with the big fellows, we gently put them back where we found them and tucked them in for the night. Invariably they nestled down trustingly and went back to sleep. The amazing thing is that parrot fishes, especially large ones, are extremely wary by day, and it is seldom possible to get close enough for good pictures.

All the creatures we saw appeared to be blinded or confused by the glare of our head lamps. Some tried to escape, but were unable to see where they were going and blundered into the bottom. Others allowed us to come closer than they would permit in daylight.

Herring Strike Like Hailstones

We caught many organisms easily. A small squirrelfish, gently lifted from his niche in the coral, fluttered blindly in my hands. Squirrelfish are active at night, and this one was obviously awake but baffled by the light.

Great schools of plankton-eating herring, which feed at night, were confused by our head lamps. We found ourselves caught in violent showers of the silvery fish, which

MASTER OF CAMOUFLAGE, the scorpion fish blends with algae-covered rock. Soft, fleshy protuberances help to disguise the body; only an eye and the outline of the mouth reveal its proportions. Poison glands at the base of the grooved spines can cause a painful sting.

pelted us like hailstones. Fortunately, these herring weigh only a few ounces, and do no damage when they bump into us. One wonders, however, what would happen if a school of 100-pound tarpons reacted that way.

From time to time we were surrounded by dense swarms of planktonic animals, including small worms and parasitic isopods, apparently attracted by the light (page 144). They entangled themselves in our hair and wriggled into our ears, so numerous that they blurred some of our pictures. The sensation of being crawled on and wriggled over was distinctly unpleasant. Much to our relief, the swarms did not stay long.

Once as we crossed the top of the reef, I saw a large barracuda—at least four feet long—swimming slowly away from us. I moved in close to take a picture, then fell back to wind my camera. Walter moved in, and the great fish suddenly panicked, rushing blindly in one direction after another. I watched, helpless, as the big predator repeatedly whizzed past Walter's head, sometimes missing him by inches. Soon it was all over—the barracuda had disappeared, and we were looking at each other in astonishment.

A barracuda's mouth is filled with razor-sharp teeth. We knew that if one should run into us, even by accident, a serious or fatal injury could result. After this incident, we gave barracudas a wide berth.

We found a large loggerhead turtle sleeping under a ledge and nudged him away. As he backed out of the reef, I caught his shell and got a free ride. Rowing vigorously, he towed me around and around in circles, trying in vain to twist out of my hands.

This mild creature makes little attempt to defend himself in the water, although his jaws can amputate a leg. We released him, and he bumbled blindly off in the dark.

Loggerheads keep to deeper waters by day, and seldom appear on the shallow reefs until after sunset. Some of them appear to stay in the same area throughout their lives. One old fellow, whom we recognize because he has lost half a flipper, has lived on Alligator Reef for more than five years.

Small schools of squids hovered over the sandy bottom near the reef. They were frightened by our lights, and left dark brown blobs of gooey ink in the water as they darted away. The ink blobs were not a "smoke screen," but decoys to confuse their enemies.

In daylight, squids are seldom found near the reef, and are unapproachable. At night, it is a different story. When we followed them persistently, they became confused by the light and ultimately would pose for pictures (page 129), pliantly allowing us to position them to our fancy. This pattern appears over and over again: Creatures that are wary in daylight are blinded and helpless at night.

The squid's close relative, the octopus, also can be badgered into cooperating with the photographer. Small octopuses are common, but are usually overlooked because they blend so closely with the colors of the reef.

Everywhere we looked we saw red—spon-

ges, gorgonians, crabs, and fish. Organisms that were drab brown in the daylight appeared in luminous purples and magentas in the rays of our lamps.

As our confidence increased, we went deeper. We anchored the boat in 110 feet of water and let our beacon light down on a long extension. Down, down we went after it. We had dived on this reef many times in the daylight, but at night it seemed to take us forever to reach the bottom.

Again, the reds and purples were the most noticeable color feature of the reef. Among delicately tinted corals large groupers eyed us warily. A great pink hermit crab, his borrowed shell larger than a football, dug busily in the bottom, a cloud of dust and debris from his labors drifting away in the current. He ignored us, but we were watched cautiously by hundreds of shining eyes.

We took pictures frantically, for we could not stay long at this depth. All too soon our air was exhausted, and we ascended with film unused. Because of our short stay at 110 feet, there was no danger of the bends.

As we rose, we looked up, but we could not see our boat's position on the surface. Our beacon remained at the bottom, and we were swallowed in blackness as we left it behind. Unable to see the surface, we swam and swam. The beacon faded far beneath us. Only by looking down at it could we be sure we were really ascending.

It seemed we had been rising endlessly when, with no warning at all, pop! Our heads were out of the water! We laughed in relief and swam to the boat, bobbing quietly a few feet away. Shedding our gear, we celebrated our success with hot coffee.

That was a night to remember! We had braved the deep reef and found it no more terrible than during the day. We headed home in high spirits. The nocturnal ocean with all its secrets was ours to wander in.

Reef Creatures Learn to Coexist

Typical reef colonies are old, old communities. During millions upon millions of years of existence their inhabitants have learned to cooperate with each other in many ways, and they have evolved into many interesting forms. Nowhere else in the animal kingdom do we find so many organisms living so close together, or participating in such complex relationships.

Deep borings on modern atolls have revealed continuous coral strata dating back some 60 million years, and fossil corals of much greater age are known. Some show ages of half a billion years or more, and are among the most ancient evidences of life.

In this vast span of time, the reef environment has been so constant that its inhabitants have been able to speciate, or split into different types, and to specialize as nowhere else in the world. The most remarkable aspect of reef creatures' behavior is the extent to which they cooperate with one another. The best instance of this is parasite removal or "cleaning." Many small fish and shrimp enjoy freedom from predation by larger fish in return for removing skin parasites.

Gobies Brave Moray's Teeth

We have seen neon gobies, no larger than a finger, fearlessly enter the mouths and gills of large groupers, and even of fierce moray eels. Little coral shrimp will stand on a prominence, waving their antennae and seemingly crying, "Eat me! Eat me!" They pick parasites from the skins of fishes, and so enjoy special privileges.

How this strange truce came about may be suggested by the shrimp we observed in association with fish resting at night. Perhaps the first parasite pickers foraged for copepods on sleeping fishes, and gradually were able to stay on into the day. We have observed the banded coral shrimp, *Stenopus*, picking the green moray eel at night. In one case, the little shrimp was working on the eel's lower jaw (page 151).

After a summer of night diving, we made a few daylight dives for comparison. Bill had never seen Alligator Reef by day and was astonished at the big schools of fish. The reef seemed strange to us all. There was so much movement! The fish were so active, so wary! Could these be the same big parrot fish we had held in our hands? We could not get within 20 feet of them.

Night diving is habit forming, and we three are now firmly addicted. Our observations have barely begun. There are many wonders that we have not yet seen, that have yet to be photographed. We know that on many nights to come we shall don our Aqua-Lungs and head lamps and slide down through the dark waters. Who knows what discoveries, what adventures await us? The sea still holds many secrets, and none are so small that they are not worth learning.

A show in itself! The Kodak Carousel projector

Amazing performer, this color-slide projector. It won't jam, won't damage your slides. (It has no metal prongs to push your slides around.) Slides *drop* gently into place. You put on a dazzling 80-slide show automatically, starting with any slide. Or manually, by touching a button on the console panel or remote control unit. Remote focus, remote forward and reverse, too. Surprisingly, the Kodak Carousel projector is less than $150! See your Kodak dealer. EASTMAN KODAK COMPANY, ROCHESTER, N. Y.

Price subject to change without notice.

Kodak
TRADEMARK

MISSISSIPPI

Come to Mississippi this spring and enjoy the many fascinations of Pilgrimage Time in the Hospitality State. Sense the excitement of life in magnificent antebellum mansions, relax in the serenity of colorful, formal gardens, walk on hallowed ground which has seen three centuries of history unfold. We welcome you to the Hospitality State.

1964 MISSISSIPPI PILGRIMAGES

- **NATCHEZ**
  March 7-April 5
- **HOLLY SPRINGS**
  April 24-April 26
- **VICKSBURG**
  March 6-April 18
- **COLUMBUS**
  April 4-April 12
- **GULF COAST**
  March 8-March 15
- **PORT GIBSON**
  March 13-March 15

FREE colorful literature about Mississippi's pilgrimages and historical attractions.

Send coupon to

Miss Hospitality
1504 State Office Building
Jackson, Mississippi 39201

NO

Name _____

Address _____

City _____ State _____

Boys' Schools

AUGUSTA MILITARY ACADEMY

"The Friendly School." Distinguished ROTC school in Shenandoah Valley, Jr. & Sr. Divisions. Grades 5 through Post Grad. Accredited. Graduates in leading colleges. All sports; pool, gym. Rate $1350. Catalog. **Supt., Dept. N, Fort Defiance, Virginia.**

BOLLES OF FLORIDA

Fully accredited. Sound basic academic preparation. Grades 7–12. New conference-type classrooms. College Boards. Advanced Placement in English, Math, & Biology. Guidance. Varsity and intramural sports for all. Year-round golf, tennis, sailing. Outdoor swimming pool. Catalog.
Director of Admission, Box 10169-N
Jacksonville, Florida 32207

BORDENTOWN MILITARY

New term Feb. 3. Fully accred. College prep. Gen'l courses. Grades 8–12. Outstanding record of college entrance. ROTC. Boys taught how to study. Small classes. Sports for all. 43rd yr. Summer session. Catalog. **Registrar, Box 651, Bordentown, N.J.**

Brandon Hall

School of Tutoring
EXCLUSIVELY INDIVIDUAL CLASSES
Complete High School Curriculum
Preparation for All Schools and Colleges
SPECIALIZING IN HIGH I.Q.
Continuous Sessions and Enrollments
Spalding Drive, Dunwoody 3, Ga. — Grades 8-12, DRexdale 7-2963

CARSON LONG

Military School. Educates the whole boy—physically, mentally, spiritually. How to learn, how to labor, how to live. Prepares for college and life. Grades 8–12. 129th year of character building. Overall charges $1600.00. **Box 21, New Bloomfield, Pa.**

COLUMBIA MILITARY ACADEMY

Accredited. Combines academic excellence with stress on character, leadership. Prep for College, Gov't Academies. Beautiful campus. ROTC. Supervised study, bi-weekly reports. Band. All sports. Junior School. Summer School. Current expansion, new science, recreation facilities. Cat. and "47 Questions," write **CMA, Dept. N, Columbia, Tenn.**

CULVER

On Lake Maxinkuckee. Develops initiative, self-reliance, courtesy, poise. Grades 8–12. Thorough college preparation. Accredited. Exceptional facilities. Leadership training. Black Horse Troop, Artillery, Infantry, Band. ROTC. Sports. Scholarships available. Catalog. **19 Pershing Ave., Culver, Indiana.**

FARRAGUT

College Preparatory—Naval Science

Two separate schools: Toms River, N.J., St. Petersburg, Fla. Accredited. Preparation for all colleges, gov't academies. Also Jr. School in Fla. Guidance for college & career. Sports, boats, bands. Summer camp & school. Specify catalog.
Admiral Farragut Academy
Box L, Toms River, N.J.

FLORIDA AIR ACADEMY

Accredited Preparatory School for leading colleges and service schools. Located near Cape Canaveral. Grades 8–12, small classes, new gymnasium. All sports, golf & swimming. 26-acre campus. Military training. Flight optional. Write: **Registrar, Florida Air Academy, Melbourne 1, Florida.**

FLORIDA CENTRAL ACADEMY

NATIONALLY accredited. College Prep. "In the land of the Sun." Small Classes with tutoring. 30-acre campus. Outdoor pool, golf. All Athletics. Colorado and Florida Summer Schools. Catalog.
Address **Dean, Box 38, Sorrento 4, Florida.**

FLORIDA MILITARY COLLEGE

The Sunshine State's only military college. Courses leading to the A.A. degree. Small classes. Band. Drill team. Olympic size pool. Athletics. Rifle team. Write for catalog: **Col. Carl Ward, DeLand 4, Florida.**

FLORIDA MILITARY SCHOOL

Accredited college preparatory, grades 7–12. Separate 4-yr. Liberal Arts college. Academic thoroughness. NDCC Honor School near Daytona. Athletics, pool, Rifle teams. Write: **Lt. Col. W. C. Prentiss, M.A., DeLand 4, Florida.**

FORK UNION MILITARY ACADEMY

Our ONE SUBJECT PLAN of study in Upper School (grades 9–12) has increased honor roll 30%. Develops concentration. Fully accredited. ROTC highest rating. 17 modern bldgs., 3 completely equipped gyms, 2 indoor pools. Splendid environment, excellent health record. **Junior School (grades 5–8) has separate buildings, gym, pool. Housemothers.** 86th year. For ONE SUBJECT PLAN booklet and catalog write:
Dr. J. C. Wicker, Box 301, Fork Union, Va.

GEORGIA MILITARY COLLEGE

Accredited Junior College, 4 yrs. H.S. 85th year. Modern equipment. Personal guidance. Sports. Quarterly registration—Sept., Jan., March. ROTC. Highest Gov't. rating. Moderate cost. Catalog.
Col. R. A. Thorne, Box N, Milledgeville, Ga.

GREENBRIER MILITARY SCHOOL

152nd YEAR

The School of Achievement

A good college preparatory school for boys. Grades 7 through 12. Limited Post Graduate enrollment. ROTC Accredited. Develops leadership. Learning to study emphasized in all classes. Over 90% of graduates enter college. Excellent success records. New library and science building. Athletics for all. Near Greenbrier White Sulphur Springs. Summer Camp. Catalog, write: **Director Admissions, Box M-101, Lewisburg 1, W. Va.**

HARGRAVE MILITARY ACADEMY

NDCC Honor School. Fully accredited. College preparatory, general courses. Grades 8–12. How to study training; remedial and developmental reading. All sports. Summer School. Est. 1909. Catalog.
Col. Joseph H. Cosby, Box N, Chatham, Va.

HOWE MILITARY SCHOOL

Academic training in spiritual environment. Accredited preparatory. Potential Achievement Rating gives each boy a goal. Jr. School. Sr. ROTC. Sports. New dorms and pool. Episcopal. Catalog.
S. B. Bouton, 314 Academy Pl., Howe, Ind.

KEMPER MILITARY SCHOOL AND COLLEGE

Fully accredited boys' prep, Jr. College. Small classes. Fine faculty. Counseling. How To Study Program. Jr., Sr. ROTC. Sports for all. Social activities. Flying Club. Educating for leadership since 1844. Catalog: **799 Third St., Boonville, Mo.**

MARION INSTITUTE

113th YEAR. Fully accredited Junior College, 4-year College Preparatory in heart of Deep South. Special preparation for Army, Navy, Air Force Academies. Senior R.O.T.C. Small classes. Honor System. Sports. Catalog. **Dir. of Adm., Marion Institute, Box N, Marion, Ala.**

MASSANUTTEN MIL. ACAD.

Accredited College Prep. New Dorm. Gym & classrooms. In beautiful Shenandoah Valley. Small classes. ROTC. All sports. Riding. Indoor tiled Pool. Band. Rifle. Grades 8–12. 65th yr. Catalog.
Col. R. J. Benchoff, Bx. 101, Woodstock 1, Va.

MILLER SCHOOL OF ALBEMARLE

Military. Grades 8–12. College preparatory plus industrial arts, iron & woodworking, auto mechanics, machine shop & electricity. Incl. rate $1400. Sports. 88th year. Catalog. **Col. W. H. Flannagan, Dept. N, Miller School P. O., Va.**

MIAMI MILITARY ACADEMY

Fully accred. College prep. Grades 7–12. NDCC Honor School. 38th yr. Boys learn to study under inspirational instructors. 30 acres. Pool, gym. Sailing, gymnastics; all major sports. Moderate all-inclusive fee. Summer School & Camp. Catalog:
10607 Biscayne Blvd., Miami 38A, Fla.

MISSOURI MILITARY ACADEMY AND

Separate Junior School. 75th Year of Leadership! Fully accredited, grades 5–12. College Prep. Sr. ROTC. Small classes, finest teachers. New academic bldg., chapel, 238 acre campus, 5 athletic fields, golf, riding. Catalog. **Col. C. R. Stribling, 324 Main Street, Mexico, Mo.**

NEW YORK MILITARY ACADEMY

Prepares today's Youth in mind, body, character, leadership. ROTC. Advanced study: Latin, Russian, Chinese, Spanish, French, German. All sports. Band scholarships. Grades 6–12 & P.G.
72 Academy Ave., Cornwall-on-Hudson, N.Y.

NORTHWESTERN MILITARY AND NAVAL ACADEMY

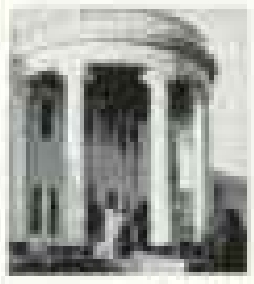
Episcopal-related college preparatory, military school. Lake shore campus. Est. 1888. Accredited. Small classes. College Board report; expert guidance. ROTC. Sports. New gym. Catalogs.
51 S. Lake Shore Road, Lake Geneva, Wis.

OAK RIDGE MILITARY INSTITUTE

113th year. High school. Junior college. Enrollment 250. Balanced program. Small classes, supervised study. Reading development. Sports. Band. U. S. Army ROTC. Address: **Col. T. O. Wright, Supt., Box N, Oak Ridge, N.C.**

ONARGA MILITARY SCHOOL

Training for character. Individual study program; Immediate Living. Accredited. College preparatory, business. Small classes. Guidance. Grades 8 to 12. Music. Pool. Moderate fee. Chicago 85 mi. Catalog.
Col. L. W. Adams, Box W, Onarga, Ill. 60955



EDUCATIONAL TROUBLE SHOOTERS

Individualized Plan—
Each Student a Class

For those with educational problems—successful college preparation and general education. **Our tests discover causes of difficulties** and we (1) devise individualized program to overcome difficulties; (2) make up lost time; (3) instill confidence; (4) teach the art of concentration, and science of study. *Faculty 14, Enrollment 38; 13 years' experience.* Write Edward R. Knight, Ph.D., Headmaster.

OXFORD ACADEMY

Box G-95, Pleasantville, New Jersey

PEDDIE

Devoted to a solid academic preparation for college. A fully accredited school where Christian influences prevail. Grades 7-12. Advanced courses available 9th–12th grades. Outstanding athletic facilities, swimming pool. New science building. 240 acres. Catalog: **Dr. C. O. Morong, Hdm., Box 1-N, Hightstown, N. J.**

PEEKSKILL

College preparation for boys, grades 7–12. 100% graduates accepted by colleges last year. Small classes, individual attention. Advanced study opportunities in mathematics, languages, science, history. Suite-plan dormitories. Gym, pool. Sports for all. 133rd year. Write for catalog.
Box N-1, Peekskill Military Academy
Peekskill-on-Hudson, New York. PE 7-4121

PERKIOMEN

Graduates attend leading colleges, universities. Home-like atmosphere. Grades 9–12. Sports, activities for all. Modern dormitories. Near New York City and Philadelphia. 90th year. Summer school. Write for catalog. **Dr. Stephen N. Roberts, Headmaster, Pennsburg, Pennsylvania 18071.**

RANDOLPH-MACON ACADEMY

Military. Accredited. 72nd Year. At northern entrance to Skyline Drive. Prepares for college by intensive study methods. Fireproof bldgs. Superior equipment. For catalog and "Your Boy": **Col. John C. Boggs, Pres., Box E, Front Royal, Va.**

IF YOU CHANGE YOUR ADDRESS

Notice should reach the NATIONAL GEOGRAPHIC by the first of the month to affect the following month's magazine. For instance, if you desire the address changed for your March number, the Society should receive notice of your new address not later than February first.

National Geographic Society, Washington, D.C. 20036

OLD ADDRESS:

NAME (please print)

STREET AND NUMBER

CITY STATE ZIP CODE

NEW ADDRESS:

STREET AND NUMBER

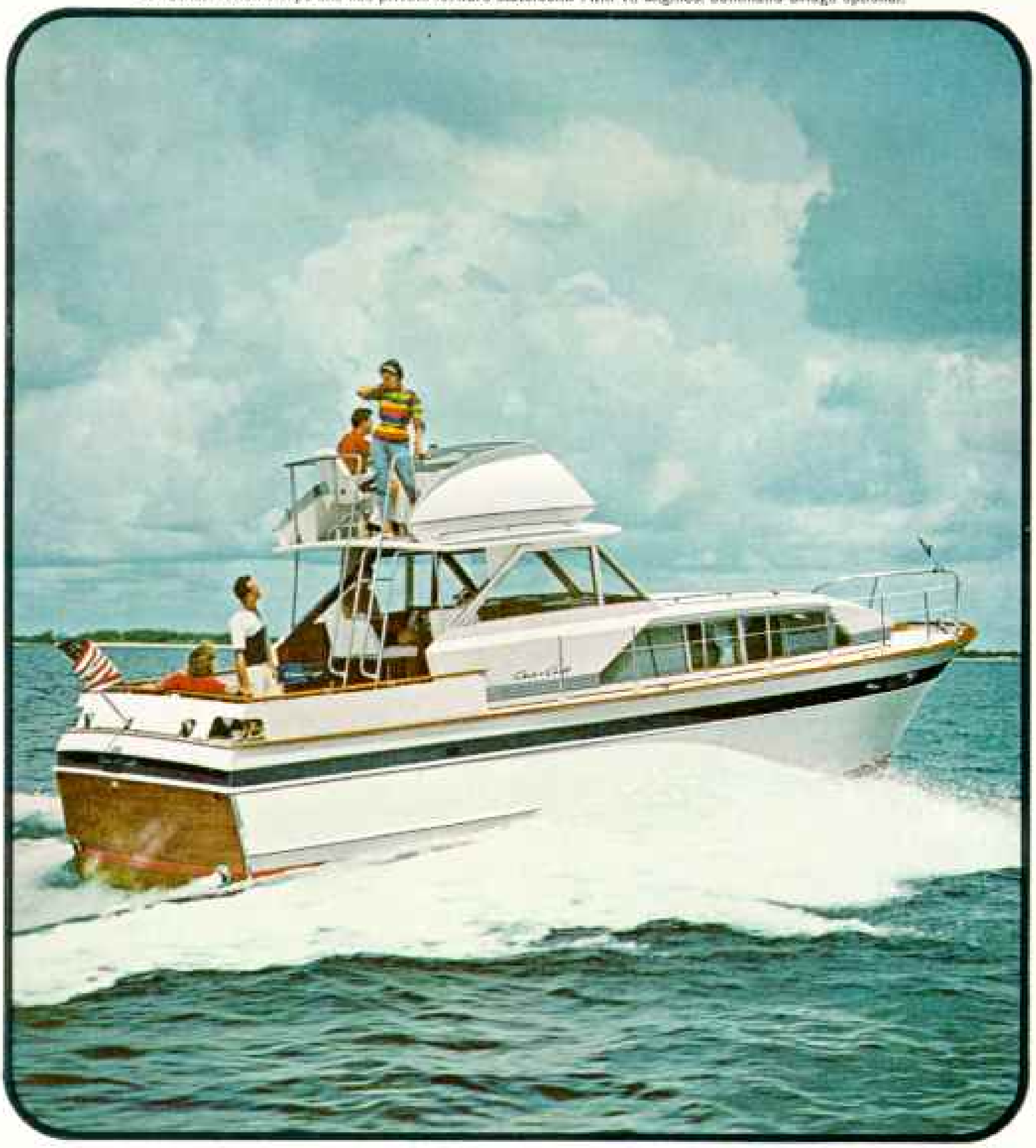
CITY STATE ZIP CODE

Every lady should carry an automatic.

This one. It runs electrically, hides in a purse and makes great movies. We took all the essentials of fine automatic 8mm movie cameras and put them on a diet! The result is this beautiful new, battery operated camera, slim enough to go anywhere. As long as you have a purse, a beachbag, a flightbag, the 45C will fit in neatly . . . go along and join in the fun. (Fits in *his* briefcase or pocket, too!) Then, when the time comes, it'll get clear, sharp, wonderful movies for you, automatically. This trim little camera has all the features of bigger automatics: lens is set by electric eye; a smooth zoom's at your fingertips. And you *know* the Bell & Howell/Canon name means quality. Here's the movie camera to share the life you lead. See the sleek new Canonet® 45C at your Bell & Howell/Canon dealer. Prices start under $150.

Bell & Howell brings out the expert in you (automatically!)

37' Constellation sleeps six, has private forward stateroom. Twin V8 engines. Command Bridge optional.



This is more than a boat. It's a whole new set of industry standards.

Year after year, the standards for excellence in pleasure boats are set by Chris-Craft's magnificent Constellations. Every Connie bears the results of fresh, imaginative thinking in both styling and engineering. Reflected in every corner of every model are the handcrafted quality and fine design that have made the Constellation boating's most popular series. There are ten Constellation models offered for 1964, ranging in size from twenty-seven to sixty-five feet. See your Chris-Craft dealer or write for complete information to Chris-Craft Corporation, Pompano Beach, Florida.

Chris-Craft®

The Luxury World of Moore-McCormack

The "Champagne Touch" of bygone days aboard the most Modern Ships afloat

There are two things to consider when you choose a winter cruise. The places you'll visit and the ship you sail. Moore-McCormack offers you America's newest luxury liners, ss Brasil and ss Argentina. Every moment aboard is graced by our "Champagne Touch." Cordon Bleu cuisine. Gracious service. Beautiful staterooms. All the elegance that made ocean travel the height of luxury in the "good old days." We have changed with the times only in the modernity of our ships.

Caribbean Cruises: from New York—Jan. 3, Jan. 14, Feb. 27, April 16
from Port Everglades, Fla., Jan. 3—from Baltimore—April 25, May 7, May 13
Carnaval-In-Rio Cruises: from New York—Jan. 17—from Port Everglades, Fla., Jan. 19
Sea-Safari Cruise around Africa: from New York—Jan. 29—from Port Everglades—Jan. 31
South America Cruises: from New York—March 13, April 25

FOR FULL DETAILS WRITE TO US OR SEE YOUR TRAVEL AGENT

MOORE-McCORMACK LINES

Two Broadway · New York 4, N. Y.