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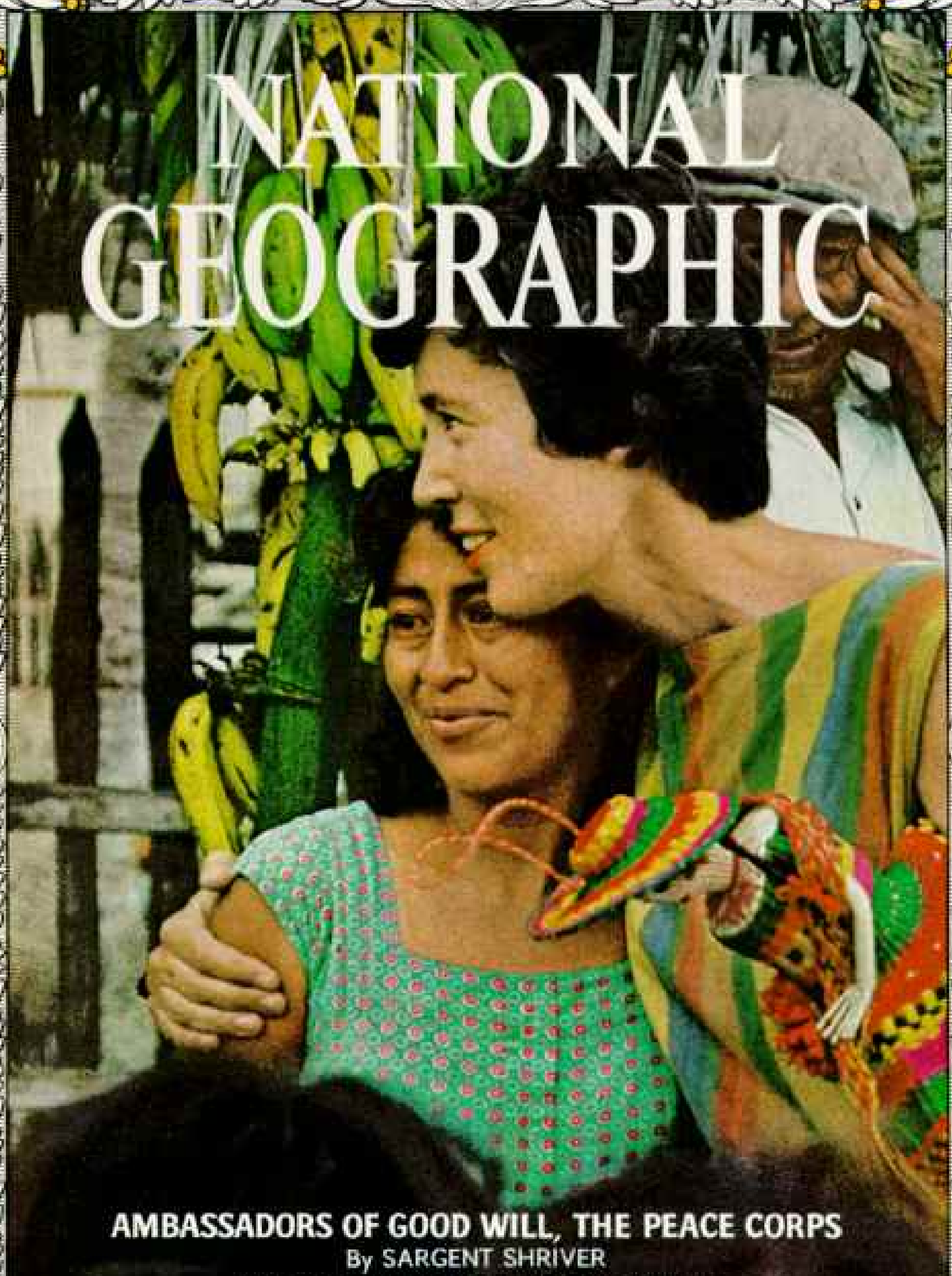

AMBASSADORS OF GOOD WILL, THE PEACE CORPS

By SARGENT SHRIVER

DAVID S. BOYER, JAMES P. BLAIR, PAUL CONKLIN

with reports from Peace Corps Volunteers in

BOLIVIA TANGANYIKA GABON TURKEY SARAWAK ECUADOR

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COVER: Peace Corps Volunteer Rhoda Brooks says goodbye to the Ecuadorian villagers whose lives she has shared for twenty months (page 344).

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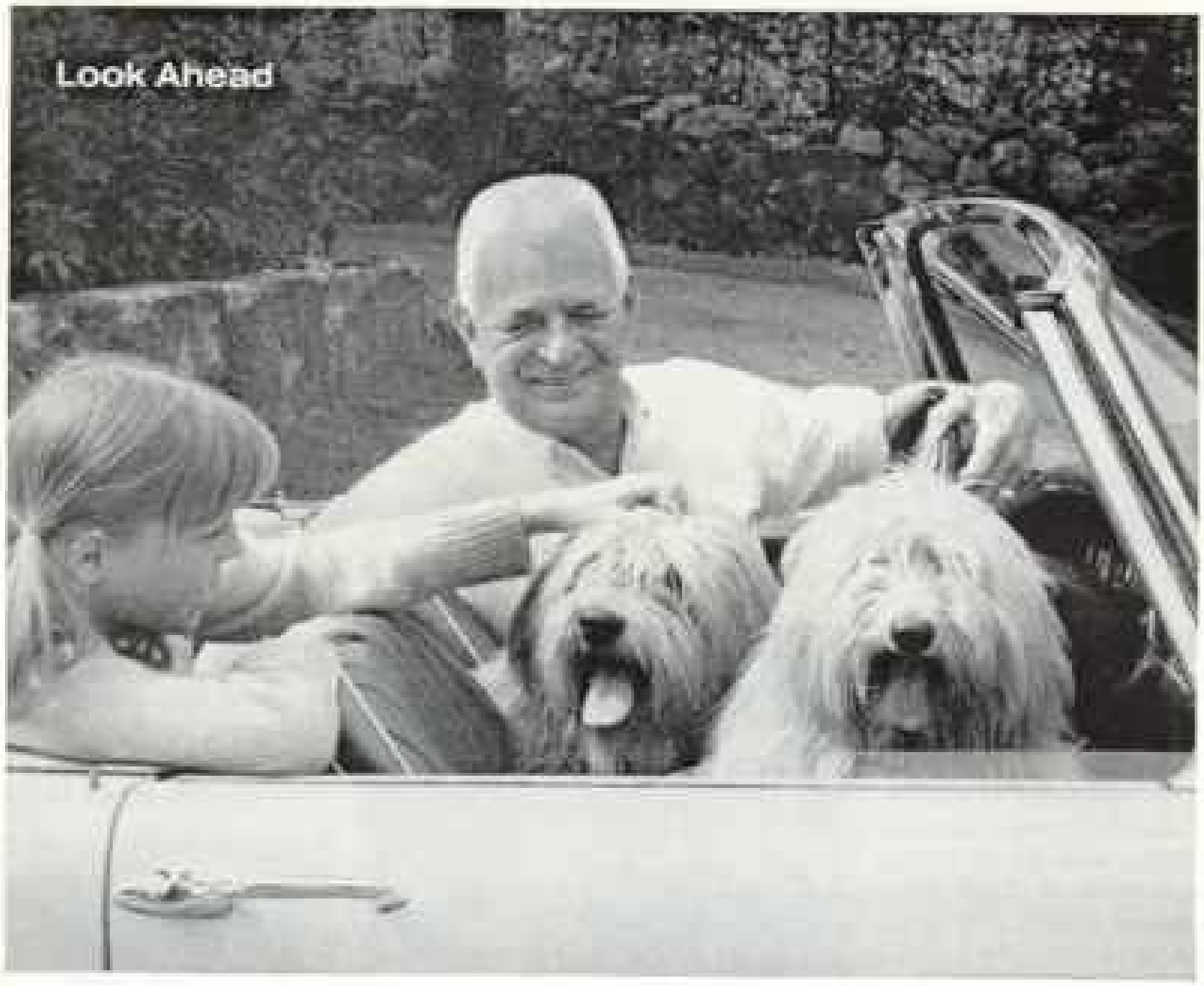

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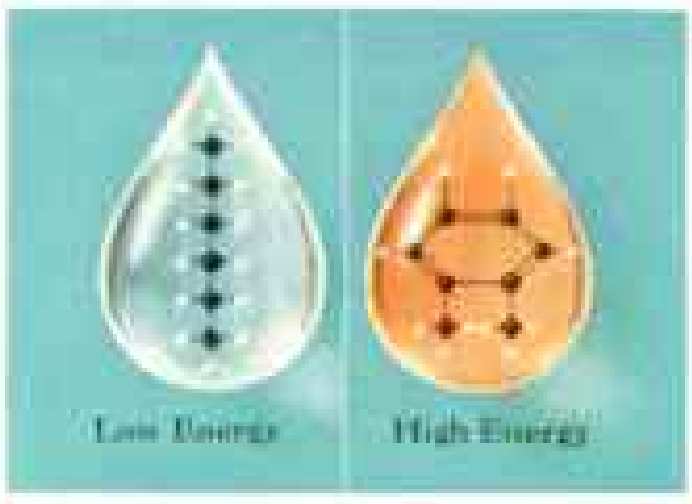
High Energy Gasoline...one reason why Paul Richards depends on his Mobil dealer



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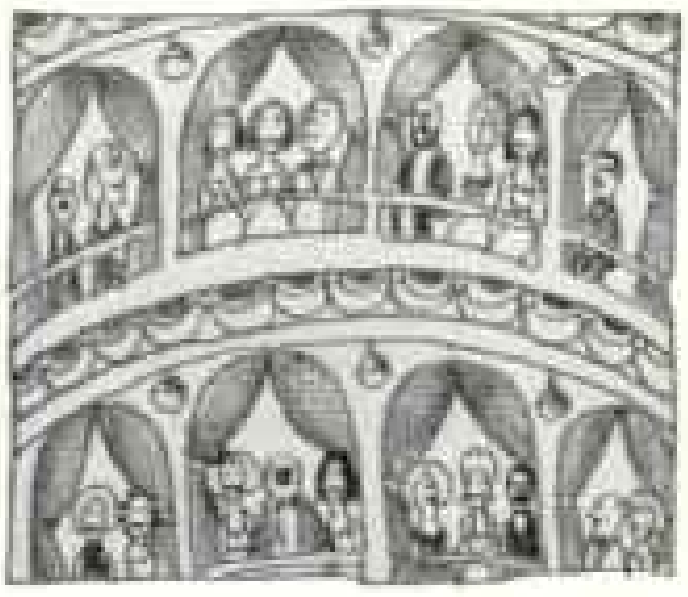

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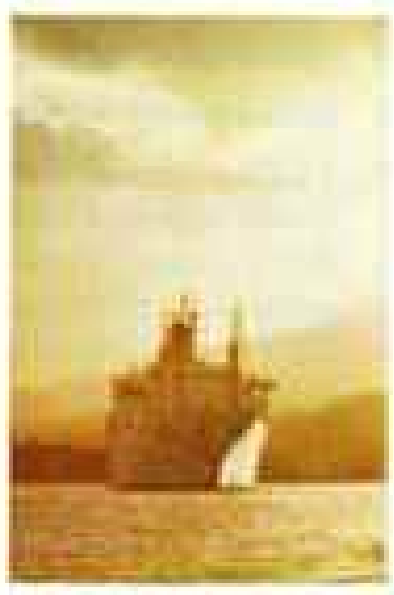

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"But if it *weren't* for that $300, we'd still be living in Forest Hills, and I'd still be plugging away at the same old job. Strangely, it's all thanks to something that happened, quite accidentally, in 1948. It was August 17, to be exact. I remember the date because it was my fortieth birthday.

"To celebrate, Peg and I were going out to the movies. While she went upstairs to dress, I picked up a magazine and leafed through it idly. Then, somehow, my eyes rested on an ad. It said, 'You don't have to be rich to retire.' Probably the reason I read it through was that just that evening Peg and I had been saying how hard it was for us to put anything aside for our future.

"Well, we'd certainly never be rich. We spent money as fast as it came in. And here I was forty already. Over half my working years were gone. Someday I might not be able to go on working so hard. What then?

"Now this ad sounded as if it might have the answer. It told of a way that a man of 40—with no big bank account, but just fifteen or twenty good earning years ahead—could get an income of $300 a month, an income that would be guaranteed for life. It was called the Phoenix Mutual Retirement Income Plan.

"The ad offered more information. *No harm in looking into it,* I said to myself. When Peg came down, I was tearing a corner off the page. First coupon in my life I ever clipped. I mailed it on our way to the movies.

"Fifteen years slide by mighty fast. They were busy, unpredictable years. I couldn't see into the future. But my Phoenix Mutual Plan was one thing I never had to worry about! 1963 came... I received my first check—and *retired.*

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NATIONAL GEOGRAPHIC

September 1964

THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 126, NO. 3

AMBASSADORS OF GOOD WILL

The Peace Corps

By SARGENT SHRIVER

THE FIRST Peace Corps Volunteers to set foot on foreign soil stepped off a plane in Accra on a hot and dusty day in August of 1961. These young American men and women were destined to teach in the secondary schools of Ghana, which had gained its independence only four years earlier.

This should have been an anxious moment for me—but frankly, I had been too impressed by the caliber of Volunteers in training to believe they would let us down. They didn't.

A number of high Ghanaian officials, including Minister of Education A. J. Dowuona Hammond, waited at the Accra airport with U. S. Ambassador Francis H. Russell. The 51 Americans who emerged from the plane were not loud and flippant, chewing gum and taking pictures of everything and everybody, as some might have expected. They behaved in a quiet, unassuming manner, and the only loud thing they did was to sing a song in Twi, the commonest of Ghana's languages.

The Volunteers had been given only two months of language training. So their Twi was less than perfect, but their song was an instant hit. Nothing could have broken the ice more quickly. Witnesses sensed an eagerness, a reaching out in these young people.

Ghana Radio taped their performance and played it back over the air. The broadcast announced that here were some Americans who had enough interest in the land where they would be living for the next two years to take the trouble to learn the local language.

In time these Volunteers proved equally successful in the classroom: Before the first year was out, half of Ghana's secondary school students had come in contact with our Peace Corps teachers—in the classroom, on the playing field, in extracurricular activities. And before they left Ghana, President Kwame Nkrumah himself paid tribute to them.

Since the auspicious arrival of that first group, more than 10,000 Peace Corps Volunteers have seen duty in 46 countries (map, pages 312-13). Contemplating these figures, one can realize how far the Peace Corps has come since October, 1960, when John F. Kennedy, as the Democratic Presidential candidate, proposed it.

Founder of the Peace Corps, President Kennedy confers with the author at the White House. On signing the order creating the Corps on a pilot basis in March, 1961, Mr. Kennedy said: "Our Peace Corps is not designed as an instrument of diplomacy or propaganda or ideological conflict . . . . [but] to permit our people to exercise more fully their responsibilities in the great common cause of world development."

There's a familiar old saying: "No army in the world can withstand the strength of an idea whose time has come." And certainly the time had come for this idea: an army of men and women dedicated to helping others less fortunate than themselves.

The proposal caught fire immediately; 30,000 Americans wrote in support of it, and the mail continued to pour in long after the election in November.

In January, the President-elect asked me to come to Washington to organize the Peace Corps. Later, when he proposed to name me its first director, I suggested he appoint instead someone to whom he owed a political debt. "If it flops," he replied, only half joking, "it will be easier to fire a relative than a political friend."

Peace Corps Begins in a Hotel Room

To keep from getting fired by my brother-in-law, I needed help badly. Working out of a room in Washington's Mayflower Hotel, I started rounding up friends who had some knowledge of international student exchange and education programs, plus practical experience in managing them. They, in turn, called friends of theirs, and pure chance brought me other splendid people.

From early each morning until late at night all through February of 1961, some 15 to 20 of us argued, wrangled, suggested, proposed, until finally we had completed the outline of an organization. We were none too soon. President Kennedy wanted to know what was taking us so long—a whole month! I replied weakly that no one had ever tried to put together a Peace Corps before.

Finally, I submitted our proposed organization to the President, and on the first of March he brought it into being by executive order, although our existence was not official until Congress had approved. On September 22, 1961, Congress appropriated $30,000,000 to run the Peace Corps in its first full year.

Although some newspapers and magazines supported the idea, others called the Peace Corps "a boondoggle," "a second Children's Crusade," or "Kennedy's Kiddie Korps." The word was widely spread around that Americans were soft, too used to luxury to volunteer for the kind of life we offered.

Among foreign officials, too, I caught an occasional undertone. Did I really think Americans could live the way poor people live in struggling lands abroad? Would today's Americans really bring with them their country's old heritage of idealism? Would they have the stamina to make our ideals really stick?

I answered yes, emphatically, although I had yet to see a Peace Corps Volunteer.

Meanwhile, Americans of all ages continued to demonstrate their enthusiasm by flooding us with applications. So far, more than 110,000 Americans have applied; about 5,000 are now offering their services each month.

By September of 1965 we expect to have 14,000 Corpsmen—and 24 countries are on the "waiting list." No Volunteers are sent to any nation unless specifically asked for; today we have requests from foreign governments for more than 50,000.

This is one measure of the reception our Volunteers have received abroad. Another is attuned to the adage that imitation is the sincerest form of flattery.

Seventeen nations have either mounted Peace Corps-type programs in the past two years or have announced plans to do so. In addition, 14 of the developing nations are raising their own Peace Corps to work inside their own borders.

Newspapers Mirror Praise Abroad

Still a third measure of attainment can be seen in the response of the local press—often critical of anything American—in the countries where the Peace Corps has served. For instance, the second Peace Corps group consisted of 15 Volunteers sent to the Caribbean island of St. Lucia to help on farms and in schools. I never think of this project without being reminded of an editorial that appeared in the *Voice of St. Lucia* eight months after our Volunteers arrived:

"When the Peace Corps . . . first landed in St. Lucia, there was skepticism behind the welcoming speeches. 'Here they come,' said

Wary of the needle, Bolivian countryfolk gather at a Peace Corps vaccination session in the Andean village of Tocoalla. In 14 hours, Volunteers scratched smallpox vaccine into 195 arms. Ed Dennison and Rita Helmkamp are two of 10,000 ambassadors of good will the United States has sent into 46 countries to teach the people and to promote peace. Giving up comforts, accepting no special privileges, they live with their hosts and speak the local language. Ed's story begins on page 315.

Twirling a Fly Whisk, the Author Dances Gamely, Guided by an Instructor's Hands

Seated on his leopardskin throne, Paramount Chief Nana Anyane Buadum III of the Wassaw tribe presides in Asankrangwa, Ghana. Speaking through his principal agent (in orange cloak) who chanted the royal words, Buadum asked Sargent Shriver for more Peace Corps Volunteers. Solid-gold carvings top staffs. Mr. Shriver's impromptu dance followed the lead of tribal elders and councillors.

Speaking Pashto, Willie Douglas of Florida teaches Pakistanis to coax wheat from dry, rocky land.

Director of the Peace Corps since its establishment, Mr. Shriver has toured lands around the world to visit his Volunteers. Here he receives honors at Kpayie, Liberia. Bemedaled chief thanks him for sending teachers and bestows gifts: white chicken signifying purity, and homespun cloth to wrap the wearer in good health. Leopardskin slippers will mark Shriver as an honorary chief.

one socially prominent St. Lucian woman, 'straight from school to people who manage very nicely earning nothing—to teach them about refrigeration and "The Star-Spangled Banner"....' Today, America's Peace Corpsmen in St. Lucia have assimilated themselves into St. Lucian society with an enthusiasm that would have made the first missionaries quail in horror. They are on first-name terms ... with thousands."

In November, 1961, I visited our first Volunteers in South America. I saw the start they were making in Colombia and Chile at the fascinating work of community development—aid in self-help efforts by towns and villages.

Then I decided in August, 1962, to go to the Far East, where we had Peace Corps groups in the Philippines, North Borneo, Sarawak, Malaya, and Thailand. The Philippines mission was then the largest anywhere in the world: nearly 600 teachers' aides. Today, the 670 rural development workers, TV broadcasters, teachers, physical-education specialists, and city slum workers in Colombia make up the largest Peace Corps team.

Proceeding by air to southern Luzon, the Visayan Islands, Mindanao, and back again, I managed to meet with almost all the Philippines contingent, usually in groups. Among those I remember best were the ones who sent a telegram saying they would like to get together with me but were just too busy to leave their schools. This message represents a frankness and dedication typical of Vol-

unteers. Their projects—mostly things they had initiated themselves—*would* have suffered had they left them.

Such dedication did not go unnoticed by the host country. A year later I returned to the Philippines—to accept the Ramon Magsaysay Award on behalf of Peace Corps Volunteers in the Far East. This was the first time a group of non-Asians had been so honored.

In explaining why the Peace Corps had been selected, the Magsaysay Board said: "The problem of achieving peace amidst the tensions and dangers of a nuclear age occupies the mind of much of the human race, yet few within it discover a useful way to contribute. In reaffirming the essential community of interest of all ordinary people, regardless of creed or nationality, the Peace Corps Volunteers belong to that small but growing fraternity who by their individual efforts do make a difference."

As National Geographic Society members will find in the accompanying articles written by Peace Corps Volunteers, individual efforts, no matter how small they appear in the larger scheme of things, *do* make a difference. Equally important is the willingness to serve.

The Rougher It Is, the Better They Like It

Peace Corps Volunteers have all given up opportunities to live comfortably at home. They go into distant countries to work for mere subsistence pay under difficult, sometimes hazardous, conditions. They have found more meaning in service than in the easy life. Nothing is more astonishing to people abroad than to see young Americans choosing to leave America—especially the America foreigners know from the movies—to share their lives.

There is nothing complicated about what the Peace Corps is trying to accomplish. The Volunteer is a catalyst for self-help projects that will produce something of value that was not there before he arrived. It is that simple.

As individual Volunteers see it, Peace Corps work is dull, slogging, and hard. But they are doing it everywhere, and they are doing it well. Our psychologists tell me that Volunteers have a low point after eight or nine months in a country—when they realize their second year is not going to be much different from the first.

Yet they stick to it. Less than seven percent of all Volunteers fail to complete their two years of Peace Corps service—and half of these come home prematurely for reasons beyond their control, such as illness or a death in the family.

The first law of Volunteers seems to be: The rougher it is, the better we like it. Their chief complaint has a reverse twist: Things are "too easy." In Ethiopia,

Trainees, Ankle-deep in a Muddy Taro Field in Hawaii, Get a Taste of Asian Farm Life

In Waipio Valley on the island of Hawaii, Volunteers adjust to the life they will lead in coming months. They live in bamboo huts and speak only the language of their assigned country. When plowing, they use the only known working water buffalo (center) in the United States. They haggle for unaccustomed foods in open markets and cook with unaccustomed utensils. They hike mountain trails and trudge waist-deep through swamps.

Roots, fruits, and coconut milk keep them going. Many will never perform again the tasks taught in camp but, facing new situations, they will know how to call upon latent talents. Hawaii's camp is one of four; two are in Puerto Rico, another in New Mexico.

Volunteers in Addis Ababa complain that they want to move out to the provinces; those in provincial towns want to move into the wilderness. Volunteers seem to feel they make their maximum impact among small groups of people, or in small villages.

In Ethiopia, incidentally, one Volunteer's search for a teaching aid will be of interest to Society members. Jerry Springston, who taught school there, was at a loss to enliven his geography classes. One day a local missionary invited Jerry to use his collection of NATIONAL GEOGRAPHICS.

"A few months ago," wrote Jerry, "our people had no idea what snow was, but now they are familiar with it, as well as other terms and concepts difficult for a member of a semidesert society to comprehend."

The GEOGRAPHIC had scored a success.

From the beginning, I regarded the careful selection of Volunteers as crucial. If we sent the right sort of people abroad, the unfortunate incidents which many critics predicted would be avoided. The question was: What sort of people would be right?

We knew we wanted people capable of

KODACHROME (OPPOSITE) BY PAUL DONELLIN AND EKTACHROME BY DAVID S. BOYER © N.G.S.

learning a foreign language. And they would have to have the skills requested by countries inviting them. That part was easy. But what about temperament and personality?

We knew that we wanted people capable of adjusting to environments radically different from anything they had ever known; people who wanted to work, and who could work under conditions of relative hardship. We wanted men and women who sympathized with the world's hungry, diseased, and illiterate. We needed people who were both friendly and independent, both flexible and determined, people—to use an almost antique phrase—"of character."

Four Camps Train Volunteers

In the search for that vital but vague quality "character," we lean heavily on the dozen or more references we ask applicants to name. The letters we receive are usually written at length, minus traditional clichés. From them, we can draw fairly accurate portraits, and on the basis of these as well as rigorous tests, the Peace Corps selects—or rejects—applicants for training courses.

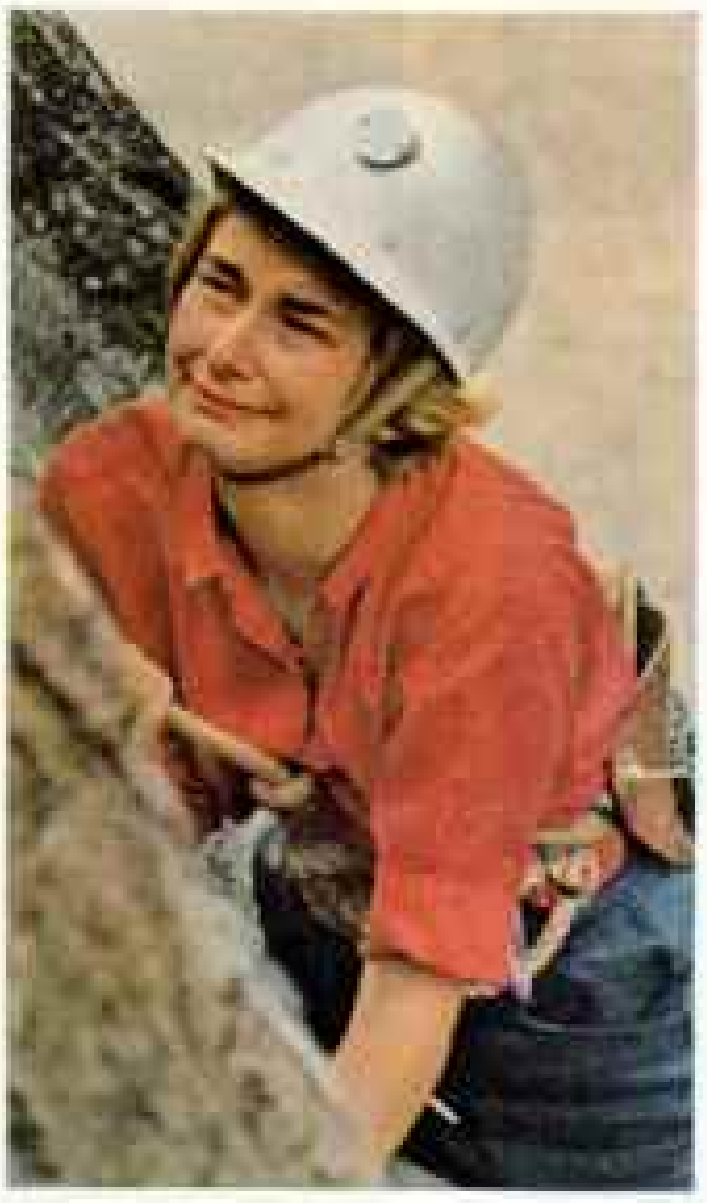
Since our first selection standards were drawn up, we have refined them by comparing our predictions with actual performances of Volunteers overseas.

One out of four applicants is invited to take part in a 12-week training program.

Of these, sixty percent accept the specific program offered. The selection process continues through the training, when we have our first chance to see a prospective Corpsman. Four out of five trainees are finally chosen to go abroad.

Each of our programs overseas has a training course specifically designed to meet its needs. Most training is conducted by colleges and universities. Contracts have been signed with institutions from Maine to California.

In the late summer of 1961, the Peace Corps opened



Obstacle courses toughen trainees. Girl above clings to swaying ropes at a Puerto Rico camp.

Fear, fatigue, and near tears mark the face of a Volunteer stuck part way through a rock climb. Trainees are not required to pass such tests but are simply asked to try.

Biting wind whips Phyllis Miotke (opposite) during a rappel down a sheer cliff. In New Mexico's snow-mantled Sandia Mountains, she trains for the Andes. In another optional test, trainees bound hand and foot dive into 10 feet of water and pluck an object from the bottom with their teeth.

Soft-hearted city girls learn to kill chickens for their dinner

As snow pelts the Peace Corps farm in New Mexico, girls who have plucked only cellophane-wrapped fowl from supermarket racks suddenly find themselves told to slaughter their own food. Instructor Mel Stout hands a fowl to a student bound for the Venezuelan back country, where she will have to fend for herself.

With an artful stroke of his butcher knife, Mr. Stout demonstrates how to decapitate a bird. Cringing students react with gasps, turned heads, and shock.

Still unable to watch, a trainee holds out a fresh victim. The knife flashes, feathers fly, but the head stays on. Another attempt succeeds. Other girls recover and watch.

Smiles mingle with sadness as the girls dip carcasses in scalding water to loosen pinfeathers. They must clean the birds and singe them over an open fire before they can cook a chicken dinner. The male members of the group are absent, learning to milk goats. Trainees also learn to slaughter hogs. They dress and roast the meat on spits or in barbecue pits. Corps candidates rate this basic butchering their most distasteful chore.

a training camp in Puerto Rico. Now there are two camps there, named for David Crozier and Lawrence Radley, the first two among eight Volunteers who have lost their lives in Peace Corps service.

Located 12 miles south of Arecibo, these two camps are principally for Volunteers who will serve in Latin America. Here they receive a transition to Spanish culture as well as a chance to look at Puerto Rico's own eminently successful experiment in self-development, called "Operation Bootstrap." *

At Camps Crozier and Radley, Volunteers are called upon to try a difficult obstacle course, scale a rock wall with climbing ropes, and rappel down the face of Dos Bocas Dam. Aside from physical conditioning, these exercises present challenging and, for most trainees, unprecedented situations. Here Volunteers must summon up unexpected resources within themselves, call forth new strengths—and build confidence (page 305).

The increase in requests for community development led to establishment of a third Peace Corps camp, in northern New Mexico. Here, under the supervision of the University of New Mexico, trainees perform valuable field work on Indian reservations and in Spanish-speaking communities. The area's aridity typifies conditions Volunteers encounter in much of the world.

Still a fourth camp has since been developed in the Waipio Valley on the island of Hawaii, primarily for Volunteers headed for the Far East. The once heavily populated valley had been almost deserted since a seismic sea wave smashed the area a few years ago. It had reverted to a primitive state. Prospective Volunteers have helped bring the valley back to life by building a reproduction of an Asian village complete with palm-thatched houses on stilts.

In Waipio Village, Volunteers learn Asian languages, how to cook Asian style, even how to plow with a water buffalo (pages 302-3). The camp is run by the University of Hawaii.

Although emphasizing the practical work Volunteers will be doing, training programs include other instruction: history, customs, health problems, and culture of the country to which a Volunteer is going; a review of American civilization; world political problems and how they affect the particular country; and some physical conditioning.

*See "Puerto Rico's Seven-league Bootstraps," by Bart McDowell, GEOGRAPHIC, December, 1962.

To manage a home in western Venezuela, a girl should be carpenter as well as cook and seamstress, so Hazel Pell teaches woodworking skills in her homemaking classes at San Cristóbal. Mrs. Pell shows teen-age schoolgirls how to build chairs, cabinets, and clothes closets. She and her husband Charles turned management of their Indiana farm over to others for two years so they could serve a hitch in the Peace Corps. Finding Volunteers with farming knowledge poses one of the Corps' biggest headaches.

Classroom clamor, the same the world over, greets Nan Borton in Antakya, Turkey. Stick, which Turkish teachers sometimes use as a switch, serves the Volunteer only as a pointer. Mrs. Borton and her husband Jim teach English and help plan community projects. Their story begins on page 331.

More than half the 10,000 Peace Corps Volunteers work in classrooms. All must speak the local language, but most conduct their courses in English. In addition to history, mathematics, and language, they teach sewing, handicrafts, and art.

But most important, the emphasis today is on language. Volunteers should speak the language of the people among whom they work; this is a basic tenet of Peace Corps philosophy. But when the Peace Corps was brand new, few of us realized fully the impact of being able to speak local tongues, and not just international languages.

Pasar Malay Opens Doors in Borneo

This impact is felt strongly by Volunteers, as well as by the people with whom they work, as I learned on a scouting mission in what was then North Borneo. Today, as a part of the new nation of Malaysia, it calls itself Sabah. Inspecting prospective work sites, we found ourselves in a typical Far East village a few miles from Kota Belud. Grass grew in the streets, straw huts stood on stilts, and swarms of children perched on ladders to the houses.

With our party was a young Volunteer named June Jensby, who was later to be stationed in Betong, Sarawak. June walked over to some of these children and spoke to them in Pasar Malay, the language we had taught her in her Hawaii training. (As far as I can find out, Pasar Malay had never been taught in the United States before.)

When the children answered, her face lit up like a full moon. She looked, in fact, as if she were immensely relieved to discover that Pasar Malay was a real language after all, and not just a lot of nonsense that we had forced her to memorize. That instant of communication between Miss Jensby and the children underscored all my convictions about the importance of language training. It has now been increased from an average of 100 hours in the 12-week training program to around 300 hours.

Peace Corps training courses have offered more than 40 languages. A partial list includes French, Spanish, Portuguese, Greek, and Turkish; the Farsi of Iran; Urdu and Bengali of Pakistan; the Hindi, Gujarati, Punjabi, and Kannada of India; Thai; the Tamil and Singhalese of Ceylon; the Tagalog and Cebuano of the Philippines; Somali; Swahili of East Africa; Amharic of Ethiopia; Ibo, Yoruba, and Hausa of Nigeria; Krio, Mende, and Temne of Sierra Leone; Arabic; Ewe of Togo; Nepali; Quechua of the Andean Indians; and Nyanja of Nyasaland.

If a Volunteer is successful, you can sense the fact as soon as you come to his village. There's an indescribable warmth in the air,

an aura of camaraderie. It is a fresh thrill for me whenever I encounter it.

I had this feeling when I visited John McLean at his school in Maha Sarakham on Thailand's northeastern plateau.

Our helicopter put down on the soccer field of McLean's school. The student body lined up on one side of us, and what appeared to be the entire population of the town lined up on the other. McLean took me up one line and down the other, introducing me to each person by his or her name. I should point out that the Thai language has five tones; its proper names, to an English-speaking person, are remarkably difficult.

McLean's school flew both a Thai flag and an American flag. I was flattered when told that the American flag had been raised for my visit. I also found out that a pair of McLean's students had bicycled to Bangkok, more than 300 miles away, to get it. Needless to say, they didn't do this for me; they did it for John McLean.

The World Offers Its Thanks

Volunteers have scored isolated spectacular successes around the world. They have saved rice crops from unseasonable floods. They have revolutionized local technologies in such crafts as bricklaying and bamboo construction. They have organized a burgeoning chicken industry in the Punjab of India. They have helped to keep Tunisia's heavy construction equipment rolling while training Tunisians to run the repair depots.

But most accomplishment is not measured by the spectacular. Volunteers shun the word "success" as giving a false picture of their results. Nevertheless, the idea of the Peace Corps has won the approval of the entire free world—an approval expressed in many ways.

In Nepal, villagers walked for more than five days to the place where our Volunteers were working, to bring them the tragic news of President Kennedy's death. In Iran, one of our Volunteers was told by an Iranian fellow worker with tears in his eyes: "*Our* President is dead."

I am still taken aback when I walk into a village hut in a distant land and find a picture of John F. Kennedy, torn from an old newspaper, on the wall. But the explanation is simple: The people of economically underdeveloped countries believe that the late President cared for the hungry and the dispossessed. And one of the reasons they believe this is because they associate him with the Peace Corps he created.

In the Dominican Republic, a group of people were writing "Yankee Go Home" on a wall while one of our Volunteers watched. When they finished, he said: "I guess that means I'll have to go home."

They turned and said: "No, we mean Yankees, not the Peace Corps."

The King of Thailand said to me recently: "Mr. Shriver, your Volunteers are showing us a new side of the United States."

In Turkey, every Peace Corps teacher has been asked to remain, after his or her two-year tour, to become a *paid* member of the Turkish school system.

In Panama, last winter's anti-American rioting caused many United States citizens to flee to the Canal Zone. But not Peace Corps Volunteers. Our 60 men and women continued at their jobs. Some were reassured by Panamanian friends: "If others don't understand who you are, we will protect you."

I could multiply these stories a dozen times, but the point I am trying to make was most eloquently expressed by a local official in Sarawak, who said of the Volunteers who were helping him cut a road through the jungle: "They're not *your* people any more, they're mine."

We have received thousands of earnest, moving letters. They come from ordinary citizens of many nations, and in their varied ways they say thank you for sending so-and-so to us. Parents of Volunteers have received letters saying thank you for sending us your son or your daughter. I have seen messages from school children in Africa: "Mr. or Miss So-and-so from the Peace Corps is the best teacher I have ever had."

Often Peace Corps Volunteers abroad work so hard, and appear so different from any white men the local citizens have seen before, that they arouse much curiosity. In Nepal,

Paraffin Gauntlet Applied by a Volunteer Eases the Pain of Leprosy

Heat of melted wax soothes sores and relaxes the muscles of a patient in Los Negros Leprosarium, Bolivia. Beth Ussher repeatedly bathes the afflicted arm, then massages it. She runs little risk; the malady is not highly infectious. Properly called Hanson's disease, leprosy can be arrested by drugs but not cured.

NATIONAL GEOGRAPHIC MAP BY J. MARSHALL C. SMITH © N.G.S.

ROOSEVELT BY PAUL CONKLIN © N.G.S.

Director Shriver wears a prayer scarf given to him in Nepal. He heads both the Peace Corps and the war on poverty.

TATTERSHALL BY DAVID S. BOYER © N.G.S.

Volunteer Rhoda Brooks cuddles her adopted daughter. She also brought back an adopted son from Ecuador (page 339).

for example, villagers had been referring to Volunteers with the words *yurpin* or *sahib*, meaning European or white man. After a few months a delegation cautiously asked: "You can't be Westerners. What are you?"

The answer: "Peace Corps Volunteers."

"Oh, and where is Peace Corps?" the Nepalese asked, believing it a new country.

The answer is easy: The Peace Corps is in the heart of America.

But the answer to the question *what* is the Peace Corps is not quite so easy. It was not until the Peace Corps was well under way that we discovered what we were really sending abroad. Other foreign-aid programs have given money and high-level technical assistance. We thought we were sending a kind of middle-level technical assistance into the villages and neighborhoods of the ordinary people—and we were.

But we were sending them more than that, something whose worth cannot be estimated, something that we did not know would be of such immense value. We sent them people. We sent them men and women of good will with whom they could talk about their hopes and suffering, with whom they could share the experiences of living, and with whom they could plan a better life.

The spirit of what we have done was eloquently expressed by the distinguished cellist, Pablo Casals, speaking to a Peace Corps Conference of 43 nations in Puerto Rico in 1962:

"This is new, and it is also very old. We have in a sense come full circle. We have come from the tyranny of the enormous, awesome,

Turkish villager, crowned with coins, wears her wealth.

Pensive pupil attends a Corps-built school in Gabon (page 325). To Gabonese, the American Volunteers are "the whites who work."

Blue shows Peace Corps countries. Kenya and Uganda will join the program in November, 1964. Figures project the number of Volunteers as of September 22, third anniversary of the Peace Corps Act, except for British Honduras, shown as of October 5. Thirty-two hundred trainees will be sent abroad in the last three months of 1964. Carpenters have been withdrawn temporarily from Cyprus.

discordant machine, back to a realization that the beginning and the end are man—that it is man who is important, not the machine, and that it is man who accounts for growth, not just dollars or factories. Above all, that it is man who is the object of all our efforts."

What Is a Volunteer Like?

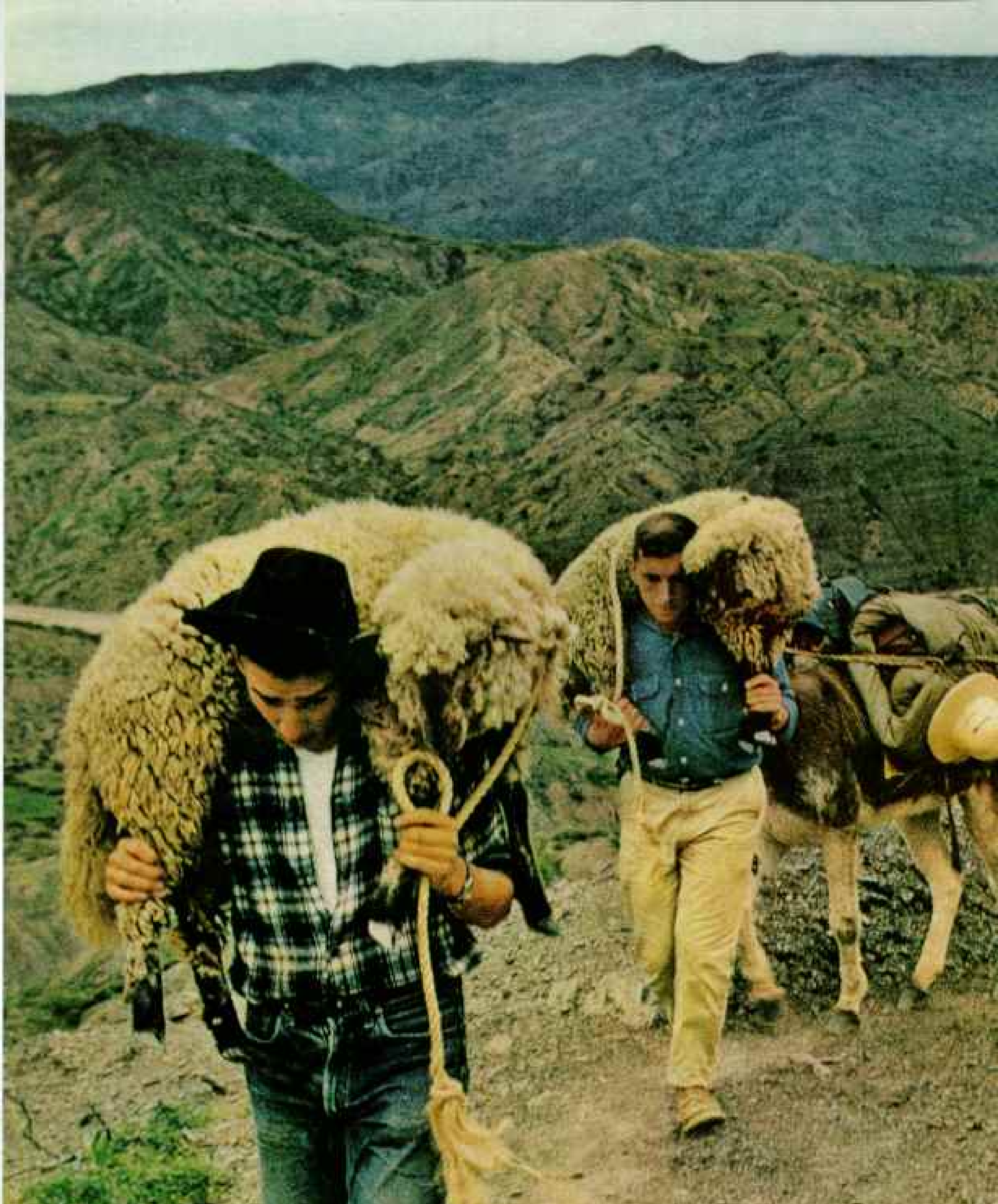
I have often been asked to describe a "typical" Volunteer. What is he or she like? Well, frankly, there is no typical Volunteer, unless you believe in the hazy concept of a "typical" American.

Peace Corps Volunteers look like any American you might pass in the supermarket, or like a neighbor who lives down the street. They average 24 years of age for men, 25 for women—although almost 80 of them are over 60. The things that make them different from the average don't show: their good will, their sense of adventure, their willingness to sacrifice for others and to work hard under difficult conditions.

They go abroad with no special privileges, no hardship pay. They are subject to the laws of the country in which they work. They do not have the commissary privileges enjoyed by many Americans abroad. They speak the local language. They live on the economic level of local citizens who do the same kind of work.

They are the best and best liked unofficial ambassadors this Nation has ever sent to lands overseas.

What are they like? They are like the eight Volunteers whose stories follow.



Bolivia

By EDWARD S. DENNISON

THE SHEEP ON MY SHOULDERS was filthy. He wasn't one of those nice clean rams that are flown down to Bolivia from the United States in an antiseptic airplane.

He wasn't even a purebred. We hadn't been able to afford that this time. But his sire was a purebred. Together with his 50-pound cousin, draped around my Peace Corps colleague Mel Zielinski's shoulders, he would help improve the flocks of sheep at the mountain village of Tocoalla. If we ever got there.

Mel and I were trading off, carrying or herding the rams along rocky trails with Claude Wolfe. Claude headed our joint Heifer Project-Peace Corps team, an effort to improve the agricultural life of the Quechua Indians—descendants of the ancient Inca people—around our headquarters city of Cochabamba.

We had with us another Peace Corps Volunteer, Rita Helmkamp, a registered nurse. Except for a veterinarian, who came only once, she would be the first medical person of any kind ever to reach Tocoalla.

Rita was carrying enough smallpox vaccine for about 200 Indian villagers. The leaders of Tocoalla had been asking us for vaccine, remembering a horrible epidemic five years before.

"We can give these people a little vaccine," Claude was saying. "Maybe a few new ideas about farming, and a little hope, and confidence that they can learn to help themselves. The question is, is that enough?" We had collapsed beside a stream for a rest, and for a drink of the polluted water, which we treated with chemicals.

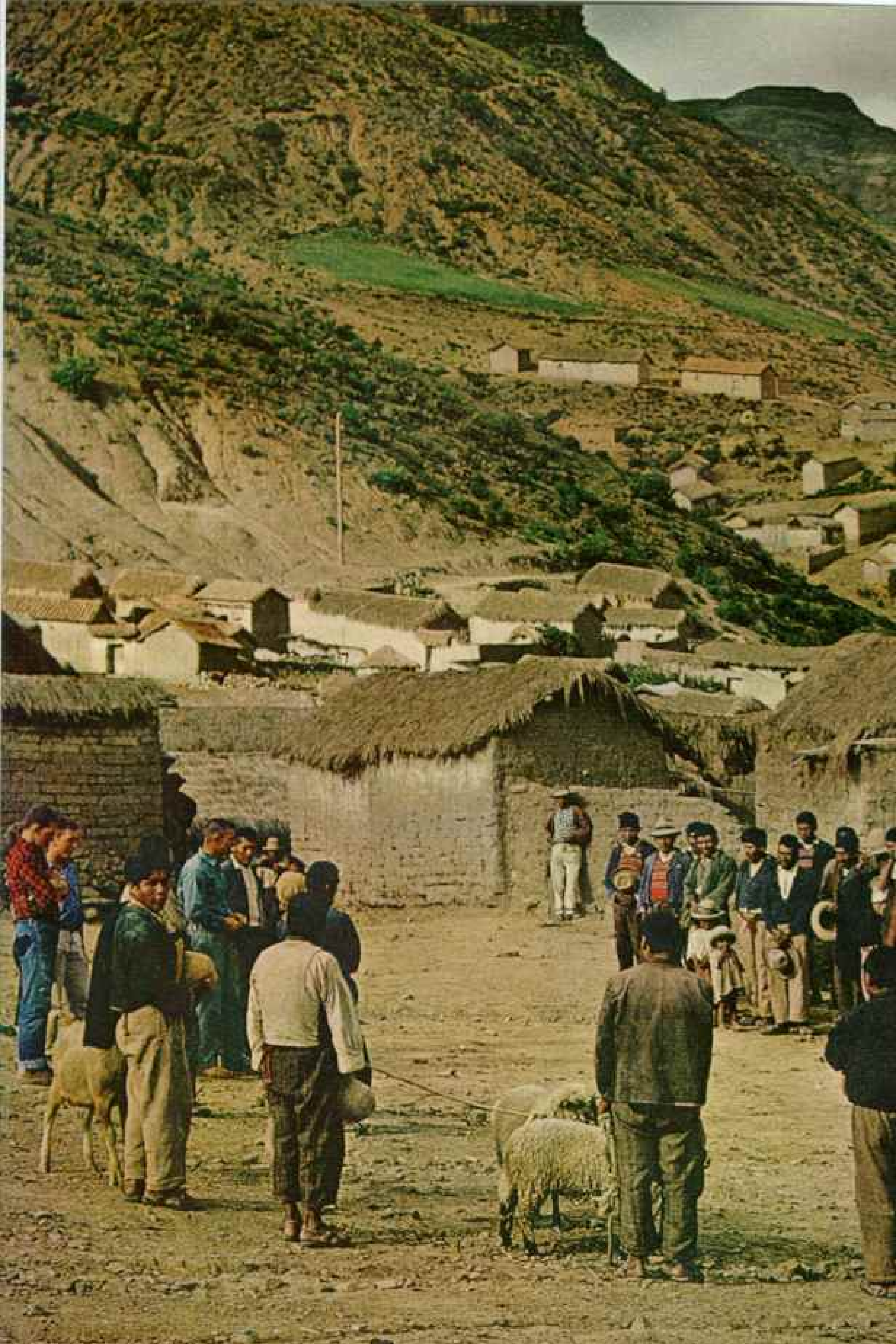
I thought of the Indian farmers who had come to me, when I was working as a Peace Corps Volunteer with the Bolivian Ministry of Agriculture, to ask for tractors, or road graders, or even sewing machines. In my job I helped Bolivians improve their agricultural techniques, but I had no equipment to distribute. At each request I answered: "The only resource I have to give is me."

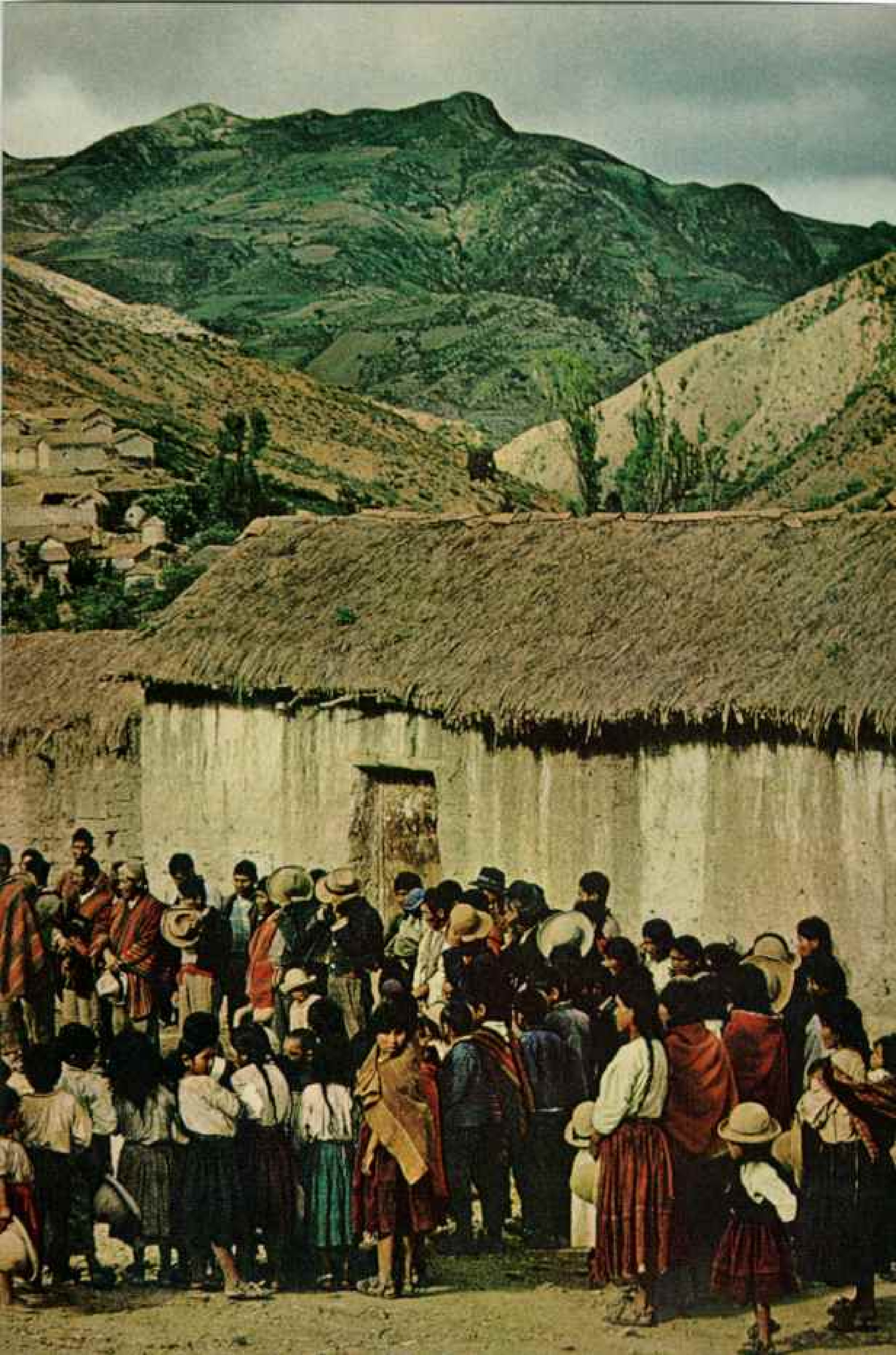
Actually, there was a little more. The rams, for example, and previously a goat for the village of Tocoalla—gifts of Heifer Project, Inc., a nondenominational Christian organization set up to distribute

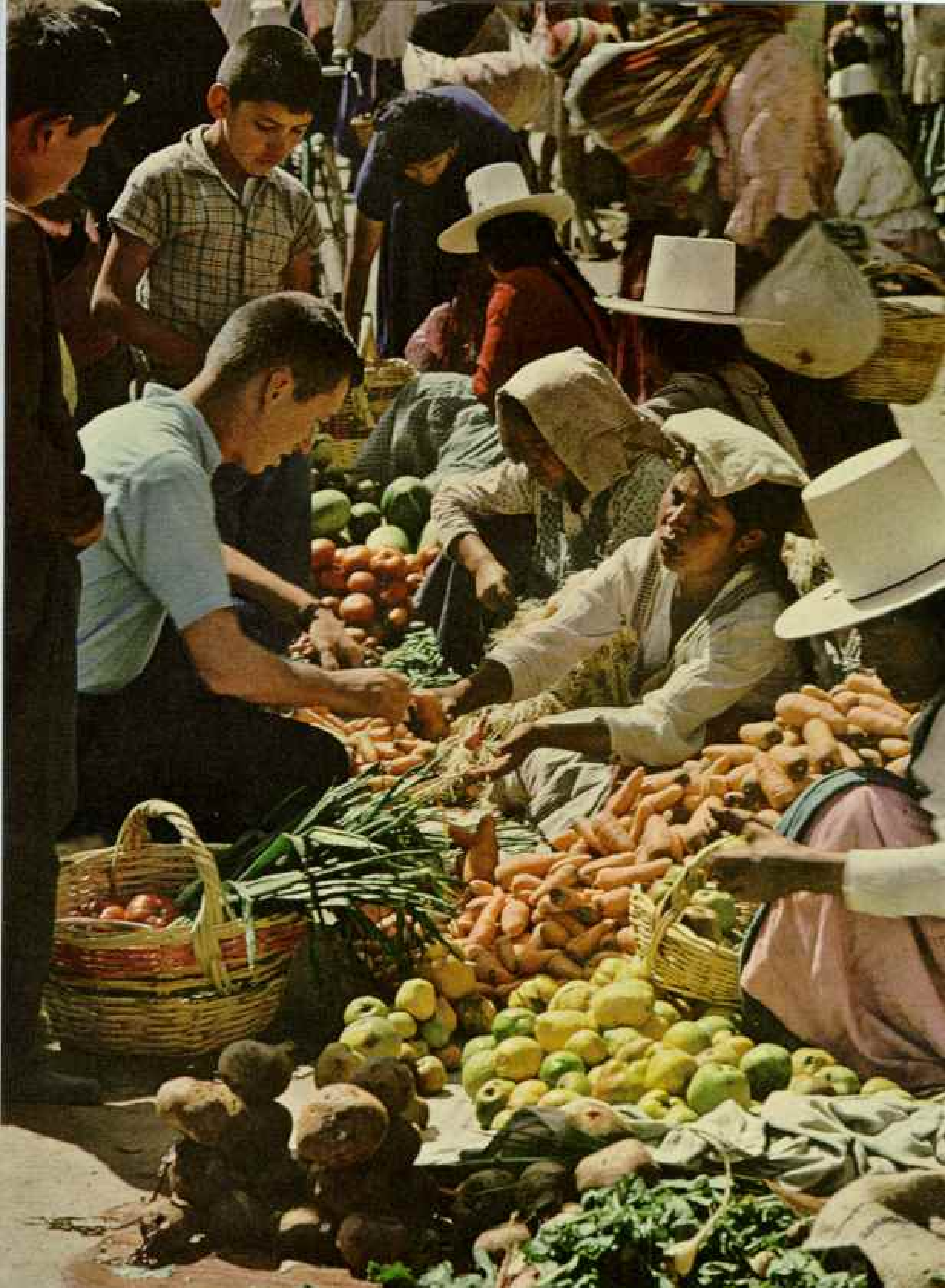
Balky 50-pound sheep that refused to climb Bolivian peaks ride the backs of Mel Zielinski (left) and the author to a new home in Tocoalla.

Tocoalla villagers salute the arrival of the animals. Ed Dennison and his friends (left) speak Spanish; an Indian translates into Quechua.

PHOTOGRAPHS BY DAVID S. BOYER © N.G.S.







PHOTOGRAPHS BY DAVID S. BOYER, NATIONAL GEOGRAPHIC STAFF © N.G.S.

Author tests his bargaining skill in a Bolivian market. Straw hats identify residents of Cochabamba and its environs. Mr. Dennison's hosts, a dentist and his family, treat him like a son. He responds by helping them with shopping and household chores.

high-quality livestock around the world.

There had been enough cement to build a small dam to increase Tocoalla's water supply. There was money enough to buy doors, windows, and a roof for a new mud-brick village school. Claude Wolfe's family in the United States had stopped exchanging Christmas presents and pooled the money for these gifts to be sent to Tocoalla. The precious smallpox vaccine we carried came from the Bolivian Ministry of Health.

We got up from our brief rest. My bones ached. Would pushing these smelly rams over 20 miles of precipitous mountain trails really be worth the effort?

I guess at this point some of the things that were stressed in our training began to come back to us. At our Puerto Rico training camp we forced ourselves to swim underwater with our hands tied, tried to climb almost impossible cliffs, ran a heart-pounding mile before breakfast. Not so much just for sheer physical torture, but to try to develop confidence for challenges we might face.

Somehow the memory of those ordeals made carrying the sheep a little more bearable.

Then, too, I recalled the words of one of our training professors at Arizona State University. "You can count on a lot of frustrations in your Peace Corps work. It may seem to you that your two years will have hardly scratched the surface. But if you can change one man's ideas about the way he farms his land, or plants his crops, or cares for his cattle, then your efforts will have been worthwhile."

Maybe, after all, my efforts had been worthwhile. I had vaccinated hundreds of chickens and talked with scores of farmers about poultry diseases. I had helped start 4-S Clubs—Bolivian versions of our 4-H Clubs. Certainly I had changed more than one man's idea about the way to farm his land.

Bolivian Supper: Big Boiled Potatoes

Tired, aching, and dirty, we reached Tocoalla at dusk. Many people came out to greet us, among them Nicanor Gutierrez, council chairman of the Tocoalla farmers, the "campesinos" (pages 316-17).

They escorted us to the tiny one-room community building that would be our home for the next two days. Soon one of the village women brought us supper. Boiled potatoes. Lots of them.

The potatoes, by Bolivian standards, were large ones. I sighed and prepared for another round in the big-potato battle. How many times had I talked with Indian farmers about saving their large potatoes for seed and eating the smaller ones? How often had they continued doing just the opposite?

The brick floor of the community building seemed almost comfortable that night. I was too tired to care.

We awoke next morning to the sound of people. Already, curious villagers were wondering how these *gringos*—a not-unfriendly name for foreigners—would spend the day.

They soon found out. At nine Nicanor called a village meeting. Claude spoke in Spanish about smallpox, its dangers, and how Rita would vaccinate all who were interested.

Proud Indians Practice Self-help

As Nicanor translated what Claude said into the Quechua language, many of the people nodded their heads with understanding. This dread disease was nothing new; dozens of pocked faces told the story.

One man brought his ten-year-old son to us. "My boy was blinded by smallpox," he said. "Is there anything that can make him see again?" Rita swallowed hard, then gently replied, "No, there is nothing."

Indian mothers swarmed around us with their babies. Mel cleaned each arm with cotton dipped in acetone. I placed a drop of vaccine on the arm with a hypodermic needle. Rita made the scratches, using boiled straight pins (page 298). In the evening, by the light of four candles and a flashlight, we finished up.

We vaccinated 195 villagers that day. We also saw a lot of smiles, and heard a lot of thank-yous.

By the end of the next day we had talked much about potatoes. And corn. And contour plowing. And about planting some green vegetables for a better diet. We also learned that Tocoalla needed shovels and wheelbarrows to make a truck road for carrying produce to market. The Indians wanted trade, not just aid.

And we had seen the dam they had built on a creek with the cement we sent them. Now for the next step in helping them help themselves—obtaining, somehow, the pipe needed to bring water to their village.

Claude had approved the progress on their school. Nicanor would come with us, back to Cochabamba to buy roofing, doors, and windows. The Christmas money of the Wolfe family would be used—for something better than ordinary Christmas gifts.

We started back down the trail. It was easier going down without the sheep, and our hearts, too, were a little lighter.

Tanganyika

By RUTH E. DYGERT

RETURNING TO TANGA after a vacation made me feel I must have been partially asleep for the past year. Along the road I saw so many things I could not remember having seen before. The town itself looked so familiar, yet so different. Why?

The daily routine of Suburbia, U.S.A., was one of the things I had hoped to avoid by joining the Peace Corps and working in a developing country. But now I realized that it was easy to slip into dull routine in Tanganyika, too. How had I come to let the days slide by without really living them? What had I been doing for the past year?

I thought of that September day when we descended the ramp at the Dar es Salaam airport—Tanganyika Peace Corps Project II, 27 female nurses to work in Tanganyika hospitals. The intense heat and glare of sun on asphalt hit us cruelly. I felt wilted only two steps outside the plane door.

A Ministry of Health official told us cheerfully that this was the cool season.

"It doesn't even begin to warm up until the last of October."

Driving from the airport into town that first day, I stared at the mud-and-wattle houses, the coconut trees, and men dressed in ankle-length kanzus that looked like nightshirts. How strange the Moslem women looked in their black buibuis, which the breeze billowed around them like large bags.

Nurses Try Out Their Swahili

We lived for two months at a Salvation Army hostel in the Mgulani area, three miles outside Dar. I remember our first visit to the city's large open market.

With children and chickens perching on our laps, we rode into Dar on the local bus, surprising passengers by greeting them in Swahili. But soon we were frying in our own fire, because they answered with long conversations we couldn't understand. A man with a tasseled fez reassured us.

"*Kidogo, kidogo*"—"Little, little," he said, meaning slowly we would learn.

Later that afternoon, trying to find the bus home, I managed the sentence, "*Busi kwa Mgulani itakuja wapi?*" "Where will the bus for Mgulani arrive?" A passerby took us to the bus stop five blocks away, and waited 45 minutes to put us on the right one.

After a year the hesitation of beginning a conversation has disappeared. The singsong of Swahili has crept into my speech; the questioning inflections that were such a problem come without thought.

Five-thirty a.m. one October day found eight of us, plus 1,300 pounds of baggage, at the Dar es Salaam bus station. We were off to Tanga—a tiring, all-day trip—to work in the 414-bed Government hospital.

As we jounced along, we dug out a guitar and ukulele and tuned up on favorite songs from our training, both American and Swahili. An English-speaking passenger told us why we were arousing so much interest: Because we were white, he said, and because these people had never before seen a traveling band of women musicians!

All eight of us were tense as we filed into the matron's office that first day to receive our hospital assignments. Before I knew what was happening, I was in Galanos Block, a new three-story building with six wards.

Mr. Justin, a staff nurse, was saying, "You may go work on the ward until your staff nurse returns." (This came after a five-minute introduction to a busy 28-bed male surgery ward.) I was in a panic. It was my first day as a licensed professional R.N.

A moment later I was walking calmly down the long ward, telling myself, "You must at least smile, Ruth!"

On past 18, 20, 22 beds I went. It seemed a mile to the far end of the ward, where an orderly who was making beds smiled and accepted my offer of assistance. He was certainly more help to me than I was to him in those next few days!

Since then, one of my problems has been coping with the philosophy of life based on *shauri la Mungu*. This means "the will of God." It expresses a profound pessimism, a "leave-it-to-fate" attitude concerning efforts to help oneself or others.

This little phrase explains much that happens here. For one thing, I feel it keeps many African nurses and orderlies from fulfilling their potential.

Cookies comfort a child with a fractured leg as Ruth Dygert calms a noisy 36-bed pediatric ward at lunchtime. Launching her nursing career in Tanganyika, the 24-year-old Potsdam, New York, farm girl and seven other Volunteers tend four busy wards around the clock in Tanga Government Hospital, one of the largest in the young nation.

And it really isn't hard to see why. If I believed that a patient's recovery depended solely on fate, would I really be conscientious about doing everything that scientific theory tells me to do?

Would I always see that medicines were given at prescribed times, in prescribed doses? Would I make sure that everything that needs to be sterile really is?

Tradition is hard to defy, but education and the impact of outside ideas are modifying the role that this pessimistic philosophy plays. Otherwise the frustrations of working day after day with little or no progress would be unbearable.

At present I am working in the 36-bed pediatric ward of the hospital. Can you imagine trying to provide adequate nursing care for the very ill, making all the formulas, feeding the babies, ordering medicines daily, performing all the ward's administrative detail, seeing that all the children get their baths—and at the same time keeping out of mischief the majority of the 36 who are out of bed running around?

At times it is hair-raising, but mostly it is not only fun, but also satisfying. How many times have I wished for my camera as I've watched one of the children, well and happy after a healed fracture or a corrected nutrition problem, waving *Kwaheri*—"Goodbye."

The Strange Becomes the Familiar

Besides hospital duties, all of us do some teaching. Three of the present five instructors in the Tanga Hospital Training School for Nurses are Peace Corps Volunteers. They teach medical and surgical nursing, pharmacology, and anatomy and physiology to both first- and second-year students. I have been teaching health science at the Government Secondary School in town.

Sunrise glows on tattered sail as an outrigger canoe points its prow into the Indian Ocean off Kigombe, Tanganyika. Ruth Dygert, going out for skin diving and spearfishing, is a guest of the fishermen. She keeps fingers clasped around her knees. "Once," she explains, "I saw a shark staring at me as I trailed my hand in the sea."

Awed youngsters in Kigombe, 20 miles south of Tanga, watch Miss Dygert's medical magic ease the discomfort of an ailing baby. Flattened cardboard carton protects the infant from the cot's irksome cords.

"We have a standing invitation," says Miss Dygert, "to spend weekends with our friends at Kigombe. But free weekends are few."

When I saw the hospital again after my month's vacation, I knew that I was returning to a job where I am needed. This time I felt no anxiety—just the disturbing feeling that the first year had slipped away.

How did it happen, then, that the days just began to roll on, blending one into the other? It wasn't that new experiences and interesting things ceased happening, but that the strange became the familiar so quickly, and the unexpected became part of the daily routine—even in Africa.

Seeing Arabs in their flowing kanzus, turbans, and lovely silver-cased daggers; Masai women in ocher-colored clothes wearing wire coiled from wrist to elbow and bead necklaces eight inches wide; a lion quietly stretched on a roadside tree limb, or an elephant flicking his ears at me as I drive by—these are still eye-wideners. But the intense excitement they hold for the *mgeni*—"stranger"—has somehow been toned down to lively enduring interest by day-in-day-out living.

Speaking for myself, I know that with the termination of my two years of Peace Corps work in Tanganyika I will have gained and be taking home with me far more than I could ever hope to leave behind.

Would I do it again? Yes. The good and happy things have far out-shadowed the discouragements. Granted, there are days when I feel that I'm knocking my head against a stone wall. "Is this sterilizer properly filled?" Pointing out such a mistake to the same student nurse for the twentieth time sends my blood pressure to the ceiling, or brings another shrug of resignation.

But sometimes I hear a new patient being told by one of our long-termers, "That nurse is not just a *mzungu*, a European. She's an American." The trust in his voice suggests how much good we shall leave behind.

Gabon

By JOHN F. MURPHY, JR.

NDENDÉ, a district in one of the nine Gabonese prefectures, or states, gave a birthday party in August, 1963, to celebrate the third anniversary of Gabon's independence.

While women in grass skirts and feather headbands hopped to the rhythmic clicking of bamboo sticks and the pounding of drums, the wife of a French guest remarked: "Do you notice how old all the women are? Ten or fifteen years ago, all the young girls of the village did this dance. Now the young ones like to dance only the twist."

My impressions reflect the same blending of past with present. I stopped at a village on the road from Ntoum, the site of the second school we have built in this country, and asked some of the Gabonese if I might take their picture. I thought I'd have an ideal explorer's snapshot—until the last of the children joined the group. He proudly wore a clean white T-shirt. Neatly stamped on the front was "Connecticut, the Nutmeg State."

Peace Corps Task: New Schools

I am one of 55 Peace Corps Volunteers here to help the Gabonese build schools in the countryside. Our goal is 30 rural schools and 90 houses for the Gabonese teachers and their wives and children.

We have divided ourselves into construction groups and a support party of mechanics and truck drivers. Each group has six to eight Volunteers, who hire Gabonese workers at the various sites. Each man in a group works at varying times as hole-digger, carpenter, mason, or painter.

Libreville—the capital city—surprised me at first with its modern look. Its bikini-clad French girls, its traffic circles and splattering of cubistic structures, such as the new post office, show what the Gabon of the future will be like.

Here in Libreville, nuns motorbike about the paved streets in their white habits; and French construction foremen in white shorts and knee-length stockings can be seen at the many work sites throughout the city. Gabonese gendarmes dress smartly in the French manner, in khaki shorts and navy blue upside-down caps.

But moving 20 miles away from Libreville to Ntoum takes you from the present across the ages, into the cool, sweet smell of the jungle, ripe and decaying.

With the work that is to be done, there is no time to be overwhelmed by this abrupt transformation. Soon you get acquainted with the two lizards that rendezvous, upside down, over your eating table. You no longer bat an eyelash at the occasional worker with neatly patterned facial scars or filed teeth. You even grow accustomed to the nightly rhythm of the drums. Someplace, out there in the darkness, there is a feast or a dance. Or a funeral.

Goats and chickens wake you each day, and, walking across the road to mix your first batch of cement for the stone you will lay, you notice the hunter with his shotgun stalking game along the side of the dirt road. After you have driven your last nail and cleaned the cement mixer for the day, you might see the same man returning with a dead monkey or a gazelle.

Women plod along the side of the road with heavy baskets strapped to their backs and foreheads. They walk to their "plantations" to plant manioc, pick pineapples, or cut firewood or lengths of bamboo from which to weave matting.

Wives Carry a Man's Loads

Because of the tsetse fly and the sleeping sickness it brings, beasts of burden are relatively rare. Often a man will have several wives, who fill the role elsewhere reserved for a mule, horse, donkey, or camel.

We gave a ride to one of these women. Two of us had trouble lifting her basket onto the truck. It must have weighed more than a hundred pounds. And women walk miles with such loads!

Our work day runs from 6:30 in the morning to 1:00 in the afternoon. With spare time on our hands, we engage in a variety of non-scheduled activities—basketball, swimming, or softball, teaching English classes, or a river outing in our pirogue.

Banging hammers shape the future of Gabon, Colorado-size new nation in Africa. Author Murphy and an African workman nail siding on a new school in Ndendé, a back-country district. Volunteer Thomas Longenecker arches above them. Murphy heads one of several Peace Corps teams building rural schools and teacher residences here. Their work spurs the country of 450,000 toward its goal of universal education.

At Ntoum, after our school and three houses were finished, we had to wait for the trucks to bring us south, so we decided to spend these few days building a playground and a soccer field. Then someone suggested, "Why not run a carnival?"

The idea caught on, and for three days we built seesaws, swings, and a slide. We put up booths for the bean-bag toss and other games, with bubble gum for prizes. Mike Morrison and Paul Seymour, our mechanics, made a train by tying five trailers together, and towed them with a truck.

But the real hit of the show was a merry-go-round, rigged out of planks and ropes suspended from a slowly revolving cement mixer. It helped make the carnival an unqualified success.

Language Problem: Laundry or a Bride?

Our school-building job is not without its problems: getting gravel, lumber, nails, and stone, for example, though the U. S. Agency for International Development (AID) helps by providing many such supplies. And we have our endless difficulties with language.

There are so many tribes—the Fang and the Bopounou, the Batsangui and the Banjabi, and a host of others—and they all have languages of their own. As we move on after the

Christmas excursion in Gabon takes Volunteers to the jungle hospital of Albert Schweitzer. Talking with Mr. Murphy, the 89-year-old medical missionary tells of incidents in his half-century of working with untutored peoples. He gave up a professional career in Europe to settle down in Lambaréné, his village for the sick. There he has labored against tropical diseases since 1913. Physician, philosopher, and theologian, he is also a celebrated organist.

Touch football adds excitement to life in Ndendé when Peace Corpsman Murphy coaches youngsters in an after-school game. Although he and his companions have returned to the United States, they left their mark on Gabon not only in the schools they helped build, but in the playing fields they cleared.

completion of each school, we change tribes. Some Volunteers pick up an occasional word, but most of us hesitate.

Our French, the common language of Gabon, isn't well-polished either. But the brave among us go on experimenting.

Shortly after one of our groups arrived at Akok, the site of the third school, about nine miles from Ntoum, Tony Kasper and the rest of the group felt it would be a good idea to get someone to do the laundry. An old man of the village told him that his daughter would be happy to oblige.

Tony agreed, since the price for the month seemed reasonable indeed. That night the man came to the campsite with his daughter.

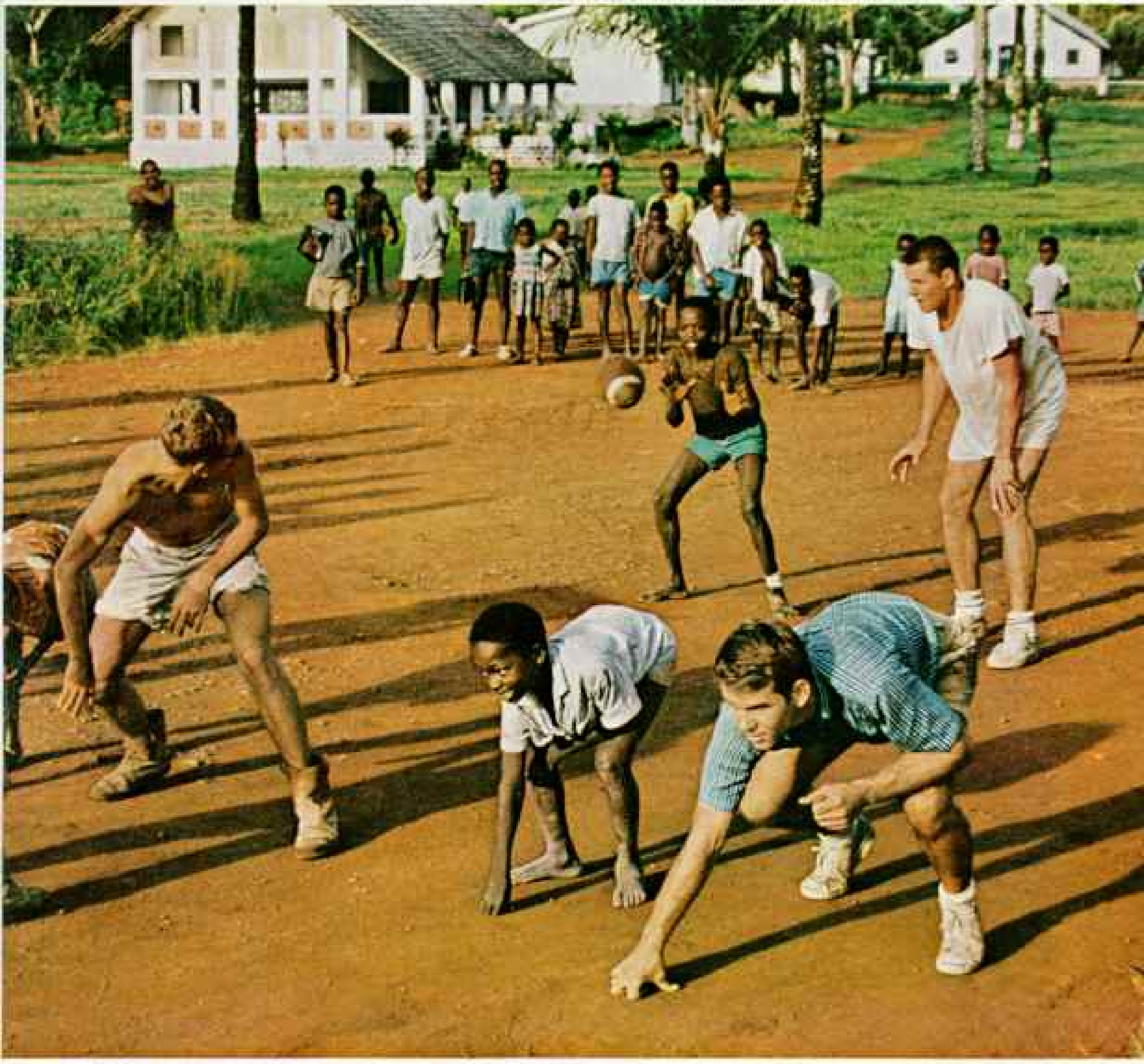
Tony asked, "Why is she here now? I already gave her my laundry."

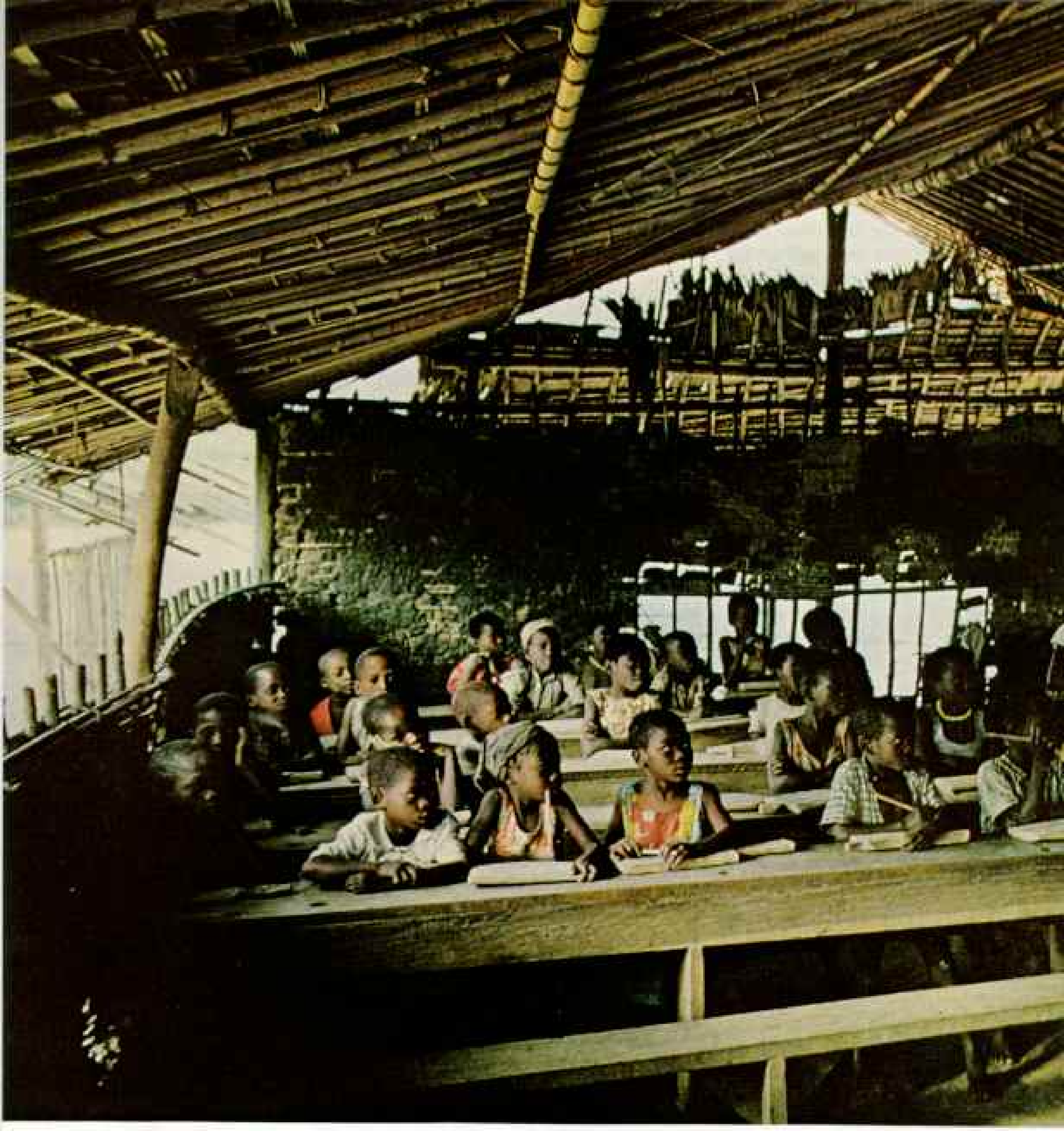
Another Volunteer, more skilled in French, realized what had happened.

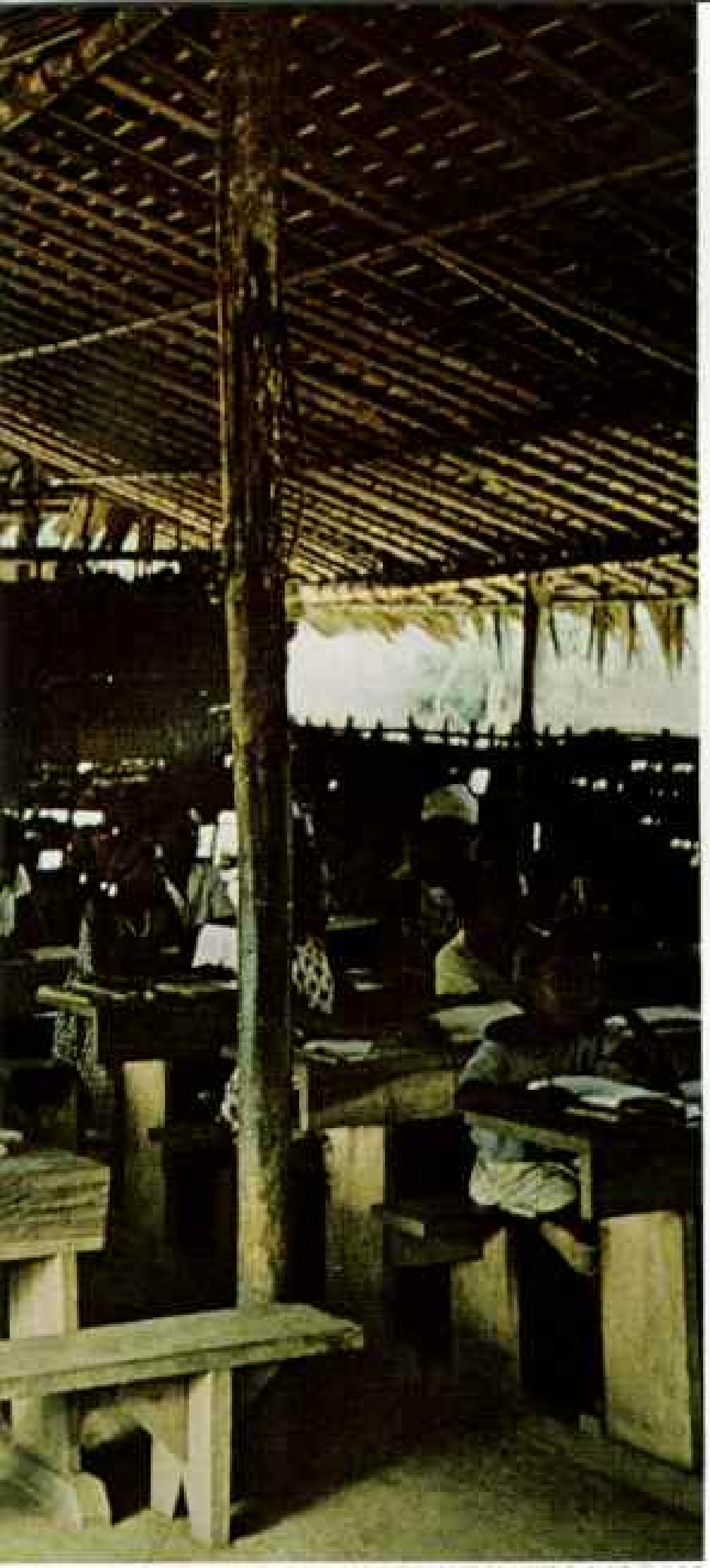
"Congratulations, Tony," he said, and shook his hand heartily. "You just bought yourself a wife."

Tony got a chance to learn some more French in a hurry; the rest of the group left him to get out of the problem by himself. "I'm sorry. I only want laundry," he said, finally convincing the old man that he was not interested in matrimony.

The Gabonese we have met in the interior







KODACHROME (ABOVE) AND EKTACHROME BY JAMES P. BLAIR © N.G.S.

The old: Sagging schoolhouse of wattle and thatch shelters students from sun and drenching rain. Youngsters learn their lessons in French, only common tongue among the 40 tribal groups of Gabon. New buildings going up will ease overcrowding.

The new: Murphy measures boards for a carpenter to cut. School in background, almost complete, has a double roof to allow circulation of air. New teacher residence, here used as a workshop, may attract an instructor who might otherwise refuse because of poor accommodations. Mr. Murphy, a former Marine Corps officer from New London, Connecticut, served as painter, hole digger, or stonemason whenever need arose.

seem natural and uncomplicated, and their acceptance of us has been unqualified and genuine. The Peace Corps Volunteers here in Gabon are known as *les blancs qui travaillent*—"the whites who work."

When the first group went to build at Okala, a village a few miles north of the Libreville airport, they were all invited to a Bwiti dance. The chief of the village was himself a worker on the school project.

Pounding of drums began the feast, and palm wine brought it to a close. By three in the morning most of the women were in a trance. The chief did a fire dance, and enthusiastically offered his favorite wife to his favorite Peace Corps Volunteer.

Americans' Strength Attributed to Needle

The older villagers' innocence of the outside world reveals how time has left them behind. One night we showed the movie of John Glenn's flight. When the women saw the silver space suit, they giggled and one of them asked, "Is he going to a feast?"

But what may appear to be naiveté often comes very close to truth. Once, after three hours of helping some Gabonese load cement on board a ship, one of the men turned to me with a wry smile and said: "Americans can work hard because they give you the needle *pour la force*, for strength."

I laughed, imagining that he meant something which is sometimes illegally given to race horses to make them run faster. I told him that he was wrong.

But later I came around to his way of thinking. We have our polio vaccine, smallpox shots, typhus vaccine, gamma globulin for hepatitis, and antitetanus shots. These may not give us strength, but they certainly keep us healthy and better able to work.

Complicated and bewildering changes are part of Gabon's future. Many Gabonese do not know what must be done to bring these changes about, and perhaps wouldn't care if they did know. Those who have been educated want everything now.

A bulldozer operator for the Public Works Department at Ntoum took the middle ground. "It is not myself who will see the progress. It is too late for me. But my children will go to school, and they will learn what I have never learned."

On our part, we know that the schools we are building will help raise the level of education. We like being known as "les blancs qui travaillent." It is good to feel that we are a part of Gabon's future.

Turkey

By NAN and JAMES W. BORTON

JIM AND I are a great responsibility to the Turks.

We first realized this after nearly a year in Turkey, when we made the trip from Istanbul to Izmir. We found ourselves on the train for 33 hours, and we had neither food nor water. The other two passengers in our compartment opened their well-stocked baskets, pushed an assortment of food to us, and said, "God has given us responsibility for you. Please eat."

During our first trip to Istanbul, we gave our taxi driver the name of an expensive restaurant and told him we were teachers in a public high school, living on the salary of a Turkish teacher—$70 a month. He said, "My son, this restaurant is too expensive for you. Come where the cab drivers and policemen eat, and then I'll take you to an inexpensive night club."

In Bolu, a town in northern Turkey where we lived during our first year, the horsecart driver asked Jim how much he wanted to pay for a delivery. Jim suggested 75 cents. The man refused. He asked for 30 cents. They bargained in reverse until an agreeable sum was reached.

Now we teach in Antakya, in southern Turkey. As Antioch, it once was the third largest city in the world. But wars, fires, floods, and earthquakes have taken their toll; the population has dwindled to only 46,000.

Though most of the great monuments are gone, the old section, with its winding cobbled streets, is probably laid out much the same as it was two thousand years ago. Scattered around the outskirts are reminders of Antakya's past—ancient city walls (page 333), the Iron Gate which protected the city from flash floods, and the Church of St. Peter, where Paul taught and where the term "Christian" was first used.

Against this historical background stands the modern town of Antakya. It has an excellent hospital, schools, a number of hotels, and a newspaper.

Teaching English can be difficult in Turkey. Each teacher in the country must finish a set number of lessons and give a set number of tests, using the government-approved textbook. This book teaches reading rather than speaking. Yet in Western-oriented Turkey, which welcomes tourists, spoken English is important.

Without upsetting the prepared outline, we had our pupils speak English in games: acting out *Hamlet*, for example, and playing restaurant (they nearly came to blows over the tip).

Overcrowding is also a problem. The government has built thousands of schools, but still there are as many as 90 pupils in a class, three to a desk.

From these students we have derived both pleasure and an insight into Turkey. Teachers are respected. Students rise when teachers enter and leave, and salute them in the streets. *Hocam*, "my teacher," is a title, and all the townspeople address us this way.

Both Bolu and Antakya are typical market towns. Horsecarts,

Laughter warms winter's chill at a town council meeting in the Turkish village of Enek. Corps Volunteers Nan and Jim Borton, who teach school in neighboring Antakya, join their hosts in planning a new road. To ward off the cold, they sit under quilts and a satiny cover draped above glowing charcoal. At mealtime the round mats on the wall come down to cushion trays of food.

Outstretched arm signals a question in Mrs. Borton's English class at Antakya. Volunteers ease Turkey's teacher shortage.

donkeys, water buffaloes, sheep, goats, and cows wander everywhere. Iron- and coppersmiths and wheelwrights have their tiny open-fronted shops on the narrow street leading to the produce bazaar. The sound of their steady hammering turns the drudgery of daily shopping trips into a triumphal parade.

Visiting is Turkey's national pastime, and it follows a rigid pattern, from the exchange of greetings through the number of glasses of tea consumed. Candy and fruits are offered, and refusal is an insult.

Twice a year, during the religious festivals, or *bayrams*, visiting becomes frenzied. The Turks welcomed our joining these four-day-long bayrams. We killed a lamb on Kurban Bayrami, the Festival of Sacrifices, and distributed the meat among our neighbors and the poor, as the Turks did. They all gave us the stomach, considered the choicest piece.

Single people do not often join in these visits and dinners. Moslem custom frowns on dating, and so the young men stroll incessantly while the girls generally remain at home. One of our students surreptitiously pointed out his girl to us as she was going to the fountain—they had spoken only a few times, and their courtship had consisted entirely of exchanged glances.

We have also come to know something of village life. The villages of Turkey account for about 70 percent of the population. But while major cities are rapidly becoming Westernized and industrialized, many villages remain at an economic standstill.

Last summer we lived in Yassihuyuk, near Ankara, helping 20 architecture students from Middle East Technical University build a library. We also spent hours in discussion, trying to show these students that the library should be not simply an exercise in construction but a piece of long-range community planning—a center desired by the villagers themselves, one they would help design to meet local needs. We said it should be not merely a building of brick and stone, but a building of ideas and ideals.

That summer we recognized the difficulties of our work in Turkey. If people judge the success of the Peace Corps in terms of new libraries and schools, they may be misled. The brand-new library was a project initiated outside the village. It came not from within, but from above: It was decreed rather than desired, and so it is likely to have little effect on the people who built it or the people for whom it was built.

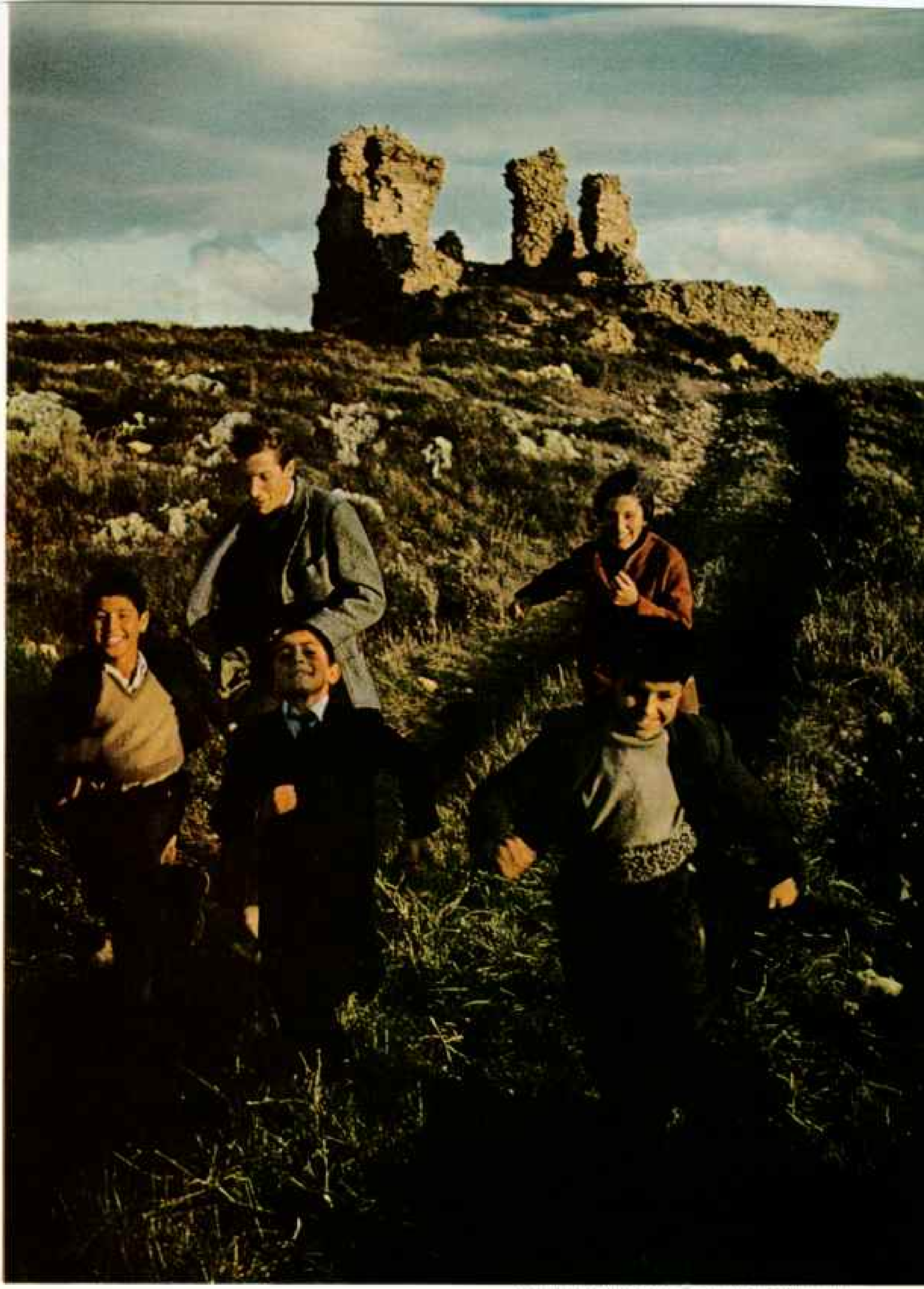
Still, if a few of our Turkish friends learned that there are other and more rewarding ways to help the villages, we were successful.

Small Successes Hold Great Reward

As to our teaching, our successes were small, but they may well make for lasting changes. Turks have noticed that a class can be controlled without hitting the students. Probably they also noticed that students are more inspired by textbook material, plus enjoyable games, than they are by the more traditional rote learning alone.

We had failures, too. There are students whom we never reached, and more who will soon forget. But seven students from Bolu High School took entrance exams for English teacher training. Only one had planned to do so when we started.

This may look small on an international scale. But to us it is a tremendous reward.



PHOTOGRAPHS BY JAMES P. BLAIR © NATIONAL GEOGRAPHIC SOCIETY

Sprint across deserted fields speeds the Bortons and three students homeward after a tour of Antakya's ruined walls. Crumbling tower is one of several dotting the hills around a shrunken city. Antakya covers only a fragment of the Biblical Antioch of 20 centuries ago. Here the term "Christian" was first applied to the followers of Christ.

Sarawak

By EDWIN C. PRICE, JR.

IN SEPTEMBER, 1962, Kanowit District of Sarawak's Third Division, on the island of Borneo, welcomed its second American. He was a 4-H Club organizer with two years of college, a developing ego, and an urge to get out and do something constructive.

He could not hope to be remembered as fondly as Kanowit's first American, Dr. Linn Fenimore Cooper, a physician and great-grandson of American author James Fenimore Cooper. Dr. Cooper has a hospital ward named in his memory, but as the second American, I can at least hope to leave a good record as the Peace Corps Volunteer in Kanowit.

Peace Corps training in Hawaii prepared a dozen of us to organize 4-H Clubs in Sarawak. Throughout our training we were called "The Plowboys." We felt our rank low among the other Volunteers, and I often wished I were a teacher. Arrival in Sarawak, however, and full realization of the job to be done changed all that.

The success of our 4-H Clubs is evident in club gardens, fishponds, and chicken houses. We're "getting progress," as the natives say.

"Getting progress" would be more difficult were it not for a few former British Colonial Service officers who know and understand Americans. "Don't expect results too fast, and take six months to settle in, if necessary," they told us when we arrived. One of them, Desmond L. Bruen, then the Kanowit District Officer, advised me through my first year. Bruen's district was 90 miles up the big river Rajang. It is the largest district of the Ibans, or Sea Dyaks, in Sarawak.*

The Ibans are traditionally headhunters, but those I know best have changed. Penghulu (Chief) Masam, my adopted father, is one. The tattoos on his hands show that he once took heads, but pleated shorts have replaced his loincloth, and he no longer wears his hair in bangs. His home is separate from the longhouse where the rest of his community lives. He was named Masam, meaning "Sour," to prevent the evil spirits from harassing him.

It is Masam and the people of his river, the Ngemah, who show the greatest evidence of my work here. I look forward to every trip I make into the *ulu*, or back country. It is seven hours by river from Kanowit to Masam's home. In that distance there are six clubs, a demonstration farm, and more than 30 longhouses at which I might stop for business. Usually my boat is loaded with seed, fertilizer, cement, fruit trees, rabbits, chickens, pigs, or anything else needed for the next step in the various projects along the river. The 36-foot outboard-powered boat is steered by Langgit, or "Sky," Masam's oldest son. Only a native of the Ngemah River can maneuver a boat over its course with any ease.

An hour after you enter the Ngemah, the river narrows, and rocks begin to ripple the water's surface. During the drier season, or *kemarau*, the boat must often be dragged through shallow water. The low water of this season claims many propeller pins and sometimes a gear system. But that is when the river is most beautiful. Giant trees stretch low over the water and shade it with mazes of vines, orchids, and rattan.

When the monsoons, or *landas*, come in December, traveling can become dangerous. The rocks lurk unseen beneath a 20-foot flood of water, and the maze that was a jungle overhead becomes an obstacle course swishing on the river's surface.

Committee for Pointing the Way

After a long day of traveling, the longhouse affords little rest for weary bones. The evening of arrival grows long with talk of rubber planting, fishponds, fruit trees, and gardens.

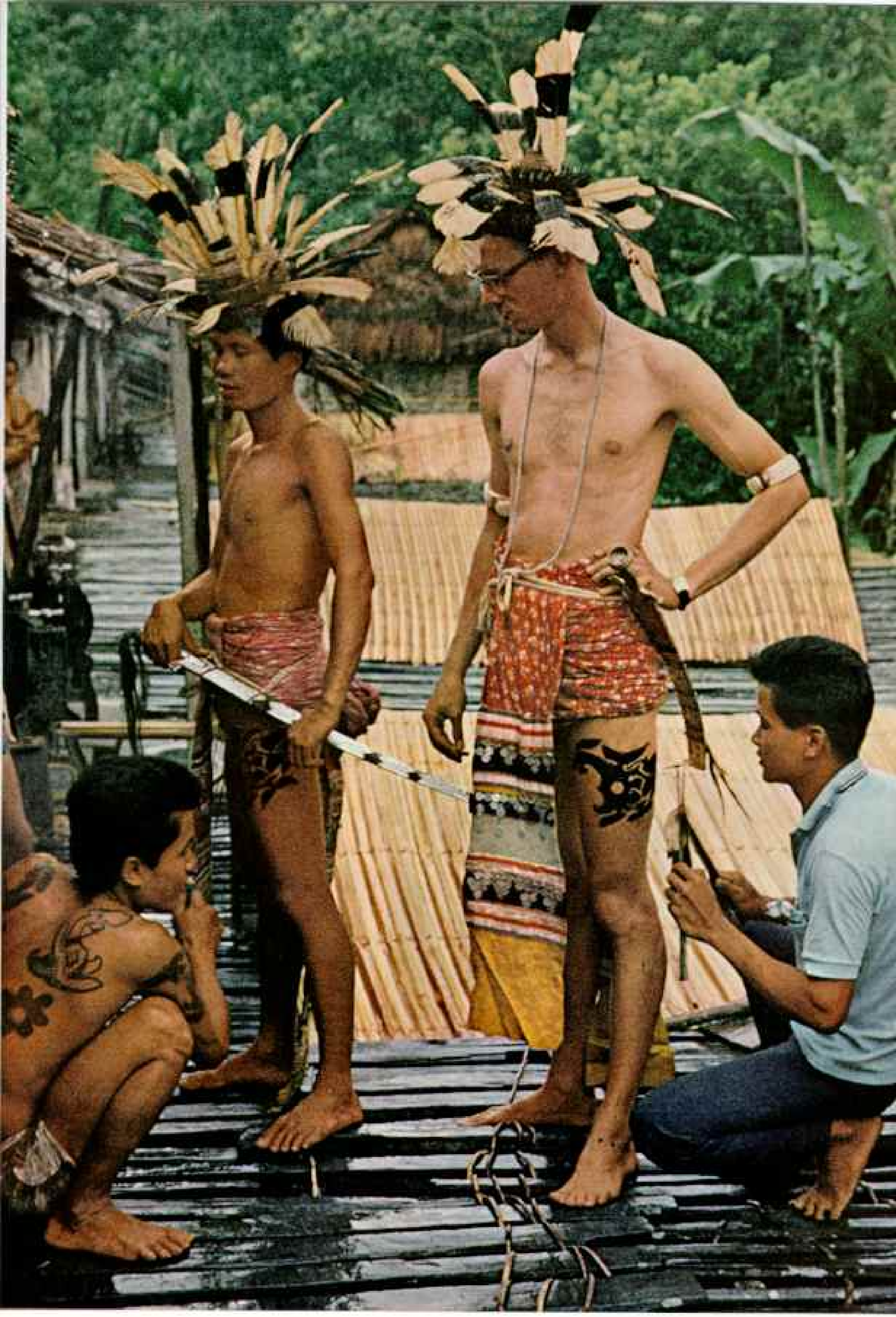
My work is supposed to be with young people, but the adults of the river have formed their club too. It is called the "Committee for Pointing the Way to Progress." Committeemen for 25 longhouses meet once a quarter to discuss new projects. Before a night's talk is over, I have made many promises, agricultural and otherwise.

One night I scolded an old man for letting his son quit school. He knew it was best that the boy continue, but in tears he replied, "I have no money." By morning I had given

*Since 1963 Sarawak has been part of the federation of Malaysia. Author Maurice Shadbolt described the infant nation and its Sea Dyaks in "In Storied Lands of Malaysia," NATIONAL GEOGRAPHIC, November, 1963.

Volunteer in Ceremonial Dress Samples Sea Dyak Tattoo Techniques

Ed Price, who urged Sarawak friends to cling to old crafts while learning new, shows his willingness to meet them halfway. He later scrubbed off the lamp-black designs. Swift taps of the artist's pin would have made the patterns permanent.



scholarships to the son and two friends in the same situation. Within a year they cost me a month's Peace Corps subsistence allowance.

When villagers finally let me go to bed, it is still not easy to rest. Bed is a bamboo floor five feet above the murk of the under-house pigsty, chicken pen, community dump, and toilet. Nightly the mangy dog packs trot the long porches where we sleep, and occasionally stop by for a friendly sniff and scratch. Light sleep is sometimes possible just prior to 5 a.m., the beginning of a new day.

People ask if life here is hard and strange. If ever I took time to think, things would seem hard and strange. But the day's tasks leave little time for thinking, and the Iban ways quietly become my own. By new definition, a floor becomes a bed, and rice a meal. Fifteen miles per hour becomes a reasonable speed for travel, and a loincloth is accepted dress for an Iban.

Some have also asked if the Ibans' law and customs interfere with my work. Often they have, but there have always been ways around the tribal taboos.

A young Iban chief once agreed with great reason and in the spirit of progress that he should try to plant a corn patch. Unfortunately, however, his best cornland was under an old curse. His grandfather had been told in a dream many years ago that anyone clearing the land would have a death in his family.

"But," the chief pointed out, "if you Christians are brave, you may do the clearing."

I did it, and no one died. Later, again in the spirit of progress, he told me, "Iban law is too hard to follow. Someday when my children finish school, I'm going to become a Christian."

Volunteer Pays Toll in Health

"You will not live here long," District Officer Bruen told me, "without falling in love with the Ibans." He proved right. It was ironic, for their land and culture have been rough on me. Or perhaps I've been heedless of too many rules of health. Muddy digging for a fishpond gave me one tropical disease; a year later, unboiled water gave me another. Now, near the end of my term, the reserve built up by training in Hawaii is gone. The Ibans say my bones have gotten soft.

It will be harder to leave here than it was to leave home to come here. Soon I will attend a Peace Corps end-of-service conference. My packed souvenirs will be sent, my plane ticket to Palatka, Florida, will be written, and I will start the three-day journey home.

Sarawak will become a memory of rushing water, tangled jungle, and wild rhythms. In vacant hours, streams I have traveled will wind into rivers. The tangled jungle will show paths I walked—and my determination to return to Sarawak will burn deeper.

Okra adds spice to the rice diet of the Sea Dyaks and helps the former "wild men" of Borneo improve their lives. Forested hills and coastal swamps leave them little farmland; new growing practices and better crops can free them from their struggle for food. Price taught the people to build chicken coops and to dig fishponds near their longhouses.

Furious paddling averts a dunking. Price and his companions fight to keep their *prau* from wallowing broadside as the boat teeters across a cataract on the Ngemah River.

Travel means adventure in Sarawak, where the highways are rivers and streams. In the rainy season, floods can smash boats to kindling. In low water, praus must be unloaded and portaged. Matted vegetation nourished by 150 inches of rain a year blocks traffic on foot.

Ecuador

By RHODA and EARLE BROOKS

UNTIL THE FINAL WEEK of our 20 months in Ecuador, Earle and I didn't realize what a townful of poor fishermen had done to us. That last week they descended on us in a daily deluge.

We couldn't even pack; the house was too full of people. We could do little more than sit and talk, put an arm around this one and that one, and cry a little.

About a dozen of them offered us their babies for adoption, to take back to the United States. "What do they have to look forward to here?" they asked.

To start adoption proceedings required only a few legal formalities. When we caught the plane, we were carrying two children (pages 312, 341).

I had half wanted to adopt Koki, our tiny three-year-old next-door neighbor, from the day I met him. Earle worried about it for more than 19 months. Then one morning during the last week, he sat up in our borrowed bed and said, "I guess we better go down and see if we can get a passport for Koki today."

That same afternoon, he took me completely by surprise: "I just picked out a two-year-old girl to go with Koki. I want you to come over to meet her and the family. I think it'd be a good idea to have two. We'd give too much attention to Koki, alone, back home. In six months he'd be completely spoiled."

In the town of Manta, on Ecuador's Pacific coast, our job was what the Peace Corps calls "community development." And I guess we really developed quite a few things, with the help of a few hundred wonderful, cooperative Ecuadorians: hot school lunches; first-aid knowledge; classes in dietetics, child care, carpentry, and mechanics; cleaner streets; garbage cans; and the first swimming classes ever taught in Manta (page 343).

Now we're developing a little Ecuadorian-American community of our own, back in the United States. Before this is published, we'll make our first 100-percent American addition to the Brooks family.

I shall never forget our first day as Volunteers in the field. Toward noon, the *bongos* came in. One by one, these hollowed-out log canoes with tattered sails landed on the beach. The fishermen, home after a night's work, pushed them up out of tide's reach. Carrying oars, they edged over to where we were cleaning out an old warehouse amid bamboo houses with thatched roofs.

They stared. Our brooms pushed out junk, filth, and dead rats by the dozen.

"Are you going to live *here?*" one old fellow finally asked.

"Yes, we'd like to," I told him. "Right here in Tarqui."

"But only the poor people live here on the beach," continued the fisherman. "The gringos"—he meant foreigners—"live over there in the *puerto*." He waved toward Manta, a fishing port about a mile away.

"That's where we're going to work," I said. "But we prefer to live with you here in Tarqui. It's so pretty along this beach, with the blue ocean and the fresh air."

Chattering children cluster about Rhoda and Earle Brooks during a stroll through Manta, on Ecuador's coast. Stilts hold houses high above livestock and crawling insects.

School lunch, only nourishing meal each day for many pupils, simmers on a homemade stove in Manta. The authors sparked community effort to set up the kitchen. CARE supplies the food.

Striped sail waves above a *bongo* as neighbors beach the craft beside the authors' home in

Simple school desk designed by Mr. Brooks will serve as a model for carpentry students at Casa del Obrero, House of the Worker. Donations and sale of class work support this shop in Manta.

Patio hootenanny finds Rhoda Brooks strumming her Manta-made guitar while three-year-old Koki Franco picks up the melody. Mr. Brooks made Koki's instrument from scrap in about five minutes; it became the boy's most cherished possession. The first song Koki learned from the Volunteers began, "At our house, we boil the water. . . ." Before returning to the United States, Mr. and Mrs. Brooks adopted Koki and two-year-old Carmen (page 312).

Tarqui, near Manta. The Brookses promoted regattas to brighten Sundays for the fishermen.

They grinned; their bronzed, weather-beaten faces crinkled with pleasure. A big broad-shouldered fisherman stretched out his hand: "My name is Mariano, and these are my sons. We will be glad to help you clean out and move into your house."

Change Begins in Local Neighborhoods

Once installed in our house, we spent days in town getting acquainted with officials of Mantan community life. How could we aid or add to their civic projects? What new ideas might benefit their people?

These officials and, later, the people who live in the *barrios*—the districts of the town—gave us a welcome to match the one on the beach at Tarqui.

Soon we were going day and night. Earle plunged into teaching mechanics and carpentry at the Casa del Obrero, the House of the Worker. When founded, it had been patterned after a Philadelphia settlement house.

Some of our projects started slowly, with community meetings. Our first such meeting, typical of others that followed, was in one of Manta's 12 barrios, on the far edge of town. We walked down the dusty street, shading our eyes in the afternoon glare, looking for the house of the friend who had invited us. There was no tree in sight, no shade, no sign of human activity.

"Where are all the people for the meeting?" we wondered.

Pigs grunted in the filth beneath the houses, and a scrawny burro nosed for food in a garbage pile.

"Don Jorge! Señora Rhoda!"

Ecuadorians can't pronounce Earle's first name. Our friend Ramona used his second, George, waving us toward the house as children's faces popped up in her doorway. We climbed a ladder and walked cautiously across the split-bamboo floor.

"*Buenas tardes*," we greeted the only other

adult in the room, an old man in a hammock. Ramona offered us her one piece of furniture, a wooden bench, and we sat down.

Half an hour went by, then an hour. The old man in the hammock went to sleep.

"Will there be more people coming to the meeting?" we finally asked.

"Oh, yes, they'll be here soon," Ramona said.

Finally, a few people climbed the ladder, bringing benches and stools. Ramona introduced us: "These are our friends, *Voluntarios del Cuerpo de Paz*. They want to help us improve our barrio."

"We need a bulldozer or an automatic garbage collector to clean our streets," one man said. We could see he thought the Peace Corps was a high-powered, big-moneyed American aid program.

"We have no equipment to give you," Earle explained. "All we offer to do is help you find ways to clean up your barrio—if you really want to do it yourselves."

Waterfront roundup draws helping hands. When fishermen haul their nets on the beach at Tarqui, a crowd joins in the work. Their reward: fish for the family pot.

Bobbing on ocean swells, children practice floating under the watchful eye of Mrs. Brooks. Her swimming classes were the first held in Manta. Beach hotels entertain vacationers from inland Ecuador.

We did have one piece of equipment, a motion-picture projector. And we had a wonderful series of Walt Disney films on public health, narrated in Spanish. Next night, in the street, beside a heap of refuse, we showed a movie on flies: how they hatch in decaying garbage, how they carry disease.

Two hundred people came. Next day, men, women, and children of the barrio pitched in. Using a dozen rakes made of old boards and big nails, designed by Earle and built by the menfolk, they scraped together five truckloads of trash. The streets were spotless, and the people beamed with pride.

This, and cleanup programs sponsored by the town, had great results. When we arrived, Manta was in the midst of a bubonic plague epidemic; the flea-infested rats that carry the plague thrive on garbage. The disease has not yet reappeared. The streets have remained much cleaner than they were.

Sailing a Bongo by Starlight

Life in Manta was not all hardship and work. There was still some time for leisure. We bought an old dugout canoe, and our Ecuadorian friends showed us how to repair leaks with coconut husks, make a tiller, fashion a bamboo mast and boom, and sew sails.

Promoting weekend bongo regattas among the fishermen was great sport. It was also one of the treasured moments of relaxation we had. To be really alone, and yet to enjoy the beauty of our surroundings entirely separated from the flood of friendship and social activity that came with it, we often went sailing, just the two of us, in the dark, at midnight. We had only the lights of Manta and the stars to steer by.

Now we are in Minnesota, thinking about all of it again. We brought a bongo home with us, like the sailing canoe we used in Manta. No doubt it will often be loaded with Ecuadorian and American youngsters as we push off for an evening sail on our lake.

And sometimes, I am sure, when it is dark and quiet and the children are asleep, we shall imagine we can see the lights of Manta. Both of us hope that one day we shall. THE END

Misty eyes and a warm embrace mark Rhoda Brooks's farewell to Manta. The couple left cleaner streets, a stronger community spirit, new friends for the United States, and lively children who might have died without help.

History Revealed in Ancient Glass

By RAY WINFIELD SMITH

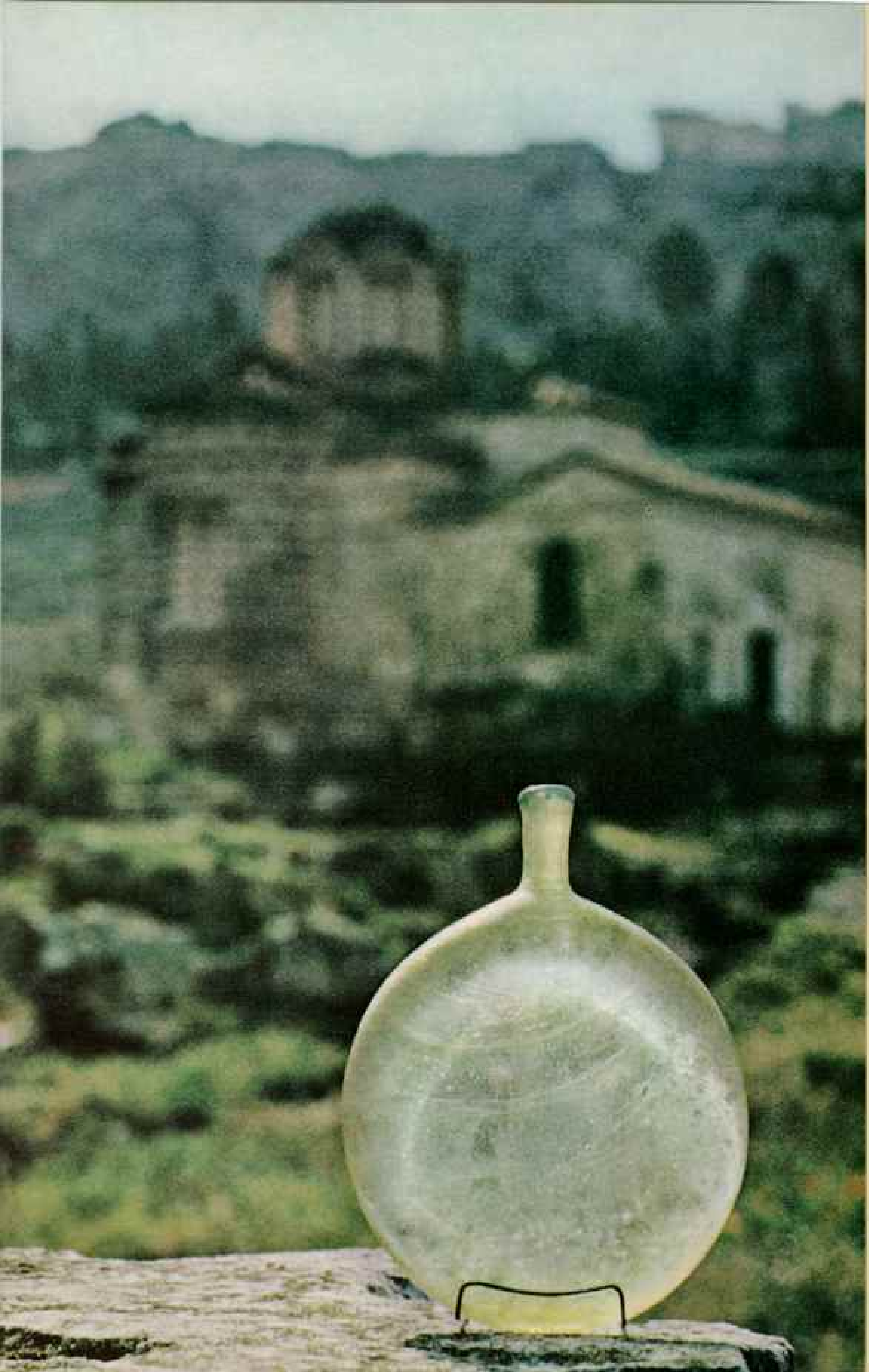
TIME AND AGAIN over the past decade I have packed up the tools of my adopted trade—small hand drill, special micrometers, a miniature centrifuge, a pocket magnifying glass—and have taken to the air for Europe and the Near East.

"Where are you off to now?" my wife has patiently asked, as she has put some shirts and a spare suit in my travel case.

"Tunis, Alexandria, Baghdad, and Tehran," might have been my answer, or on another

Perfume vial, 5¼ inches tall, overlooks the Agora, market place of ancient Athens, where it was found by the American School of Classical Studies. It has not yet been subjected to modern atomic analysis, which is revealing much about the makers of early glass, their craftsmanship, and their commerce.

ROADRUNNING BY LEE R. BATTAGLIA, NATIONAL GEOGRAPHIC STAFF © N.G.S.



Flesh-tone crust—an accident of time and decomposition—cloaks this corroded glass torso of Aphrodite. The 3¾-inch figure of the love goddess, believed to be the work of a Roman or Alexandrian artist about the second century A.D., reflects the glory of classical Greek sculpture. Pressed in a mold, the figure was finished on a cutting wheel. The Corning Museum of Glass, Corning, New York, acquired it from the author.

SOLID GOLD RINGS hold gemlike medallions in a priceless plate, called the Cup of Chosroes I for a sixth-century A.D. Persian king. Winged horses support his throne. The dish once was known as the Cup of Solomon, in the belief that it portrayed the Biblical monarch. The Bibliothèque Nationale in Paris displays the 11-inch ornamental vessel.

occasion, "Rome, Athens, and Cologne," or "Istanbul, Damascus, and Beirut." My trails have formed a web from London to Afghanistan and from North Africa to the Rhineland.

Despite the strange gear in my luggage, I have no sinister purpose—I am neither a spy nor an international jewel thief. These gadgets have been essential to my search for new knowledge of the past.

From museums, from private holdings, from cathedral treasuries, and from archeological sites, I have brought back samples and fragments of ancient glass. My purpose has been to further a scientific research program. During the same period I have acquired intact objects, frequently of fabulous beauty, for my own private collection. But the vanity of acquisition has always been subordinate to the pride of scientific discovery.

Examined by modern techniques, including atomic analysis, these glass materials have pried loose secrets of a major industry of antiquity, revealing information fascinating to scholar and layman alike. As a result, new windows have opened on events of long ago.

From study of ancient glass, we have rediscovered lost trade routes. Clear patterns for exchange of goods in antiquity throughout the Near East have come to light.

For instance, our research has furnished new evidence that far-reaching communication by coasting ship and cross-country caravan linked the Mediterranean and the heart of Asia almost 2,000 years ago. We have learned that it evidently was not unusual for merchants hundreds, even thousands, of miles apart to buy glassware from the same maker, or for artisans separated by like distances to

TUNGSTEN-CARBIDE DRILL grinds a bit of powder from the base of an Egyptian glass hippopotamus goddess of about the sixth century B.C. Such samples, collected from hidden parts of precious antiquities, undergo examination in spectroscopes. When burned in a carbon-arc flame (left), the glass dust reveals its chief ingredients. Knowledge of the elements in a glass helps show its age and origin.

Broken first-century Roman drinking vessel, found in London after World War II, is in the Guildhall Museum. Spectroscopic analysis showed high antimony content, typical of glass produced from the sixth century B.C. to the fourth century A.D. in lands under Greek and Roman rule.

At Brookhaven National Laboratory on Long Island, chemist Dr. Edward V. Sayre (right) prepares to introduce a vial from the author's collection into the atomic reactor. Neutron bombardment will make certain atoms radioactive without harming the specimen. Analysis of these radioisotopes reveals each element in the glass.

order ingredients and "ingot" glass from a common supplier.

Our research has brought new awareness of the technical skill of the ancients and the sophistication of their glassmaking. We have analyzed pieces of layered, multicolored, sculptured, and mosaic glass that the most modern factories would be hard put to duplicate—if indeed they could match them at all.

Atomic Methods Probe the Past

Most important, perhaps, our analysis has established a new classification system for glassware from antiquity. This system will help to establish dates and places of origin for new finds of ancient glass.

How has all this been achieved? Often it has begun far from home, as I touched my hand drill to some historic or otherwise significant piece of glass. This miniature electric drill is used to extract samples from intact glass pieces. In the case of valuable objects, the specimens are removed—with proper permission, of course—from places where loss of a mere mite of glass could leave no visible flaw.

After obtaining my samples, I have taken them to Brookhaven National Laboratory on Long Island, operated for the Atomic Energy Commission by Associated Universities, Inc. Brookhaven is a leading American center for fundamental nuclear research.* I delivered the minute samples in envelopes and small packets to my colleague, Brookhaven chemist Dr. Edward V. Sayre.

Since 1955 this Brookhaven scientist has been carrying on a study of ceramics and metals from antiquity. My attention fastened on his pioneer program because I myself have been a student and collector of ancient glass for 35 years. This experience became my passport to a partnership with Ed Sayre in a research program on ancient glass. Dr. Sayre has planned and directed the analysis with all the wizard equipment of Brookhaven at his command. My job has been to provide the glass samples.

We have now analyzed some 450 examples of ancient glass. Our study spans 27 centuries of the glassmaking industry, beginning with the first Egyptian flasks and goblets of about 1500 B.C. The cutoff point is the end of the 12th century A.D., when glassmaking entered its modern era, to my mind, with the rise of the Venetian glass blowers.

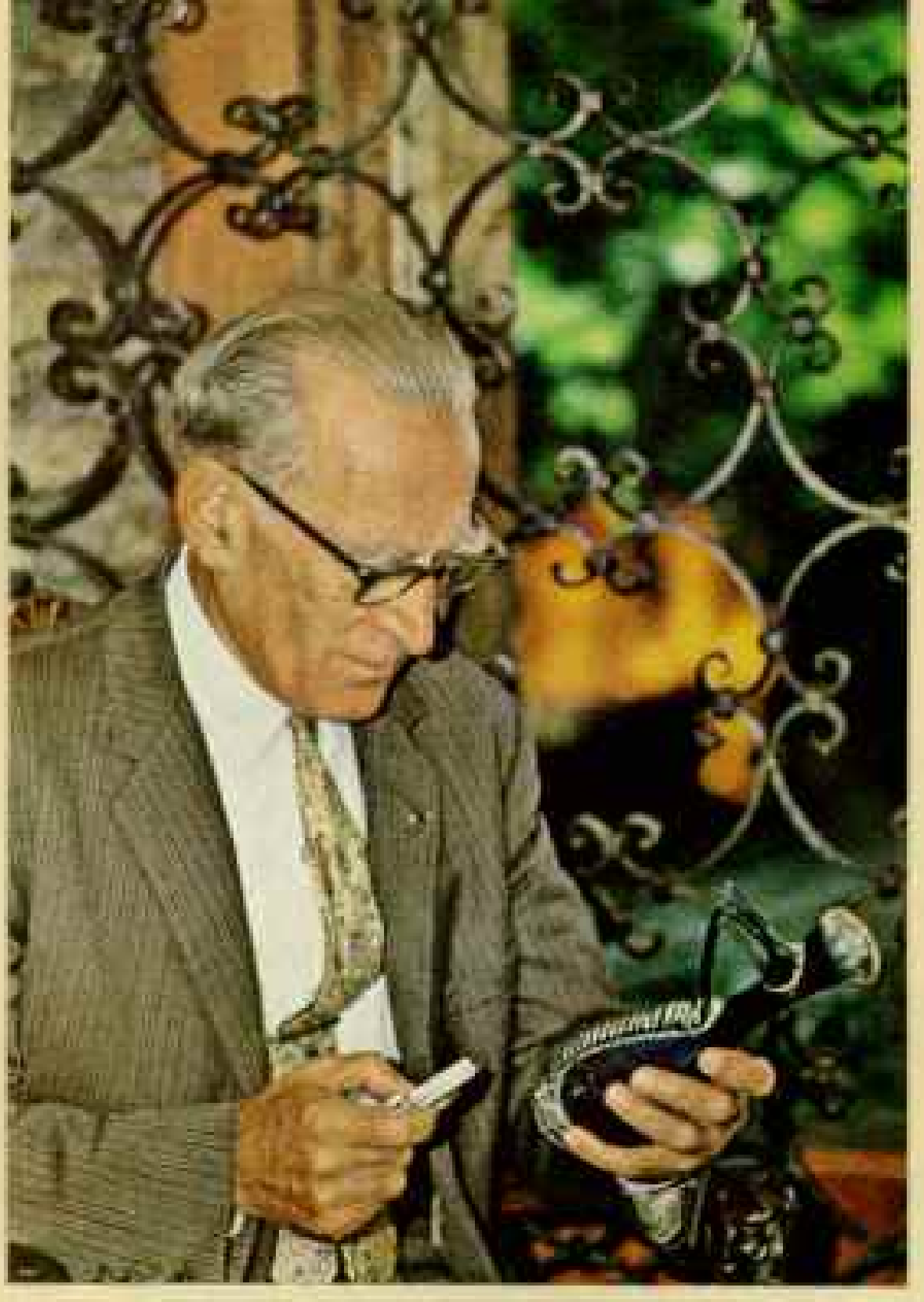
What kind of discovery has our study yielded? For one thing, we have gained new insights into the background of historic and revered objects.

On an illuminated pedestal in the museum of the Cathedral of San Lorenzo in Genoa, Italy, reposes a stately cut-glass bowl venerated for centuries as a sacred relic of the Crusades (page 362). Generations have called the vessel Sacro Catino—Holy Grail—in the belief that Christ used it at the Last Supper.

Genoese seamen claimed the Sacro Catino as part of the spoils of battle after the sack of Caesarea in 1101. The superb object was taken to Genoa and deposited in its cathedral. For centuries, the transparent green bowl was believed to have been cut from one enormous emerald. Taken to Paris during Napoleon's time, it was broken—no one knows how—and came back to Genoa in 1816 in pieces.

I have long admired the Sacro Catino and

*See "You and the Obedient Atom," by Allan C. Fisher, Jr., National Geographic, September, 1958.



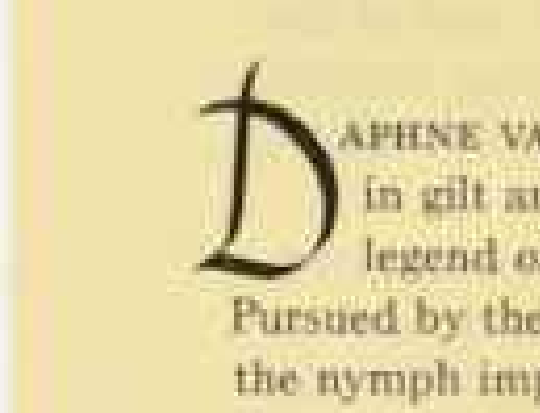
The author, holding a magnifying glass, examines a pitcher from Roman times in his Dublin, New Hampshire, home. During years abroad as businessman and diplomat, he assembled the world's finest private collection of ancient glass—1,500 objects and countless fragments. Now he serves as chairman of the International Committee on Ancient Glass.

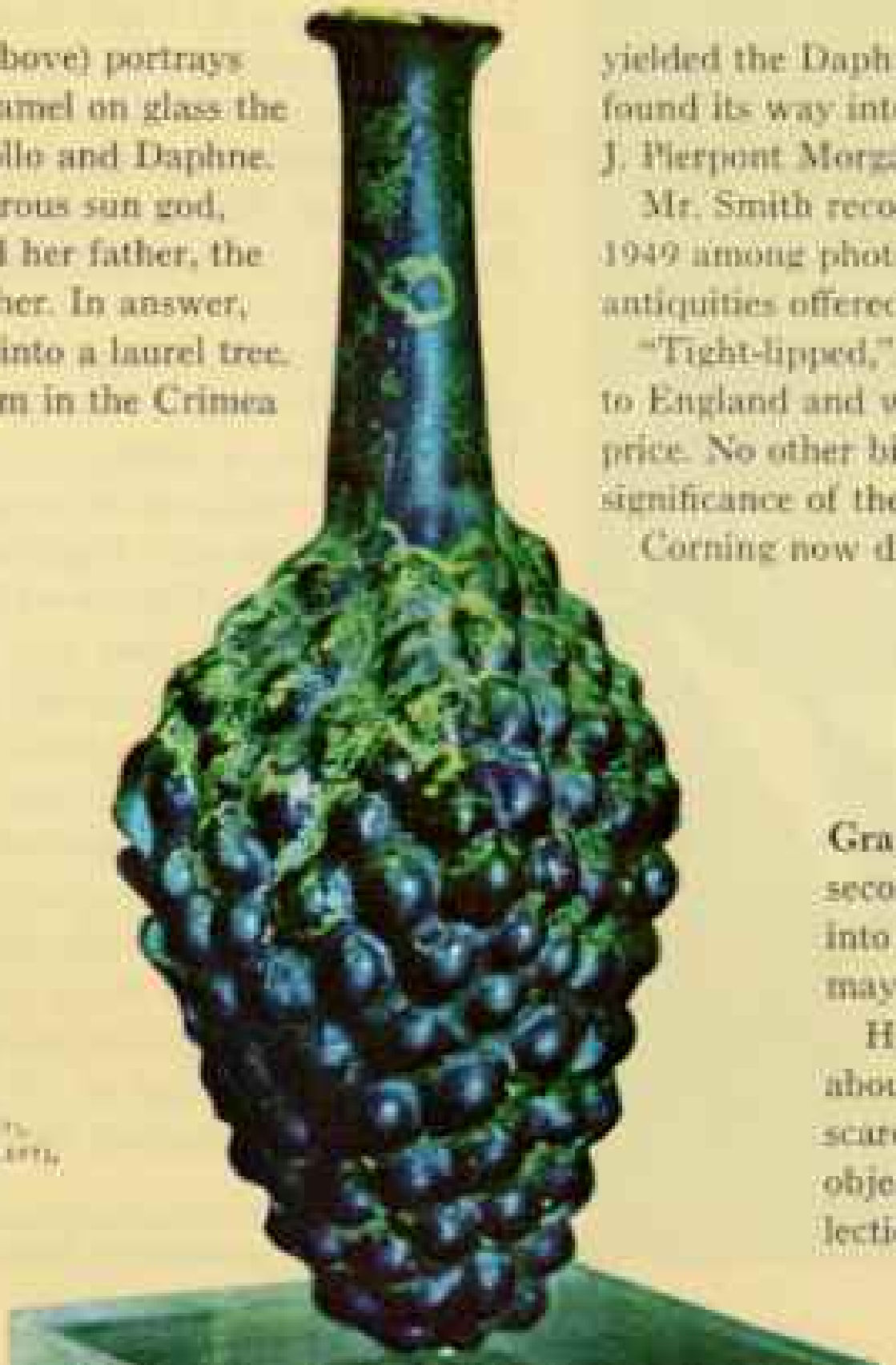
DAPHNE VASE (above) portrays in gilt and enamel on glass the legend of Apollo and Daphne. Pursued by the amorous sun god, the nymph implored her father, the river deity, to save her. In answer, he transformed her into a laurel tree. A Roman mausoleum in the Crimea yielded the Daphne treasure. In 1908 the vase found its way into the collection of financier J. Pierpont Morgan. It soon vanished.

Mr. Smith recognized the long-lost prize in 1949 among photographs of run-of-the-mill antiquities offered at auction in London.

"Tight-lipped," he recalls, "I flew at once to England and won the prize at an absurdly low price. No other bidder realized the identity or significance of the masterpiece."

Corning now displays the 8¾-inch vase.





Grape-cluster flask of the second century A.D. was blown into a mold. The 6½-inch bottle may have been made in Syria.

Head of a bearded Roman, about the third century, is scarcely an inch high. Both objects from the author's collection are now at Corning.

EVE E. BATTAGLIA (UPPER RIGHT), R. ANTHONY STEWART (UPPER LEFT), J. BAYLON ROBERTS (ABOVE), AND D. BAILEY © N.G.S.

have repeatedly studied it. With the generous collaboration of local church authorities, I obtained a mere crumb of glass from the vessel. At Brookhaven, Ed Sayre analyzed it.

Ed had previously found that Roman glass of the time of Christ consistently contained close to one percent of magnesium oxide and averaged less than one half of one percent of potassium oxide. But the Sacro Catino showed about five times too much magnesium and four times too much potassium to fit the Roman recipe.

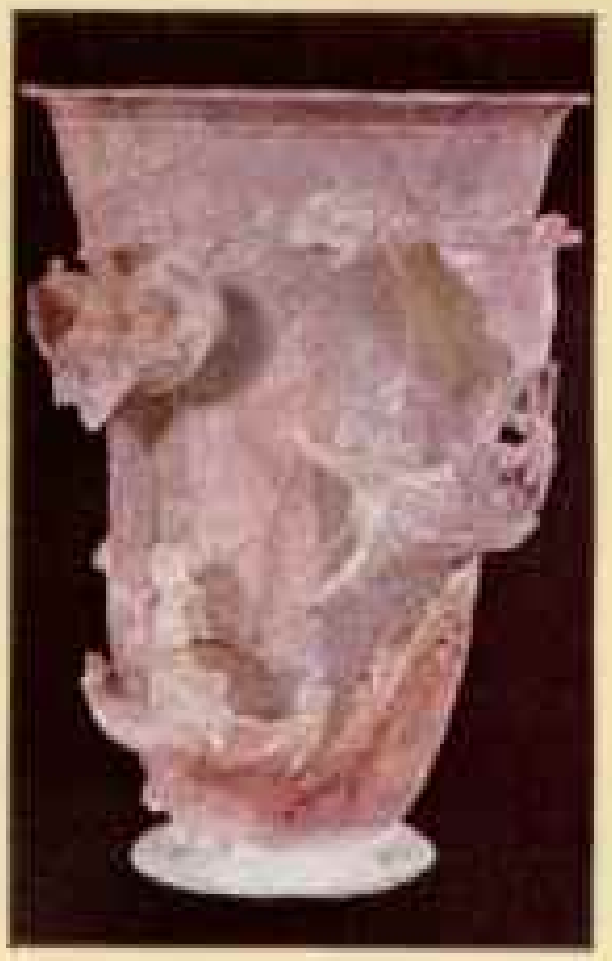
At the time of Christ, to be sure, glass with these proportions of the key metals was manufactured in areas far to the east of Palestine, specifically in the ancient fertile valleys of Mesopotamia. To the west, however, only one among 250 specimens of glass produced during the period of the ancient Roman Empire showed the same chemical make-up as the cherished bowl. The Sacro Catino's composition proved typical, though, of glass made in Palestine in early Islamic times, a period centuries after Jesus' lifetime.

It must be added that stylistically this superb piece has strong affinities to Islamic glass, but little to known Roman ware of the time of Christ.

The analysis, in my opinion, indicates the Sacro Catino most probably was made much too late for Christ's hands to have held it. Here is one case where impersonal technological tools have not confirmed a reverent, long-established tradition. But we know that we now have means of gaining a clearer understanding of the origins of historic objects.

Even highly discriminating chemical analysis, however, cannot give black-and-white conclusions of 100-percent assurance. Much of what we have learned inevitably lies in the light-gray area of high probability.

Our sleuthing-through-chemistry has re-



SEA GOD POSEIDON, carved on a 1,700-year-old beaker, surmounts a wonder of the ancient world, the Lighthouse of Alexandria (right). Boats ply the opposite side (above). These scenes imply that the 7½-inch-high object was fashioned in Egypt, though it was found far to the east, in Begram, Afghanistan. From Brookhaven's analysis, the author considers it more likely that it was made in the upper Euphrates Valley. The Kabul Museum in Afghanistan exhibits the Begram diatretum.

CATACOMBES BY JAMES CURREY © NATIONAL GEOGRAPHIC SOCIETY

LUSTROUS as an opal, a ewer of the early Christian era rivals the rainbow. Sheen results from corrosion of the glass in microscopically thin layers during centuries of changing temperature and humidity. Diffracted light gives rise to spectacular color effects. The 5¼-inch ewer, probably Syrian, belongs to the author.

emphasized the frequency, if not the ease, of ancient travel to central and southern Asia. Consider, for example, the evidence for far-reaching cultural exchange which we obtained from the magnificent Begram diatretum (preceding page), a sumptuous object excavated in distant Afghanistan.

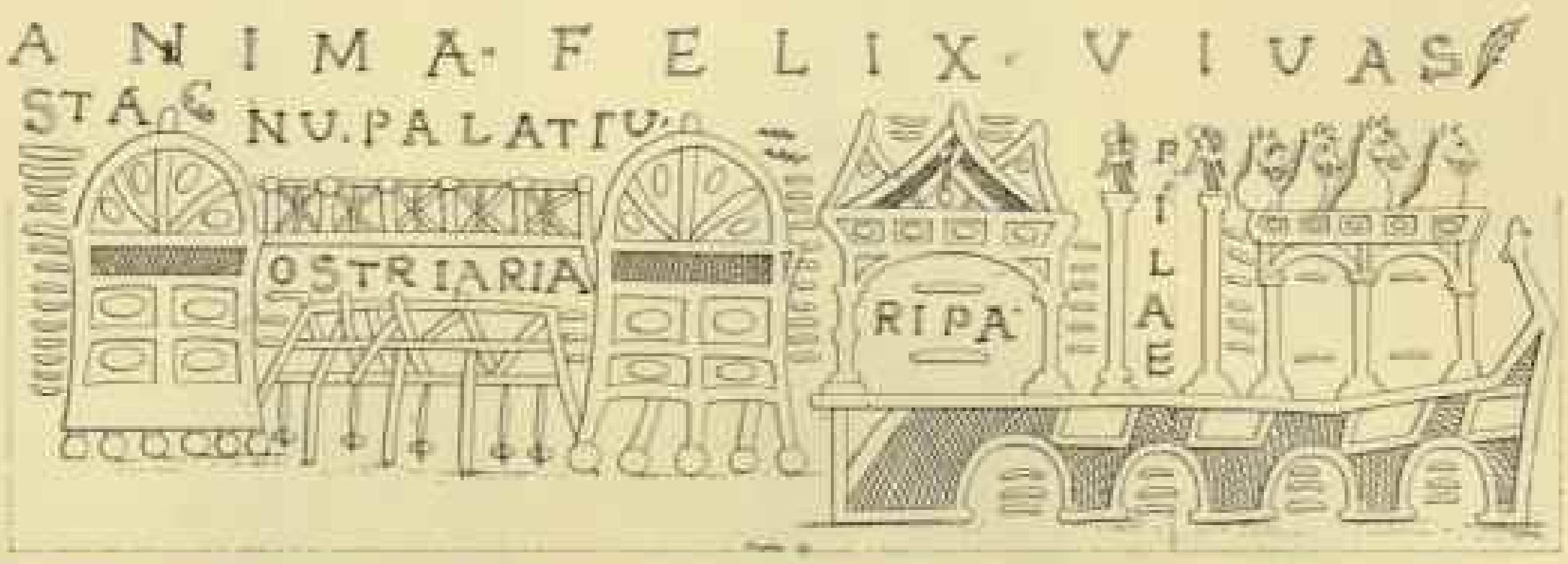
A small group of vases and buckets called diatreta, or cage cups, are among the most remarkable glass treasures from antiquity. We don't know specifically where any of them were made. The Begram piece—with a more elaborate decorative design than any other diatretum—has long posed a special paradox.

A craftsman of 17 centuries ago carved the vase to show the Pharos of Alexandria in Egypt, the lighthouse that was one of the Seven Wonders of the Ancient World. This colossal mariners' beacon, topped by a huge statue of Poseidon, stood some 400 feet high. The design, of course, would suggest that the massive cup was fashioned at or near Alexandria. The piece could have reached Begram, 2,400 miles east of Egypt, as a commissioned work of art or as a royal gift.

At Begram, cradled beneath the snowy Hindu Kush in Afghanistan, French archeologists in 1937 excavated the ruins of a summer palace built by King Kanishka. Breaking into a sealed chamber, the diggers uncovered an extraordinary treasure of ancient ivories, bronzes, and glassware. Of glass alone, scores of exquisite objects and fragments were found, including the diatretum.

From the Kabul Museum in Afghanistan, where the vase is now exhibited, I was permitted to bring back to Brookhaven a tiny sliver from the Begram diatretum. Ed Sayre found this and seven other Begram glasses to be high-antimony ware of a type well known in the Roman world. From Afghanistan, however, we know of no other antimony glass.

There is a chance, but a very slim one, that the Begram diatretum was made in central Asia. We have no firm evidence, though, of the existence there of a glass industry



KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

BROOKHAVEN TECHNICIAN adjusts a Corning Museum treasure for X-ray bombardment. Elements in the famed fourth-century Populonia bottle will fluoresce at varying wave lengths and reveal its composition. Found in an Italian tomb at Populonia a century and a half ago, the engraved vessel pictures the luxurious Roman harbor resort of Puteoli, near Naples.

Woodcut of 1812 (above) reproduces the bottle's Latin greeting, *Anima felix vivas* (may you live a happy life). Labels, some misspelled, identify waterfront features: *stagnum* (pool); *palatium* (palace); *ostrearia* (oyster beds); *ripa* (shore), and *pilae* (pillars).

CARVED AND ENGRAVED glass vessels in the Corning Museum's display of Islamic ware date from the eighth to the twelfth centuries A.D. The museum, south of the Finger Lakes, houses thousands of fragile relics of the past as well as examples of modern glass. Five thousand pieces on permanent display range from a 3,300-year-old Egyptian amphora to the first casting of the 200-inch mirror for Palomar Observatory's Hale Telescope. Corning's Glass Reference Library contains 10,000 volumes.

EKTACHROME (ARCHIVE)

capable of producing such elegant objects. Far more probable is that the diatretum came to Afghanistan from the west. Stylistically, this glass bears a certain resemblance to Syrian objects.

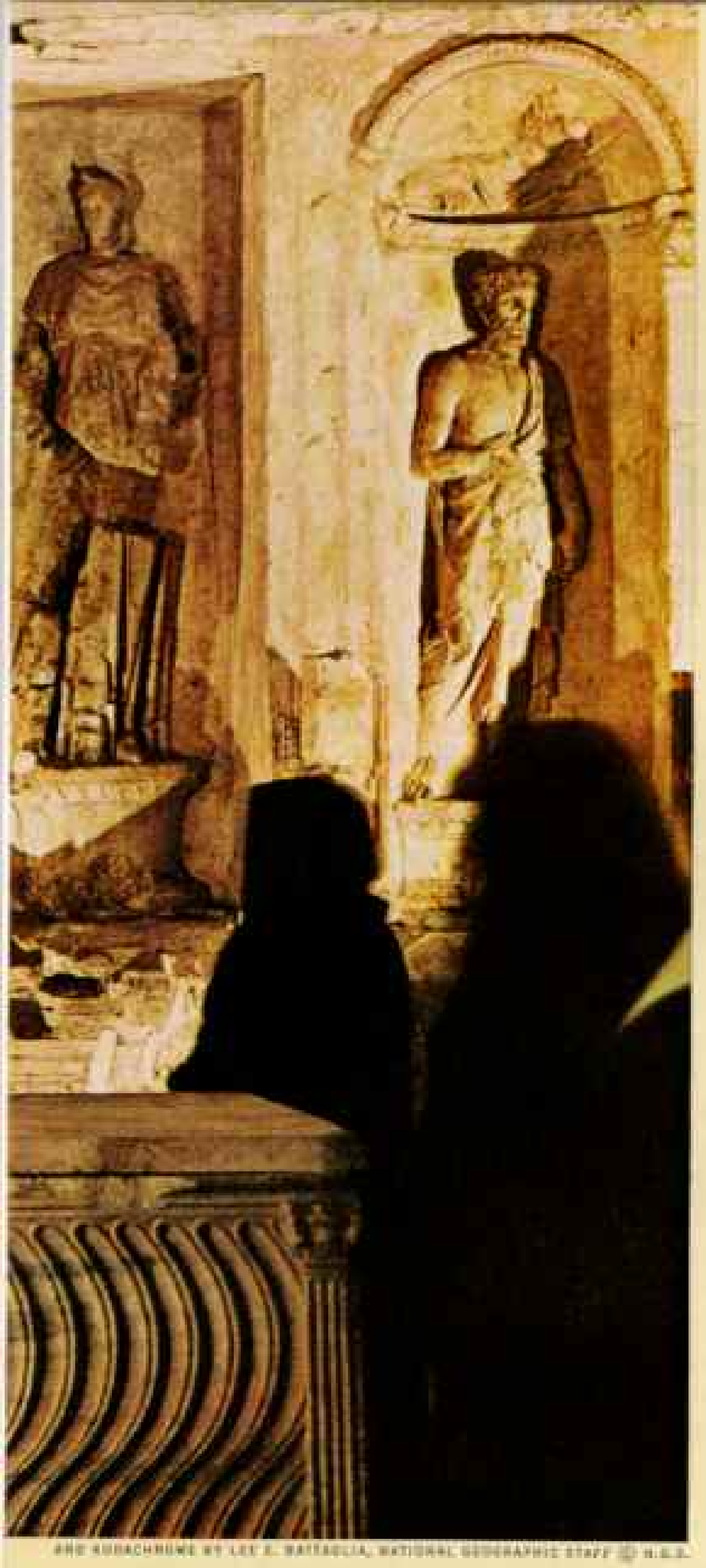
Despite the scene of Alexandria, I suspect that the diatretum originated in the upper Euphrates Valley, a region known to have produced antimony-rich glass. Glassmakers in antiquity were an itinerant group. An Alexandrian could well have fashioned the diatretum after moving eastward to the Euphrates.

Whatever the answer to the puzzle of the diatretum's origin, the Begram cup shows us the long reach of trade and travel in the early Christian centuries. The Empire of Parthia, bitter enemy of Rome, lay astride the land routes, though probably not totally obstructing them. But there was, alternatively, the well-established Roman sea route along Arabian shores eastward from Egypt, then out across the Arabian Sea to the Indus River.

Tools of a Glass Sleuth's Trade

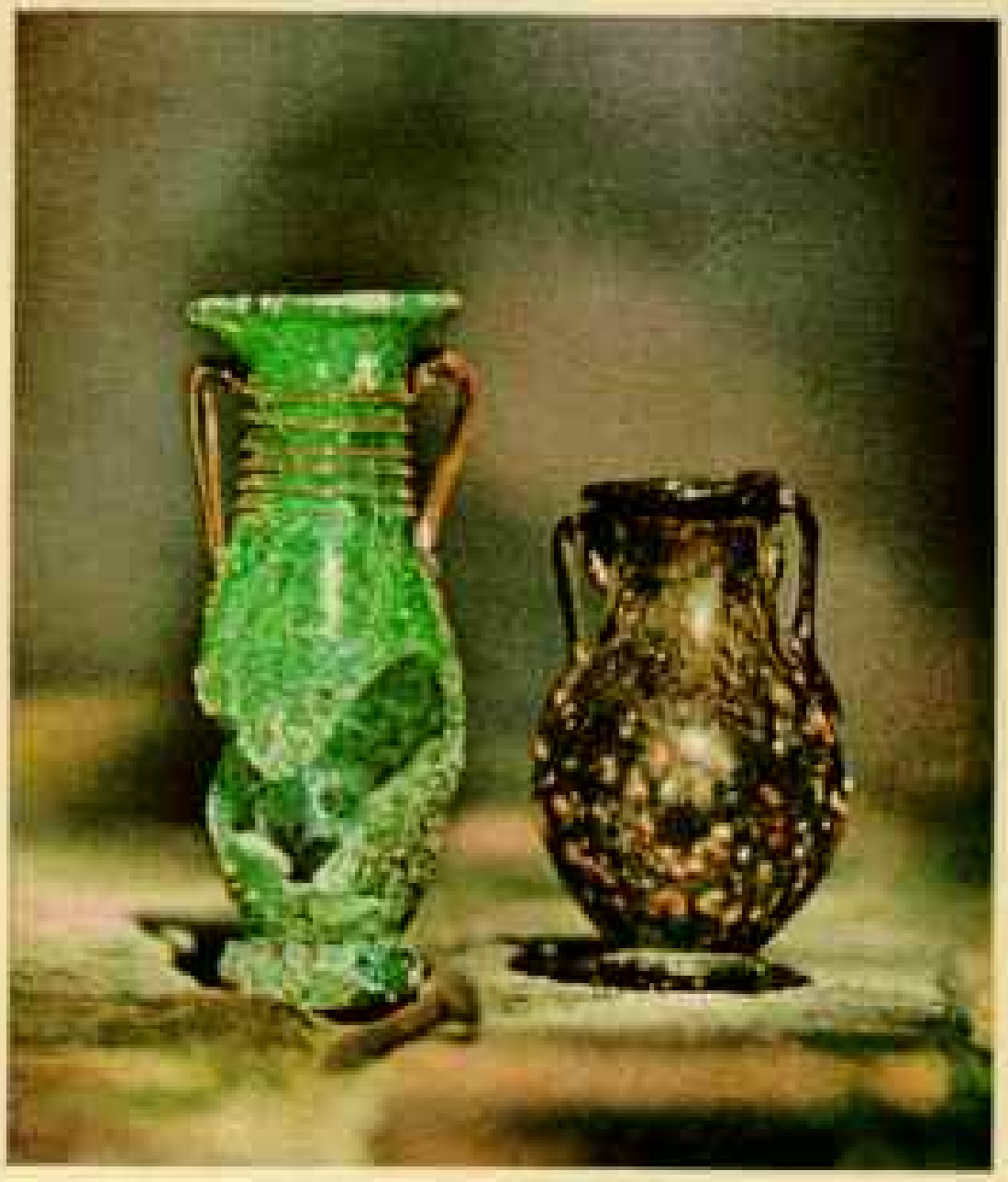
The amount of glass needed to analyze a treasure such as the Begram diatretum is minute indeed. A few-score milligrams of powder, not enough to cover half your little fingernail, are more than ample. Of course, I always remove specimens from a hidden part of the object—from under the base, the inner surface of a handle, or behind a lip or ridge.

Recently, I've been using a tungsten-carbide drill that rotates very fast. It removes



STUCCO FIGURES line the walls of the 1,800-year-old mausoleum of the Valerii, a wealthy Roman family, directly beneath St. Peter's Basilica. Outline of the vanished central sculpture suggests the sun god Apollo. Nuns, blurred in a time exposure, move about a marble sarcophagus in the lavish chamber.

Perfume vials found here during excavations beneath St. Peter's between 1939 and 1950 tend to bear out the Roman Catholic belief that the grave of the Apostle Peter lies below his basilica. Analysis of the three- and two-inch bottles shows components typical of glassware produced in the first century. Church tradition holds that St. Peter died a martyr's death in Rome about A.D. 64.



AND KODACHROME BY LEE R. MARTAGLIA, NATIONAL GEOGRAPHIC STAFF © N.G.S.

glass powder with no dangerous pressure against the object (page 350).

With the drill, I sometimes use a little suction-powered centrifuge that assures collecting practically 100 percent of the sample. As the powder flies from the drill, I suck through the implement and centrifugal force whirls glass particles into a collecting pocket.

The first analysis of glass at Brookhaven, when a sample is expendable, is normally by spectro-chemical means. A few milligrams of the specimen—a mere wisp—are burned in a spectrograph (page 350). Light from the vapors of the burning glass is projected onto a grating and then focused on a photographic plate. The grating breaks up the light into components of individual wave lengths produced by elements that compose the specimen.

Frequently it is better to use X-ray fluorescence equipment, which allows an entire glass object to be analyzed. The glass specimen fluoresces under beams of X-rays, and each element within the sample emits its characteristic radiation. Using counters, Dr. Sayre reads the quantity of certain elements by the relative strengths of their emissions.

Analysis by X-ray fluorescence is essentially nondestructive. The same material may be measured over and over again; a sample need not be removed from the object.

To probe even deeper into the character of ancient glass, Ed Sayre has turned to the nuclear reactor itself. He has put specimens inside the reactor, withdrawing them after a

few minutes. Exposure to the blizzard of neutrons in the reactor causes no visible change within the glass.

Neutron bombardment, however, changes the structure of a minute fraction of the atoms of many elements in the sample. The new forms, radioisotopes, lose radioactivity on an individual timetable of decay, each with the emission of characteristically different radiation. Modern counting devices permit us to separate these different radiations and to count their intensities individually. The radiation intensity from an isotope indicates the scarcity or abundance of the element.

Neutron activation, as this technique is called, can detect and measure quantities of elements as minute as a few parts per million million. This is an amount expressed by a decimal number in which 11 zeros precede the first digit. Neutron activation is one of the few methods of sufficient sensitivity to measure the rare earth ingredients of glass, such metallic elements as cerium, europium, lanthanum, yttrium, scandium.

Chemistry Unknown to Ancient Artisans

The ancients of the Mediterranean and the East were intelligent and practical people. Yet when I speak of cerium and lanthanum, of antimony and manganese, of lead oxides, soda, and lime, you must not think that the artisans of those times understood the chemistry of these ingredients as we do.

Identification of elements and compounds lay far in the future. Industrial chemistry in antiquity, though tremendously impressive, was strictly a trial-and-error affair. Glassmakers simply knew that certain substances in nature—in rock, sand, earth, or ashes—gave special properties to their products.

"That yellow rock you brought in from Phoenicia last time was just the thing," a glassmaster might remark to an arriving mariner, holding up a bowl fresh from the oven. "And see what a sparkle that sand from the mouth of the Belus has given this wine glass."

One would be tempted to conclude that the ancient glassmaker's lack of true chemical knowledge was a severe handicap. Actually, through endless experimentation, these pioneers were able to develop incredibly sophisticated glassmaking techniques, fully understanding the results if not the causes.

For our program, Ed Sayre and his helpers needed from me an extensive series of specimens, a good cross section of ancient accomplishment. Analyzing these samples would establish the chemical ingredients of ancient glass from a wide selection of sites and periods. The work has thus provided a background of knowledge against which specimens can be compared in the future.

In the Brookhaven program, a glass specimen should bring with it a clear archeological origin. It should have been excavated by trained archeologists. It should be the property of a responsible institution and bear an acquisition number.

We at first preferred that it be an object of clear, rather than colored, glass. We favored colorless glass because we thought that the oxides added to impart a desired color might inject complicating variables. As it turned out, however, some of our colored samples have given us more and better information than many of the clear ones.

Ideally, a specimen for analysis should come from a complete piece or from a fragment large enough to allow an expert to visualize the shape of the object and its decoration. But small fragments have yielded some of our most useful results.

"See these three fragments of Roman gold-band glass?" Ed said to me on a recent visit to Brookhaven. "One is from Pompeii, one has a doubtful origin—you bought it in Rome—and one came from Susa, the ancient city of Esther and Ahasuerus in Iran."

The pieces Ed held were of a fine type of first-century glass. They were remnants of vases, jars, or bottles made by an elaborate technique that produced a mosaic of colored bands, each band layered in an intricate way, and some of them holding flakes of gold leaf. The effect was kaleidoscopically rich.

Same Factory Made Far-traveled Glass

"We've found that the amount and kind of impurities which came along with the material added to give color are identical for each fragment," Ed told me.

The light blue bands were colored by copper, apparently introduced in the form of bronze; all three specimens had tiny percentages of copper, tin, and lead in almost the same ratios customarily found in bronze artifacts. We could picture the glassmaker melting down a chunk from an old and battered ornamental bust to give the right color to his glass mix.

What Ed reported indicates the strong probability that the three original objects came from the same factory. The fact that two of the pieces were found 2,000 miles apart shows how active in Roman times was the international trade in luxury glassware.

BAREBACK RIDER clutches his mount by the neck and glances backward in this detail from a 10¾-inch *situla* in the Treasury of St. Mark's Cathedral, Venice. Already centuries old, it was brought to Italy after the Crusaders' sack of Constantinople, A.D. 1204. Four bands of small circles of elegant workmanship once subdivided the lower section. Only a few remain intact. Other sumptuous glass and gold objects, many studded with priceless jewels, comprise St. Mark's Treasure.

Bacchanalian feast decorates another glass bucket that one expert has called the most beautiful ancient object in the St. Mark's Treasure. Frolicking amid garlands of grapevines, the man at left offers a bowl of fruit to his female companion. Here reduced in size, the silver-handled vessel stands nearly eight inches high.

My collecting journeys have made me familiar with many masterpieces of the ancient glassmaker's art. I have examined with awe the almost incredible fused mosaic plaques turned out in Egypt and in Rome during the two centuries bracketing the birth of Christ (page 363). I have been the privileged recipient of a tiny sample of the famed Portland Vase, a first-century cameo glass masterpiece which is certainly the single most celebrated glass object from antiquity (opposite). And I acquired for my personal collection under remarkable circumstances the lovely Daphne Vase (page 352).

Everywhere I went, a mutual interest in ancient glass gave me acquaintance, and often friendship, with extraordinary men.

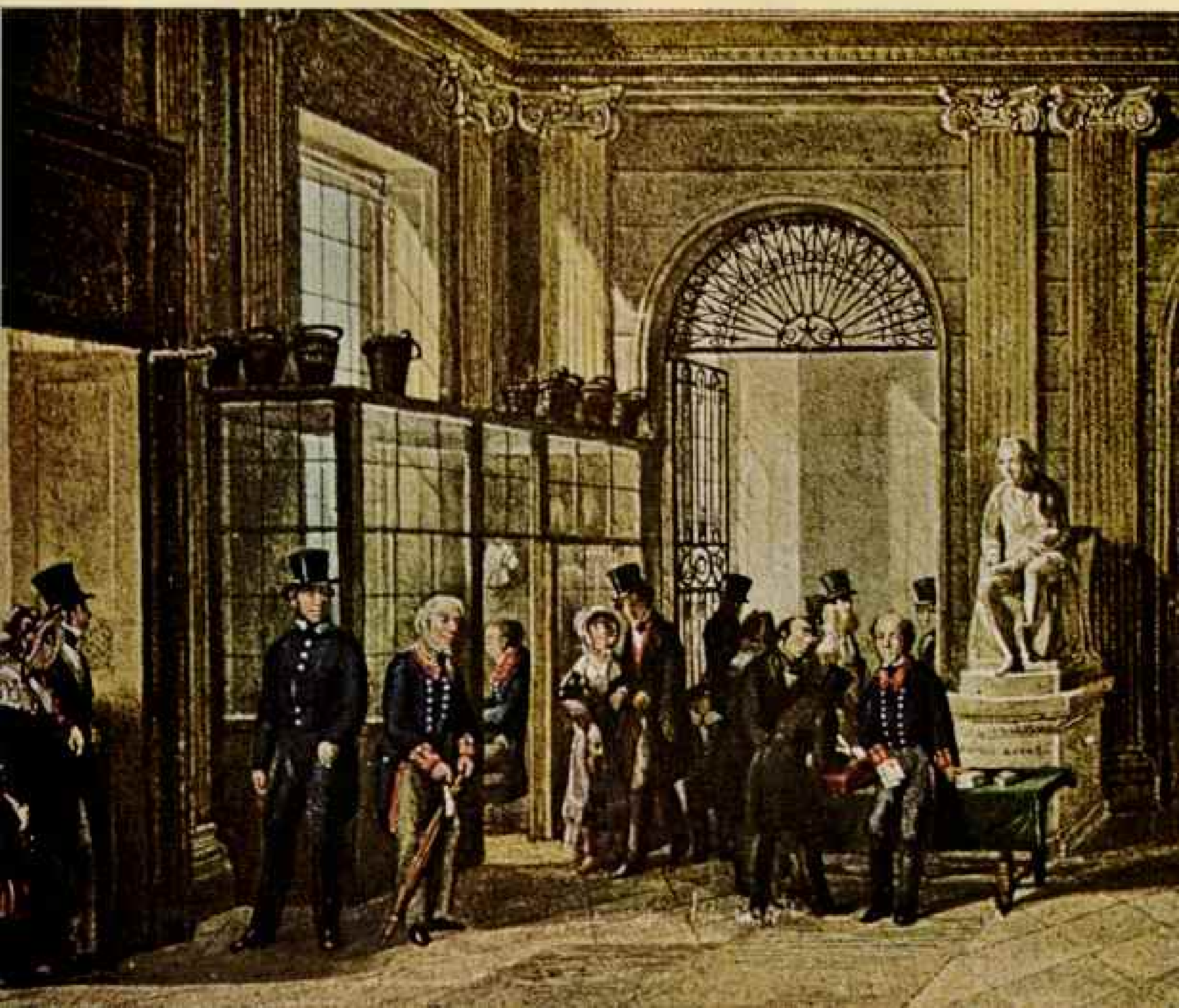
When the late Pope John XXIII was Cardinal Roncalli, Patriarch of Venice, he honored me with an audience in his palace adjoining St. Mark's Cathedral. The genial, merry-eyed man rose, strode across the room, and greeted me as if we were friends of long standing.

The Patriarch showed keen understanding of the promise of the Brookhaven program. He gave instant approval to my removing specimens from 18 glass objects in the St. Mark's Treasure, one of the most splendid groups of ancient glass the world knows.

Before escorting me out, the Cardinal turned to pick up his scarlet skullcap from a table. Typical of his informality was the remark, "You know, Mr. Smith, I mustn't by any means forget to put *this* thing on!"

Pictured on page 359 are two pieces from St. Mark's fabulous collection. These are just a portion of that rich booty of glass which the victorious Venetians brought back after the sack of Constantinople in 1204.

The elegantly sculptured bucket portraying a Bacchanalian feast may have stood on the shelf of a Byzantine emperor's salon. The old-time artists in glass were skilled in bringing their scenes to life: What a vigorous feeling of action animates the chase on horseback carved on the sumptuous greenish bucket!



UNTIL February 7, 1845, the Portland Vase stood in the British Museum as an unblemished example of ancient cameo glass. On that day a visitor, seized with the urge to smash something, hurled a piece of sculpture and reduced the world-famous urn to bits.

The incredible incident took place in Montagu House (below), which then housed the museum; its stately entrance hall appears in this water color by the elder George Scharf. The scores of fragments were painstakingly gathered up and recorded in a painting (lower right), which poses a mystery. The central figure, fitted into the base when the vase was restored, later proved not to belong to it. That shard has been removed.

Produced between 100 B.C. and A.D. 100, no one knows where, the vase first came to public attention when the Barberini family in Rome acquired it in 1623. About 160 years later it passed into the family of the Duke of Portland.

To fashion the vessel, artisans overlaid dark-blue glass with white and then cut away the outer layer until only the design remained.

Not all important pieces are big and showy. Consider two little vials in the collections of the Vatican in Rome (page 357). They provide supporting evidence, in my opinion, that St. Peter could indeed have been buried in the place claimed by Roman Catholic tradition—under the remains of a fourth-century basilica and beneath the present St. Peter's that rose much later on the same site.

St. Peter was put to death A.D. 64 or soon thereafter. Very probably the Apostle was buried by fellow Christians in an inconspicuous cemetery on the city's fringe.

On a recent visit to Rome, I stood deep beneath the floor of St. Peter's with Signor Francesco Vacchini, an official of the great church, in the cold vault of the second-century mausoleum of a prominent Roman family, the Valerii. This once stood above ground, part of a row of ornate tombs.

"It is here," Signor Vacchini explained, "that we found the two perfume vials."

Building the Valerii burial chamber, workers may well have retrieved the pair of perfume bottles from older burials at the site. The vials, conceivably from St. Peter's own grave, could have been placed in one of the niches of the Valerii mausoleum.

Ed Sayre has analyzed the samples that Signor Vacchini allowed me to take from the perfume vials. They contained the antimony-manganese components found particularly in glassware of the second half of the first century, when St. Peter died.

The little bottles give stylistic support as well for belief that a first-century cemetery existed at this spot. They have looped handles quite unlike typical Roman handles. In the National Museum of Naples I recently discovered no fewer than 10 objects with the same distinctive feature. All came from Pompeii, which dates them firmly to sometime before A.D. 79. Pompeii, you recall, was buried by Vesuvius's eruption in that year.*

So our research has buttressed an ancient and devout conviction of the Church of Rome—that its mother shrine rises above the burial place of the Apostle Peter.

*See "Last Moments of the Pompeians," by Amedeo Maiuri, NATIONAL GEOGRAPHIC, November, 1961.

EXQUISITELY simple in design, the hexagonal Sacro Catino has been revered for centuries as the Holy Grail. Analysis indicates the bowl does not fit the usual formula for Roman glass of Christ's time but is typical of later Islamic ware. Acquired by Genoese sailors in Palestine during the Crusades, the vessel later was shattered; part of it is still missing. The Cathedral of San Lorenzo in Genoa, Italy, guards the 16-inch-wide relic. This is the first color photograph of it ever permitted.

Inlay head suggests the serene nobility of an Egyptian of 2,500 years ago. Originally opaque red, the 8-inch fragment now wears a green film of decomposition. It once perhaps formed part of a temple wall relief. Corning Museum displays the piece.

It is a great satisfaction to me that Pope John knew something of our research results, which had in part developed out of his personal breadth of vision, before his death in June, 1963. Flying to Rome, I had the privilege of summarizing our work in one of the final audiences His Holiness was able to grant a few weeks before he died.

Glassmaking Divided Into Eras

Over the years, as I brought samples back to Brookhaven, one goal always challenged us: to make an orderly classification of ancient glass. I shall never forget the day when Ed Sayre told me he thought that our work had finally brought this aim within reach.

"It seems that our jumble of miscellaneous data is finally falling into place," Ed told me. "Some of the lines in the picture still are fuzzy, but all our glasses appear to belong to just a few basic and distinct categories."

Over the ensuing months the pattern emerged more clearly, and our conclusions underwent more than one adjustment. But that day, as Ed showed me how order was coming out of chaos, I shared with him a real sense of victory.

Ed pulled out analysis graphs for several hundred specimens. Zigzags of colored lines showed the abundance of oxides of the metals magnesium, potassium, manganese, antimony, and lead. These elements have provided the most consistent guideposts for identifying the different glasses of antiquity.

Now, two years later, the evidence is in. According to chemical composition alone—although stylistic features often give corroborative proof—we can identify three major categories of ancient glassware, two of which subdivide into additional categories.

Almost all of our most interesting and informative pieces encompass two basic types of soda-lime glass. The first of these, in time sequence, is characterized by a high content of magnesium and potassium. This glass was produced around the eastern Mediterranean, predominantly in the second millennium B.C. and then, much later, in Islamic times (eighth to eleventh centuries A.D.)

In the Tigris and Euphrates Valleys and

NO WIDER THAN A POSTAGE STAMP, the end of a mosaic plaque shows half the head of a bearded man. "Such exquisite glass miniatures rank among the most astounding achievements in the history of glassmaking," says the author. Egyptian craftsmen and their successors in Rome created the delicate masterpieces in the two centuries bracketing the birth of Christ. To make the bars, they fashioned thin rods of glass and bundled them together with rods of contrasting hues. Fusing and drawing out the bundle formed a long "cane" in which the built-in pattern ran from end to end. Artisans cut the hardened cane crosswise, like a jelly roll, probably with a metal blade and abrasive sand. Individually, or paired with identical but reverse designs (lower), the thin, polished slices served as inlays for furniture and jewelry or cosmetic boxes. Such inlays formed a major part of the early glass industry, which can be traced to 3000 B.C., when glazes of true glass were manufactured in Egypt. The Smithsonian Institution's Freer Gallery of Art in Washington, D. C., owns this example.

EXTACHROME (LEFT) BY ALDO BATTAGLIA AND KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS B. ANTHONY STEWART (CENTER) AND THOMAS NEBBIA © N.G.S.

farther east—in fact, all the way to India—the traditions of glassmaking, like customs in general, were slow to change. Quite a few finds give sharp evidence that manufacture of this "old-fashioned" high-magnesium glass continued at least in some Mesopotamian centers throughout the whole 27 centuries of our study period.

The contrasting type of soda-lime glass, low in magnesium and potassium, characterized production in ancient Greece, Rome, and Persia for more than 1,500 years, from the sixth century B.C. to at least the tenth century A.D. This category we subdivided on the basis of the amounts of antimony and manganese, chemicals used primarily as decolorants of the glass.

The two high-magnesium glasses, early and late in our period of study, we designated as Second Millennium B.C. and Early Islamic. Between these, and covering a continuous span of time, were two groupings of low magnesium glasses we tagged as Antimony-rich and Roman.

The third, and latest, of our major categories we called Islamic Lead. In time and place of manufacture this lead-oxide glass overlaps Early Islamic glass, being made from the tenth century onward.

The breakdown we made of glasses from nearly three millenniums in Europe, Africa, and western Asia benefited from earlier work by other experts. In making announcement of our new classification, Ed Sayre and I acknowledge, of course, that many skilled chemists made individual contributions to this effort well before the Brookhaven program was undertaken.

The metallic oxides of antimony and manganese played a dual role in glass

RESCUED IN 1950 from Roman baths at Carthage, one of antiquity's finest examples of pictorial glass cutting portrays the Apostles Peter and John fishing on a rocky coast. One saint holds a line, the other a cast net. A building with pitched roof appears at the top of the shallow bowl. Shellfish and other sea creatures ring the sides. Once broken into three pieces, the bowl has been restored. The unknown artist achieved a rare sculptured effect with his cutting skill, says the author, who believes the dish may have been used ritually in early Christian services. Bardo Museum in Tunis houses the treasure, estimated to date from the fourth century.

VAULTED FURNACE spews flame in a 16th-century glassworks (opposite). Craftsmen fashioned vessels by hand, using techniques little changed in 1,600 years. Nearly hidden behind the furnace, a craftsman puffs a blowpipe; another shapes a molten blob on a slab; still another swings a bottle above his head to lengthen the pliable neck. The woodcut appears in a noted 1556 treatise by the German Georgius Agricola.

CAPPED with a gold stopper, the Cesnola amphora in the Corning Museum ranks as one of the most celebrated pieces of ancient painted glass. Named for an Italian-born American who found it in Cyprus, the 4¼-inch ointment bottle may have graced a lady's dressing table during the first or second century A.D.

R. ANTHONY STEWART (BELOW AND OPPOSITE) © N.G.S.

chemistry in antiquity. Both were used to produce limpid, colorless wares and also, in slightly varied chemical form, to introduce color in glasses or make them opaque.

Ed Sayre has made a major contribution to archeology in establishing that antimony was the standard decolorant in a great segment of the glass industry in antiquity. This magic substance removed tint and light obstruction by counteracting the iron omnipresent in sand. The antimony oxidized the iron, eliminating the "bottle-green" hue so familiar in cheap glass.

Handled differently, antimony had the amazing effect of producing opaqueness in glass. For about 1,000 years, starting in the middle of the second millennium B.C., antimony was the prime additive to produce opacity in white, yellow, blue, and green glasses. Not until the sixth century B.C. was it used to render pieces colorless.

During glass melting with antimony present, a simple rise in temperature would convert an opaque white glass into a crystal-clear one. It was inevitable, therefore, that glassmakers would stumble on the clarifying power of antimony. What a magical surprise for the artisan who first saw the color disappear from the molten mix, leaving glass as pellucid as mountain spring water!

Roman use of antimony as a clarifier reached a peak in the second century A.D., particularly in Europe. Starting in the first century A.D., manganese was increasingly used as a clarifier. After the fourth century, when antimony dropped rapidly out of fashion as a decolorant, manganese fulfilled this function on through the Islamic centuries.

Glasses Reflect Culture Peaks

The first real flowering of the ancient glassmaker's art took place in the 15th century B.C., and such great figures as Thutmose I, Akhenaten, Tutankhamun,* and Nefertiti enjoyed the creations of early Egyptian glass artisans. Mesopotamia, Mycenae in Greece, and Persia also provided a few of our oldest specimens.

The New Kingdom in Egypt spanned centuries of great vigor in politics and the arts; it was then that the great temples of Karnak and Luxor were built. The cosmetic tables of royal ladies of the time displayed perfume jars, frequently of dark-blue glass decorated with white and yellow geometric patterns.

Antimony-rich glass was standard in Greece, Asia Minor, and Persia during the periods of highest civilization in those ancient lands. Many of the objects were extraordinarily beautiful, for these were days that achieved a notable style and elegance in living. It was the era when men like

*See "Tutankhamun's Golden Trove," by Christiane Desroches-Noblecourt, NATIONAL GEOGRAPHIC, October, 1963.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EXTRAORDINARY free-blown bottle, the work of Persian artists probably of the 12th century, is so thin and delicate that it may never have seen practical use. It must have belonged to a wealthy Moslem, says the author, a luxury object to be admired but not exposed to the danger of breakage. Ornamental animals surmount the handles and crouch atop the shoulder of the 10⅛-inch-high clear-glass bottle, which in richness represents the highest craftsmanship and cost of its age. The Corning Museum recently acquired the object from the author's collection.

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

Sophocles, Herodotus, Pericles, Plato, and Aristotle set the intellectual tone of a brilliant Athenian society. The royal court in Persia enjoyed an unprecedented splendor.

Glass of our Roman classification became the accepted standard on the Syrian coast, in North Africa, and even in western Europe. Manganese glass could have cupped the wine that high-living Nero sipped as flames threatened his palace during the burning of Rome A.D. 64. Pontius Pilate, Governor of Judaea, may well have drunk from it in the turmoil and tension of the terrible day on which Christ died.

More centuries slipped by, and the predominantly transparent and frequently colorless Early Islamic glass appeared as the familiar type in the Arab world. This was the time when the achievements of Arab scholars in science and mathematics began to astonish Europe.

Treasure Survives Stormy Life

Even in cases where technological analysis produced no surprises or significant new knowledge, my search for ancient glass has frequently brought back to life fascinating episodes of history.

One treasure that I fortunately acquired is the Populonia bottle (page 355), now in the Corning Museum of Glass at Corning, New York. Engraved on the glass is a panorama of the waterfront of Puteoli, the Roman resort city that many centuries ago occupied the site of present-day Pozzuoli, near Naples. Even today on the Pozzuoli waterfront the sea laps against a quay whose arched footings are identical with those pictured on the bottle.

The Populonia bottle bears the name, however, of the town on the west coast of Italy where the clear spherical flask was found in a Roman tomb early in the 19th century. Its history since has skirted the fantastic.

Napoleon Bonaparte, taking care of his relatives, set up his sister Elisa as Grand Duchess of Tuscany, her residence the famous Pitti Palace in Florence. When the Populonia bottle was found, Elisa Bonaparte acquired it. The object was written up by an Italian archeologist by the name of Sestini, whose description much later led Wilhelm Froehner, Curator of the Louvre, to place it "among the most precious relics of antiquity."

Napoleon certainly handled the Populonia bottle, for the Little Corporal was much interested in antiquities. But after 1812 the piece was lost to public knowledge for 136 years.

We now know that Elisa Bonaparte gave the Populonia bottle to a loyal adviser. This man passed along the flask to his son, and so it went down the line for five generations, probably never seen outside a close circle of friends.

The last inheritor stored the treasure in a library closet when he went off to war in 1940. Returning in 1945, the owner found his villa near Florence occupied by retreating German troops. When the unwelcome guests moved on, he hurried to his library. The ransacked room was heaped with books. But on top of a bookcase, resting precariously on its round side with neck pointing out over the room, lay the treasured bottle, undamaged.

In 1948 museum people I knew in New York dropped discreet hints to me that an Italian woman was in the United States making inquiries about possible purchasers' interest in an object that perfectly answered the description of the long-missing Populonia piece. The museum felt it could not afford to bargain for the bottle.

I arranged a meeting with this somewhat mysterious lady and eventually ferreted out the actual owner in Italy. I learned the recent history of the flask, we came to terms, and I acquired this eminent and storied piece.

I think of the Populonia bottle as a "double antique," an ancient object first recovered so long ago that the lapse of time since its rediscovery would alone qualify it as an antique.

"Masterpiece" Value Tempts Forgers

Over the past century, rare and exquisite pieces of ancient glass, like all art objects, have gained value in the market place in proportion to the demand for them. An outgrowth of this economic fact of life has been, inevitably, a rash of forgeries. Chemical analysis surely will have an increasing place in the unmasking of such fakes.

Fortunately, among the uncounted thousands of specimens of legitimate ancient glass that have survived, there are hundreds of pre-eminent beauty and significance, and more will surely be found.

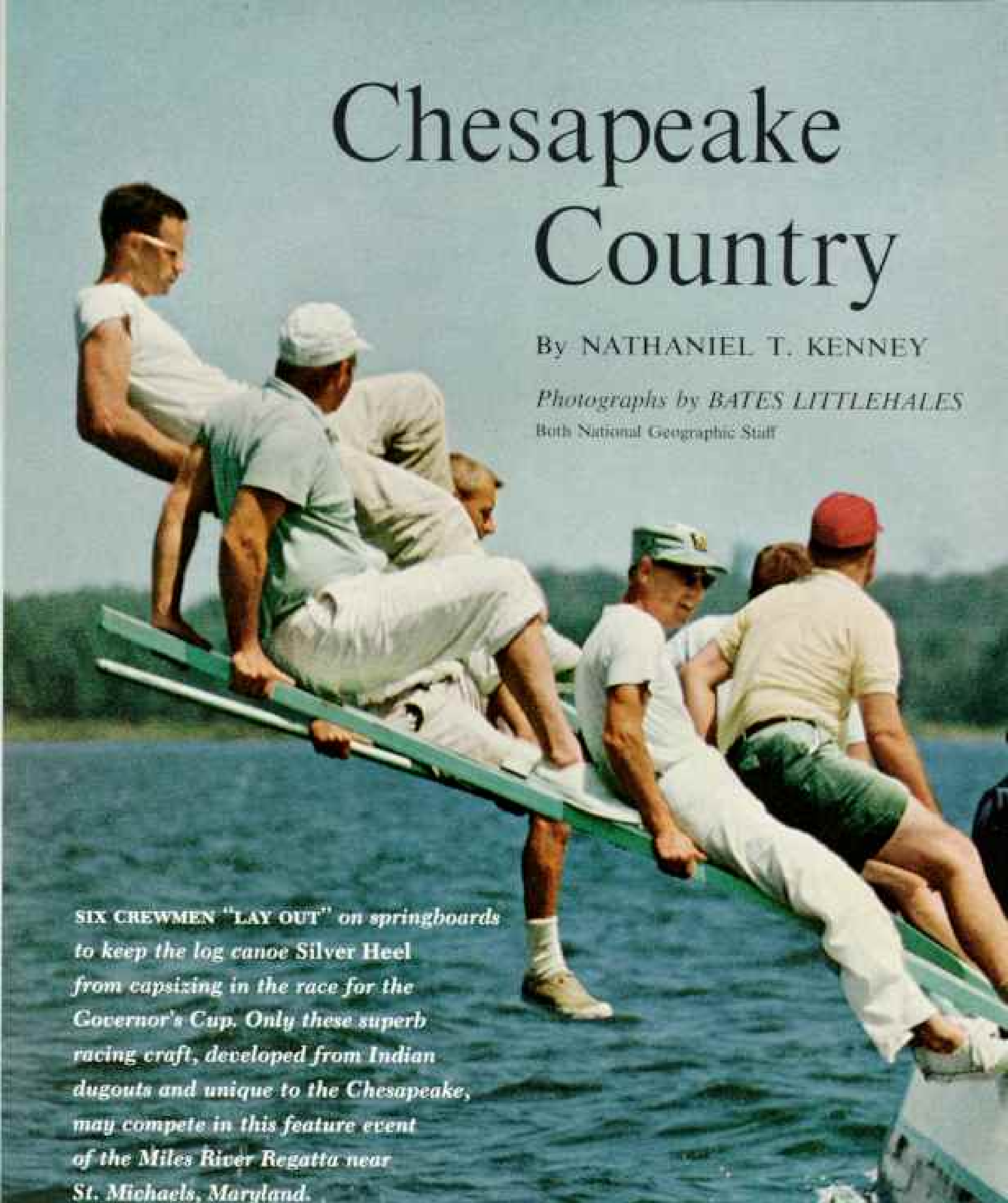
It is exciting and, indeed, reassuring that the tools of the Atomic Age are now being used not only to authenticate these precious relics, but to unlock engrossing facts about the history and culture of the ancient societies that created them. THE END

Chesapeake Country

By NATHANIEL T. KENNEY

Photographs by BATES LITTLEHALES

Both National Geographic Staff



SIX CREWMEN "LAY OUT" *on springboards to keep the log canoe* **Silver Heel** *from capsizing in the race for the Governor's Cup. Only these superb racing craft, developed from Indian dugouts and unique to the Chesapeake, may compete in this feature event of the Miles River Regatta near St. Michaels, Maryland.*

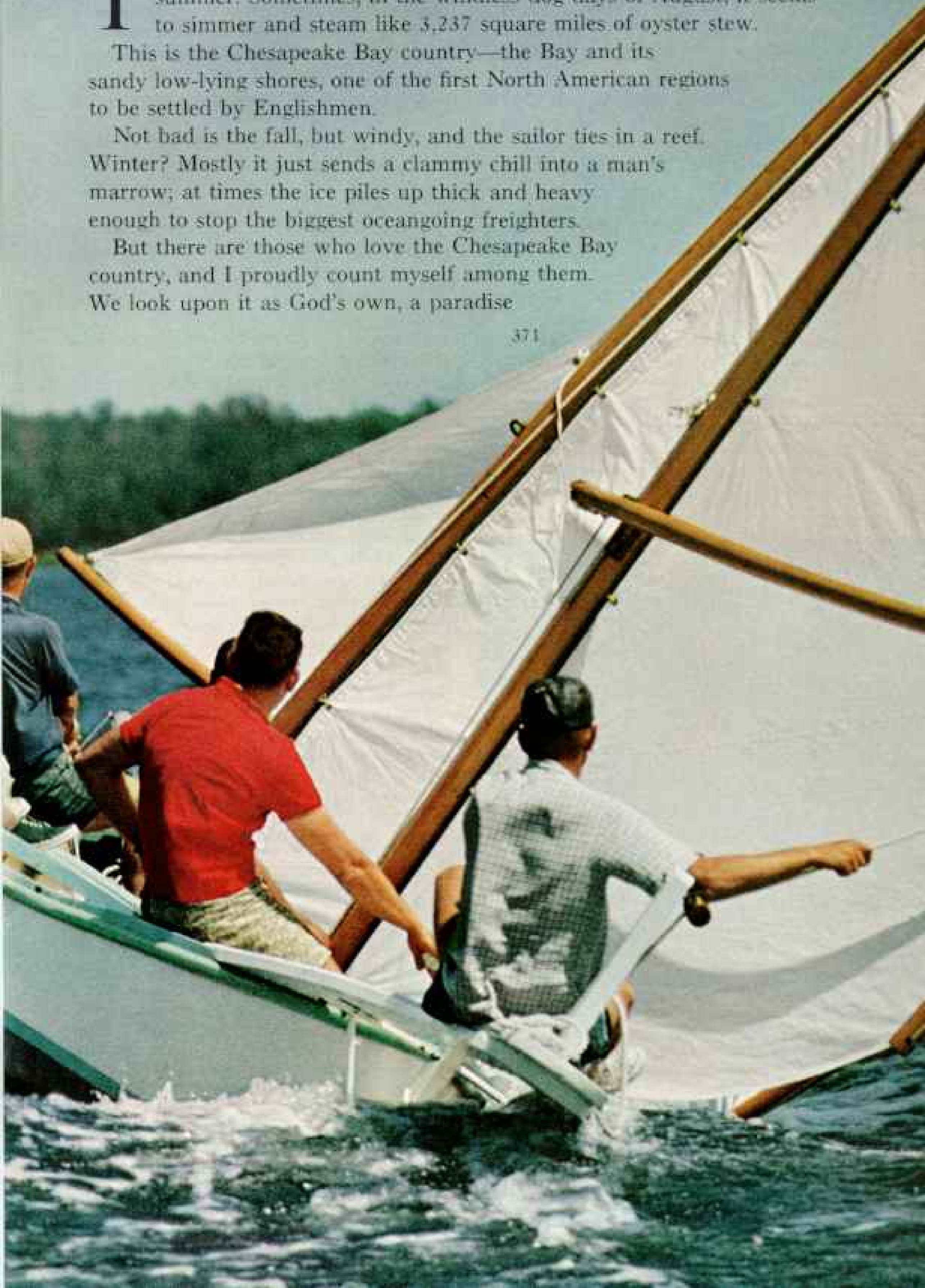
KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JAMES P. BLAIR © N.G.S.

TOO WET IN SPRING. Hot and cursed with thunder squalls in summer. Sometimes, in the windless dog days of August, it seems to simmer and steam like 3,237 square miles of oyster stew.

This is the Chesapeake Bay country—the Bay and its sandy low-lying shores, one of the first North American regions to be settled by Englishmen.

Not bad is the fall, but windy, and the sailor ties in a reef. Winter? Mostly it just sends a clammy chill into a man's marrow; at times the ice piles up thick and heavy enough to stop the biggest oceangoing freighters.

But there are those who love the Chesapeake Bay country, and I proudly count myself among them. We look upon it as God's own, a paradise



inhabited by earth's most fortunate people.

Obviously, I do not view this region with detachment. I am a native and lifelong resident of the Bay country—a Baltimorean, descendant of folk who from Revolutionary times knew the taste of fried soft crabs, the scent of wisteria growing against mellow brick, and the whistle of black-duck wings in a starlit winter sky.

Thus my feelings for my native land sometimes cloud my vision. I had best begin with the cold facts and figures found on maps.

Chesapeake Bay itself is a shallow, mostly brackish inland sea. The Atlantic created it long ago by drowning the lower reaches of the Susquehanna River. It is the largest estuary on the United States Atlantic coast.

Sailing the 195 miles from Bay mouth to Susquehanna River, the helmsman need never vary his course by more than two compass points from due north. Should he head east or west, however, he would come upon cruising grounds to last his lifetime, for 48 principal rivers with 102 meandering branches flow into the Bay, as well as countless creeks and marshy sloughs (see map, pages 374-5).

Someone once wrote that a chart of the Bay looks like the deck plan of an octopus.

To me, who had a sailboat from boyhood, the little waters—"gunkholes," as the yachtsman calls them—are the best of the Chesapeake, and that includes their wonderfully evocative names. The charts show a Crab Neck and Crab Alley Creek, as well as other creeks named Cuckold, Canoe Neck, Tar Cove, Bullbegger, Ape Hole, Plaindealing, and Antipoison.

Capt. P. V. H. Weems of Annapolis, inventor of navigation systems used on all the seas, once told me solemnly that Chesapeake tides ebb and flow upon 5,616 miles of shoreline. I asked him how he measured so exactly a shore constantly changed by wind, wave, and the tunnelings of muskrats.

"Maybe I'm a few miles off," he admitted. "I overlooked the muskrats."

Maryland and Virginia share the Chesapeake, which derives its name from an Indian word meaning "Great Shellfish Bay." Cutting the two states in twain, the Bay creates a very special land, the Eastern Shore, between the Chesapeake and the Atlantic Ocean.

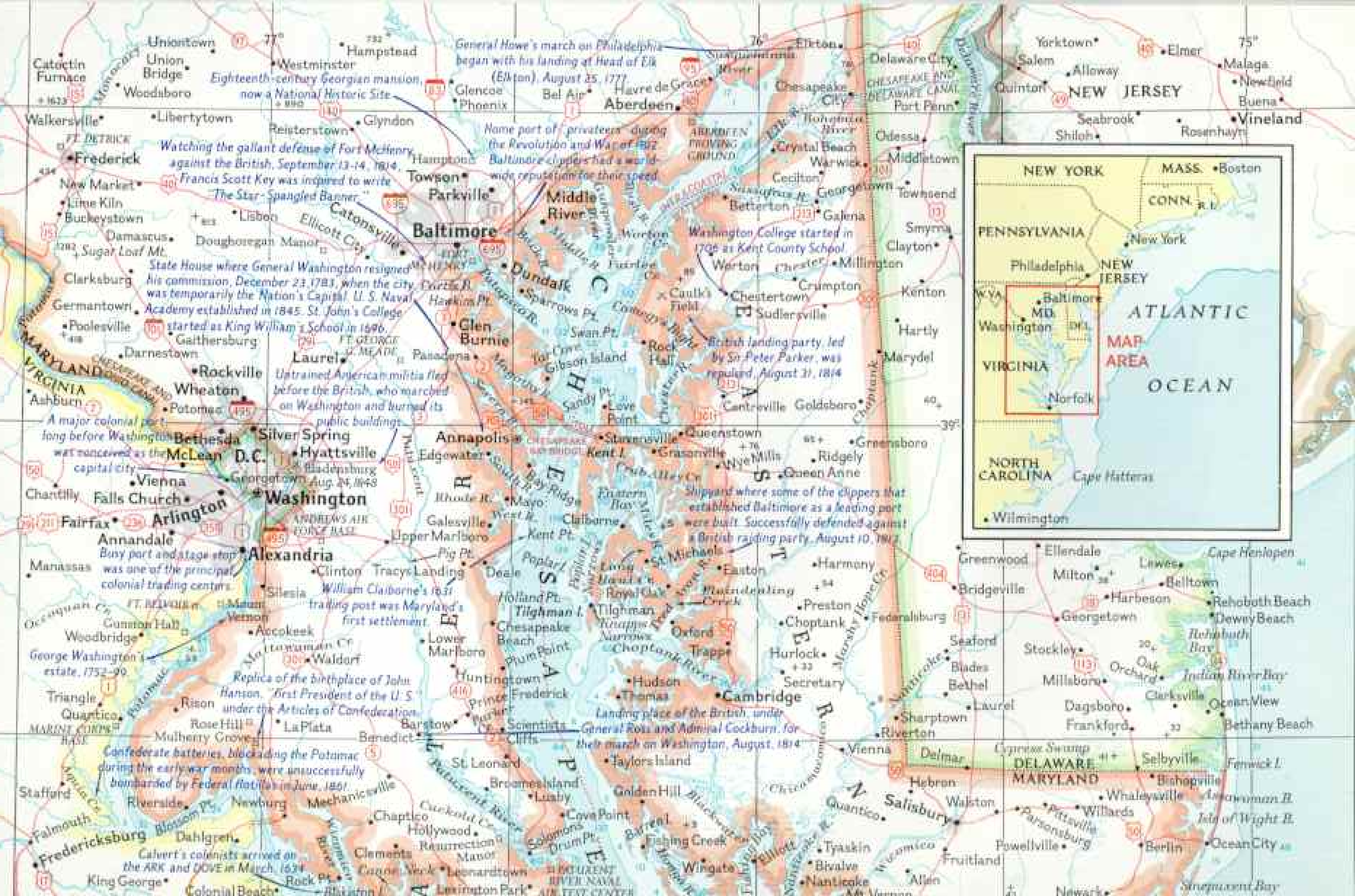
Of old English stock, Shore people have their own speechways, customs, and fierce pride. Shoremen are the quintessence of Baymen, and the late Sam Whalen of Love Point on Kent Island was the quintessence of Shoremen. He was also one of the best of thousands of good Chesapeake fishing guides.

One day he and I were chumming for sea trout—weakfish—in the steamer channel between the Chester River mouth and Gibson

Bayside residents have rarely lacked for food. Chesapeake Indians, like their counterparts in North Carolina, feasted the year round on fish, crabs, and oysters. Theodore de Bry's 1590 engraving, based on a water color by Roanoke Island colonist John White, shows Carolina Indians lighting a fire on a hearth in their canoe; actually, they built such fires only at night to attract fish. Man in the stern lays aside his net to rake the shallows for oysters. In the distance, others drive fish into weirs or impale them on spears tipped with the "hollowe tayle of a certaine fishe like to a sea crabb."

Nearly 400 years later, the Indians are gone, but Chesapeake oystermen still enjoy the bounty of the Bay as they rake the bottom with hand-forged iron tongs.

LIBRARY OF CONGRESS (OPPOSITE) AND KODACHROME BY BATES LITTLEHALES © N.G.S.


NEW JERSEY
DELAWARE
MARYLAND
VIRGINIA
CHESAPEAKE
EASTERN
General Howe's march on Philadelphia began with his landing at Head of Elk (Elkton), August 25, 1777
Eighteenth-century Georgian mansion, now a National Historic Site
Home port of privateers during the Revolution and War of 1812. Baltimore clippers had a world-wide reputation for their speed
Watching the gallant defense of Fort McHenry against the British, September 13-14, 1814, Francis Scott Key was inspired to write "The Star-Spangled Banner."
State House where General Washington resigned his commission, December 23, 1783, when the city was temporarily the Nation's Capital. U. S. Naval Academy established in 1845. St. John's College started as King William's School in 1696.
Untrained American militia fled before the British, who marched on Washington and burned its public buildings
Washington College started in 1706 as Kent County School
British landing party, led by Sir Peter Parker, was repulsed, August 31, 1814
Shipyard where some of the clippers that established Baltimore as a leading port were built. Successfully defended against a British raiding party, August 10, 1813
A major colonial port long before Washington was conceived as the capital city
Busy port and stage stop was one of the principal colonial trading centers
William Claiborne's 1631 trading post was Maryland's first settlement
George Washington's estate, 1752-99
Replica of the birthplace of John Hanson, "first President of the U. S." under the Articles of Confederation
Landing place of the British, under General Ross and Admiral Cockburn, for their march on Washington, August, 1814
Confederate batteries, blockading the Potomac during the early war months, were unsuccessfully bombarded by Federal flotillas in June, 1861
Calvert's colonists arrived on the ARK and DOVE in March, 1634
Baltimore
Washington
D.C.
Annapolis
Alexandria
Arlington
Frederick
Cambridge
Salisbury
Aberdeen
Vineland
Towson
Parkville
Dundalk
Glen Burnie
Catonsville
Silver Spring
Hyattsville
Bethesda
McLean
Rockville
Wheaton
Fredericksburg
Fairfax
Falls Church
Annandale
Middle River
NEW YORK
MASS.
CONN.
R.I.
PENNSYLVANIA
NEW JERSEY
W.VA.
MD.
DEL.
VIRGINIA
NORTH CAROLINA
ATLANTIC OCEAN
MAP AREA
Boston
New York
Philadelphia
Baltimore
Washington
Norfolk
Cape Hatteras
Wilmington

CHESAPEAKE BAY

Port Royal
Birthplace of James Madison 4th President of the U. S.
Port Conway
Wakefield
Stratford
Bushfield
Coles Point
Montross
Ancestral home of the Lees where Robert E. Lee was born January 19, 1807
Piney Point
St. Mary's City
Hooper Str.
Bloodsworth I.
Founded on an Indian townsite in 1634, this settlement served as Maryland's first Capital, 1676-1694
Deal Island
Princess Anne
Snow Hill
Wenona
Westover
Fairmount
Girdletree
Pocomoke City
Stockton
Marion
Crisfield
Somerset
Beverly
MARYLAND
VIRGINIA
Bowling Green
Milford
CAMP A. P. HILL
Reconstructed mansion, a National Monument, occupies the site of George Washington's birthplace, February 22, 1732
Balty
Point Lookout
Bridges Str.
Smith Ensell Island
Kinsale
Lewisetta
Warsaw
Callao
Haynesville
Sabine Hall
Tappahannock
Heathsville
Burgess
Farnham
Old Customs House in use more than 200 years ago when the town was a port of entry. Shelled by British Admiral Cockburn, December 1, 1814
Dunnsville
Sharps
Great Wicomico R.
Smith Point
Reedville
Tangier I.
Tangier
Base of operations for the British during the War of 1812. From here attacks on both Washington and Baltimore were launched
Cedar I.
Saxis
Nurseries for diamondback terrapins, highly prized for food
Oak Hall
Chincoteague
Chincoteague Island
Chincoteague Inlet
Wallops I.
Daswell
Center Cross
Morattico
Wicomico Church
Epping Forest
Lancaster
Fleeton
Guilford
Bloom
Modest Town
Parksley
Ashland
Hanover
Walkerton
Manquin
Stevensville
Birthplace of Mary Ball, Washington's mother
Kilmarnock
Deep Creek
Metomkin Island
ATLANTIC
OCEAN
King William
King and Queen Court House
Christ Church
Irvington
Urbanna
Rappahannock River
Antipoison Cr.
Windmill Pt.
White Stone
Onancock
Onley
Accomac
Cedar Island
All that remains of Powhatan's domain
Mechanicsville
Saluda
Harmony Village
Rosegill
Melfa
Wachapreague
Richmond
Pamunkey Reservation
Birthplace of John Tyler, 10th President of the U. S.
Port Richmond
West Point
Deltaville
Stingray Pt.
Hartfield
Plankatank R.
Gwynn I.
Jamesville
Willis Wharf
Island
Quinby
Parramore
Esmore
Birthplace of William Henry Harrison, 9th President of the U. S.
New Kent
Capital of Virginia 1699 to 1779, flourishes again as a vivid re-creation of America's past
Moore House, where terms were arranged for the surrender of Cornwallis on October 19, 1781, the culminating battle of the Revolution
Little Machipongo Inlet
Hog Island Bay
Hog Island
Great Machipongo Inlet
Malvern Hill
Bermuda Hundred
Gapeway
Charles City
Sherwood Forest
Ware Church
North
Mathews
Gloucester
Mobjack
Port Haywood
Warner Hall
Achilles
New Point Comfort
Eastville
Cobb Island
Hopewell
Shirley
Westover
Williamsburg
Gloucester Point
Yorktown
Cape Charles
Cherriton
Oyster
Seaview
Wreck Island
Colonial Hts.
FORT LEE
Built about 1310 by William Byrd II
Prince George
Jamestown
Site of the first permanent English settlement in the New World, established May 13, 1607
Parkway connects historic Jamestown, Yorktown, and Williamsburg
Carter's Grove
James River
Atlington
Date from 1610, oldest surviving English settlement in America
Ship Shoal I.
Petersburg
Bolte (Warren) House
Surry
Disputanta
Poquoson
LANGLEY AIR FORCE BASE
Back R.
Kiptopeke
Cape Charles
Fisherman I.
Smith I.
Bacon's Castle
"Noblest Bay in the Universe," an early settler described the Chesapeake. Maryland fried chicken and Virginia ham deck its tables. Skipjacks and log canoes sail its waters; ocean freighters crowd Baltimore and Norfolk piers. Three times the size of Rhode Island, the Bay stretches 195 miles from the mouth of the Susquehanna River to the Virginia Capes.
One of the world's largest shipyards, producer of great warships and ocean liners
Marquers Museum
Hampton
Battle of March 9, 1862, between the ironclads MONITOR and MERRIMACK revolutionized naval warfare
Newport News
Old Point Comfort
Smithfield
St. Luke's Church
Isle of Wight
Ivor
Some of the nation's foremost fighting ships were constructed here
Zuni
Kazeemond R.
Norfolk
Portsmouth
NAVAL SHIPYARD
Chesapeake
Windsor
Granite cross marks the first landing of the SUSAN CONSTANT, GODSPEED, and DISCOVERY, carrying the Jamestown colonists, April 26, 1607
Cape Henry
FT. STORY
Tyrandiwen Bay
Adam Thoroughgood House
Virginia Beach
Burned in 1776 by Governor Dunmore to prevent its fall to patriots
OCEANA NAVAL AIR STATION
Sailing from Jamestown in 1608, Captain John Smith explored and mapped the reaches of Chesapeake Bay.
San Marcos Wreck
Pungoteague Creek
CHESAPEAKE BAY BRIDGE-TUNNEL
NAVAL BASE NORFOLK
Hampton Roads
Monitor-Merrimack Memorial Bridge

N

0 10 20 30
STATUTE MILES

Map by Carol Cunningham and Thomas A. Wall
© National Geographic Society
Soundings in Feet

77°
75°
37°
38°

An old soldier returns to the Bay city he loved. As an honor guard lifts the flag, General of the Army Douglas MacArthur is interred in the marble crypt of his memorial at Norfolk, Virginia. The revered hero died in Washington, D. C., April 5, 1964.

Swift Phantom II's, all-weather fighter-interceptors of the U.S.S. *Independence,* fly out of the U. S. Naval Air Station at Oceana, Virginia, while the carrier is in port. Below lies Hampton Roads, where the James River meets the Bay. Four-mile-long Hampton Roads Bridge-Tunnel curves from Willoughby Spit in foreground past Old Point Comfort and Fort Monroe (directly beneath upper jet). *Monitor* and *Merrimack* battled in these waters (pages 380-81).

Island. A honker of a thunder squall came up, and lightning hit the boat. We were shocked but unharmed. Sam had an easy explanation for our miraculous escape.

"The devil did that, as I'm here to tell the cap'n," he said. "I can smell the brimstone. But he don't want any Sho'men in hell; we're too opinionated."

A Shoreman can call himself that. I use the word "independent."

Industry came late to the Bay country, and it is still predominantly agricultural. It has only two big cities, Baltimore in Maryland and Virginia's vast port complex of Norfolk, Newport News, Portsmouth, and Hampton (above). No cities were needed, in fact, until modern times. Every plantation stood on a waterway in this land of rivers; ships of the world called at every man's door.

I think that Baltimore loves the Chesapeake more than do the Virginia ports, which have the ocean within easy distance. And Balti-

COLORCHROME (ABOVE) BY U. S. NAVY AND EKTACHROME BY FRED MARD © NATIONAL GEOGRAPHIC SOCIETY

moreans display a fierce possessiveness toward the Bay. "My shore," a Baltimorean calls his weekend retreat on the water; it is never "my place" or "my cottage."

Oyster Shells Mark Indian Villages

Before the settlers came in the 17th century, the Chesapeake was prime Indian country. Broken in battle, ravaged by diseases, these first Baymen have all but vanished, leaving as memorials such place names as Nanticoke, Wicomico, Potomac, and Chesapeake itself.

Being Baymen, the Indians loved oysters. Layers of shell below the topsoil everywhere mark the sites of their villages and camps. At Gibson Island at the Magothy River mouth, where I spent my youthful summers and where my mother and brother still live, I know of such a shell stratum six feet thick. Some of the shells bear smudges of the fires used to steam them open.

Nation's largest coal-loading facility, owned by the Norfolk and Western Railway, attracts shipping to Norfolk from around the world. Ranked columns of hopper cars loaded with bituminous from West Virginia, Virginia, and Kentucky wait to fill the colliers. An average of 73,000 tons a day pours into the holds. The biggest customers: Japanese steel mills.

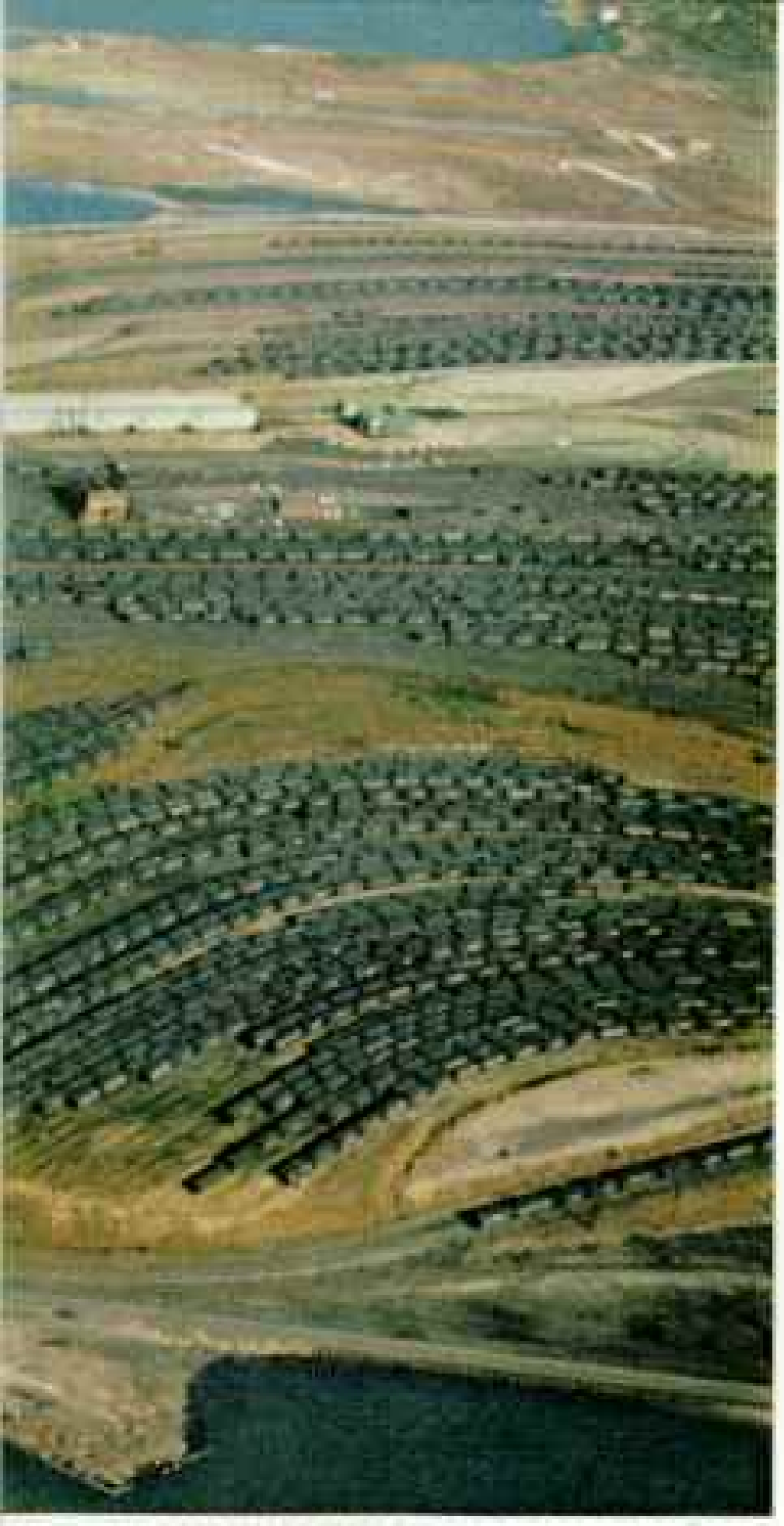
Virginia's largest city, with more than a quarter-million residents, Norfolk wears a new look, the result of a multimillion-dollar redevelopment program. New City Hall takes shape at extreme right. Plaza One office building (foreground) faces St. Paul's Boulevard.

The first Europeans to see the Chesapeake may have been Spaniards, French sailors led by the Florentine navigator Verrazano, or—some scholars have thought—even Vikings. Capt. John Smith came along with his hardy band in 1607.* The next year, fishing in the shallows at the Rappahannock mouth, the captain was stung by a Bay creature's barbed tail. Stingray Point takes its name from his painful experience.

The first Englishmen to settle in the Bay country built Jamestown, Virginia. Last summer I followed their track in from the open Atlantic, coming under sail as they did, hoping I might see my Chesapeake land as those first English inhabitants saw it.

Entering the Bay, my crew and I pretended we were

*See "Captain Smith of Jamestown," by Bradford Smith, NATIONAL GEOGRAPHIC, May, 1957.



Azalea queen, 16-year-old Gene Zuckert, reigns during the 11th annual festival in Norfolk last April. Her father is Eugene Zuckert, Secretary of the United States Air Force.

BATES LITTLEHALES (ABOVE AND BELOW) AND EMORY KRISTOF © N.G.S.

the men of Jamestown in the ships *Susan Constant*, *Godspeed*, and *Discovery*, but the Virginians inadvertently spoiled our game.

Our 36-foot ketch *Betelgeuse* (page 383) was taking a drubbing in a northeast blow. Photographer Bates Littlehales crawled forward over the plunging cabin top to take in the mainsail. Immediately the Virginia pilot boat on station off the Capes sent a launch pounding in our wake.

After that, only the shriek of wind in the rigging and pound of waves against wooden hull were the same, for nobody met the settlers in 1607. We asked the pilots why they had sent a launch.

"We never pass up a fee," said one of them, straight-faced. We knew better. They thought we were in trouble. Baymen never turn their backs on a boat in distress.

In the Bay mouth stand artificial islands from which a highway on stilts ducks beneath the waves. This is the Chesapeake Bay Bridge-Tunnel, a $200,000,000 concession to changing times.* The waterways, original highways of settlement, are obstacles in an age of wheeled traffic, and must be bridged.

Some feel the Bridge-Tunnel will spoil the quiet charm of the lower Eastern Shore. It will change it, for a fact, just as the earlier Maryland Bay Bridge from near Annapolis to Kent Island peppered the upper Shore with resorts and summer colonies.

*See "Over and Under Chesapeake Bay," by David S. Boyer, NATIONAL GEOGRAPHIC, April, 1964.

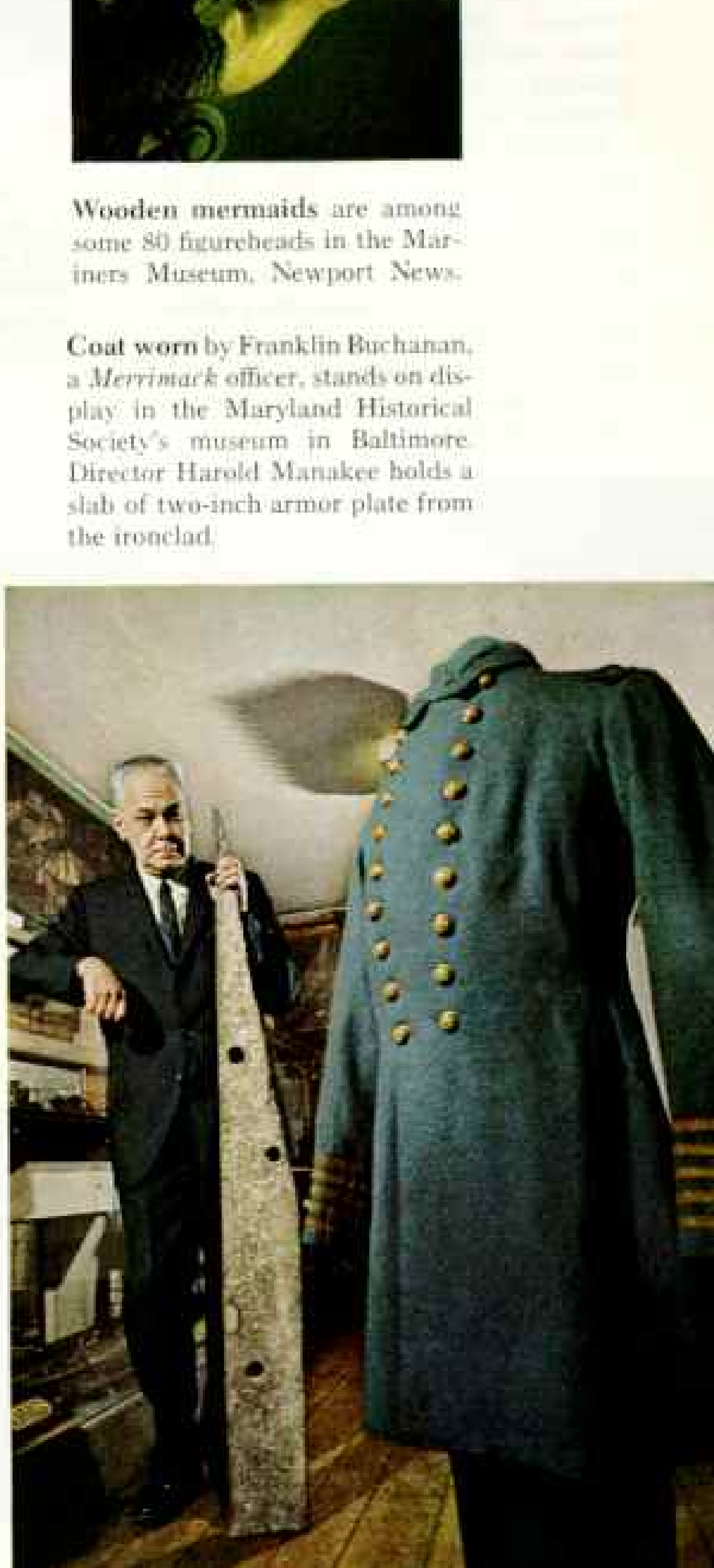
GOUACHE AND BELLOWS LITHOGRAPH, COURTESY OF CONFEDERATE MUS., BILOXI, MISSISSIPPI

Famous duel of the ironclads *Monitor* and *Merrimack* took place in Hampton Roads on March 9, 1862. One of the most momentous sea battles in history, it revolutionized the world's navies. The rebuilt Federal frigate *Merrimack* (center, right), which the Confederacy had renamed *Virginia*, sank one vessel the day before and left U.S.S. *Congress* (left) burning and aground. But on this morning a new craft, the *Monitor*, has joined the fray. An armored, raftlike boat, *Monitor* has two guns in a swiveling turret to *Merrimack*'s ten fixed guns. For hours, the ironclads fire almost point-blank, neither managing to sink the other.

This 1889 print employs artistic license, combining the events of March 8 and 9. *Congress* blew up before dawn on March 9, and her crew had fled the ship the day before the ironclads met. Newport News shore batteries at right fired on the Confederate ironclad on the 8th. General on white horse could be Joseph Mansfield, Union commander at Newport News.

Wooden mermaids are among some 80 figureheads in the Mariners Museum, Newport News.

Coat worn by Franklin Buchanan, a *Merrimack* officer, stands on display in the Maryland Historical Society's museum in Baltimore. Director Harold Manakee holds a slab of two-inch armor plate from the ironclad.



Spring's green kiss enhances the beauty of Berkeley, ancestral home of Presidents William Henry Harrison and Benjamin Harrison. During the Revolutionary War, British troops under Benedict Arnold came into the Bay and plundered this Virginia plantation on the James River. In the Civil War, Gen. George B. McClellan used Berkeley as his headquarters after the Battle of Malvern Hill. Today, for a nominal fee, visitors may inspect its high-ceilinged rooms and roam the formal garden of English and American boxwood. These American boxwood bushes were planted nearly 30 years ago, replacing much older English bushes destroyed in the Civil War.

Virginia's tidewater region abounds in stately plantation homes, built with the profits of the tobacco trade that began with the Jamestown colony. Blessed with architectural beauty, magnificent settings, and romantic legends, they attract hordes of visitors. One of the loveliest estates, Carter's Grove, near Williamsburg, opened its doors to the public this year for the first time.

PHOTOGRAPHS BY CHERY A. BENZ (BELOW) AND NATIONAL GEOGRAPHIC PHOTOGRAPHER KATE SIMMONDS © N.G.S.

The Author: In 12 years of travel reporting for NATIONAL GEOGRAPHIC, Nathaniel T. Kenney has written vividly of the national forests, the divided city of Berlin, the Great Lakes, Italy, and Africa. A native Baltimorean, he returned last year to the waters of his boyhood and sailed some 2,000 miles in the Bay and its tributaries. Here, with hand on tiller, he rides out a stormy day aboard the 36-foot ketch *Betelgeuse* (opposite), named for the giant red star in Orion.

All sails drawing well, *Betelgeuse* foots along on the port tack in the Miles River.

But I think outboard motors, with their accompanying water skis and noise, have done as much as the bridges to change the lonely waters of my boyhood to an inland sea summer-populated by countless thousands of recreation-seekers from the cities.

Crossing Hampton Roads, we dipped *Betelgeuse's* colors to warships of the Atlantic Fleet—among them the mighty atomic aircraft carrier *Enterprise*, built here by the Newport News Shipbuilding Company.*

In a way we were saluting a pair of ghost ships, too. It was in this same chop off Old Point Comfort that armored naval warfare was born. Confederate forces had raised a scuttled Union steam frigate, the *Merrimack*, and plated her with iron. On March 8, 1862, she steamed out of the Norfolk Navy Yard and handily vanquished two proud wooden warships, *Cumberland* and *Congress*.

The next morning the Union's answer to this grave ironclad threat was waiting in Hampton Roads, having arrived from New York just in time. In full view of thousands of spectators, the North's "cheesebox on a raft" —*Monitor*—engaged *Merrimack*, two guns to ten, for several hours (pages 380-81).

This first battle between armored warships ended inconclusively; North and South each claimed victory. Both vessels were to meet sad ends: *Monitor* to founder in heavy weather off Cape Hatteras, *Merrimack* to be blown up near Portsmouth to avoid capture.

A busy place by any standard is the Hampton Roads area. Norfolk alone ships more grain than any other east coast port, and from this roadstead sails more coal than from any harbor in the world. Bates and I spent a day in Norfolk watching from the Norfolk and Western Railway's new $25,000,000 loading pier, which can pour 50,000 tons aboard a collier in less than eight hours (page 378).

We stood in clouds of black dust as giant mechanical unloaders seized full hopper cars

*The author described "The Mighty *Enterprise*" in the March, 1963, National Geographic.

Union Jack and silent cannon mark the battlefield at Yorktown, Virginia, where Lord Cornwallis surrendered his British forces at the climax of the Revolution. Today the region is part of Colonial National Historical Park.

Hush of history pervades palisaded James Fort, Virginia's reconstruction of the first successful English settlement in the Americas. Here the colonists lived in thatched houses plastered with clay and twigs. Sickness and starvation decimated the pioneers; 66 of 104 died in the first eight months.

Full-scale replicas of the Jamestown colonists' ships *Susan Constant* (left), *Godspeed*, and *Discovery* (not shown) tie up in a cove off James Fort. Incredibly crowded, the original three sailed into Chesapeake Bay and up the James River in May of 1607, after five stormy months at sea.

as easily as a cat grasps her kittens, flipping them upside down. The cargo, direct from West Virginia's coal fields, roared through chutes into a Japanese ship far below. Finally, her hatches battened, the collier moved away, bound for the steel mills of Osaka or Tokyo.

That evening *Betelgeuse*, too, sailed—up the James River. We passed through the silent canyon formed by the hundreds of mothballed ships the Government holds at anchor in the deep water. Among the vessels one silhouette in the night seemed familiar.

I turned on the spotlight. On the transom I read the name *Brazil*. I had myself gone to war in this onetime luxury liner, sailing from the British Isles to Oran in North Africa.

Early in the morning we came to anchor off Jamestown. Rowing ashore, I thought what a place of sadness this birthplace of the Nation must have been. Hundreds died miserably here from disease, starvation, and Indian tomahawks. During Bacon's Rebellion, a revolt against colonial class tyranny a century before the American Revolution, Jamestown was burned down, only 69 years after its founding. The people rebuilt it, but in 1699, after a second fire, they moved away to Williamsburg.

Now a ward of the National Park Service, Jamestown has only foundations, a rebuilt church, and a good museum. But near the original site Virginia has re-created the first Jamestown fortress-village (above). Also in replica, *Susan Constant* and her sisters lie moored here (opposite). They can sail, too, and attend Virginia festivals and anniversary celebrations, their crews in costumes of old.

From pestilential Jamestown, the colonists migrated upriver to found on both shores of the James a golden civilization based on

tobacco. Ebbing and flowing according to the distant markets for this fickle crop, it did not long endure; at Mount Vernon on the Potomac, planter George Washington saw the wisdom of diversifying his crops.

But while the tobacco civilization lasted, the fiddles sang in gilded ballrooms and the mockingbirds in boxwood gardens, and the sailing ships unloaded at wharves of Berkeley and Shirley and Westover plantations the wines of France, the linens of Ireland, the fine English china. Even the slaves who tended the tobacco plants ate diamondback terrapin —and complained that this delicacy appeared too often on their tables!

We sailed into the plantation country along the James. Quail whistled in fields where no tobacco has leafed in a century. Many of the old Georgian houses still slumber in the shade of their tulip trees.

At Berkeley I wandered amid magnificent furnishings and woodwork hand-carved from pine trees on the plantation (page 382).

Farther up and across the James at Bermuda Hundred, first incorporated town in Virginia, I sought more of the past and found it readily. Prowling water's edge here, I picked up several pieces of heavy glass, their edges smoothed by river sands. They were the bottoms of spirits bottles, so I am told by experts, emptied before the Revolution.

History is like this in the Chesapeake Bay country—solid, near at hand, continuous.

When Aground, Go Crabbing

On the strong ebb tide we dropped down the James into the Bay and crossed over to the lower Eastern Shore. In the dark, I missed a channel marker in Pungoteague Creek and put *Betelgeuse* on the mud. This happens often on the Chesapeake, where soft bottom breeds carelessness, and the only damage is to the skipper's pride.

"I told you I knew every shallow in the Bay," I said. "Here's one of my favorites."

But my crew wasn't listening. Every man jack worked at the rail with dipnets, scooping up blue crabs in the glare of the spreader lights. Soon the cockpit looked like a pit of armored gladiators.

Sometimes the Chesapeake is bounteous beyond belief. H. L. Mencken once called the Bay an "immense protein factory." Mullet jump at a lantern and land right in the boat. The waterman "munging" the wintry salt marsh for terrapin sometimes finds not one but three hibernating diamondbacks when his pole strikes something solid in the mud.

And on this night in the Pungoteague, where once the famous two-masted, schooner-rigged Chesapeake pungies took shape in the little shipyards, all the crabs in creation ran fast and shallow for some secret rendezvous downriver. Two dozen never made it and were soon in the cook pot below.

Changes Imperil Bay Resources

Surely the blue crab, packed with luscious white meat, is the leading citizen of the Chesapeake. He is the first creature the visitor sees, swimming sideways or backward but never forward, brandishing formidable claws, eating almost anything that comes his way.

Because they can be cooked into many tasty dishes, crabs are big business, the main summer quarry of most Baymen who follow the water for a livelihood. In one good recent year the crab catch brought $5,500,000.

Yet it was only comparatively recently that the Bay states began studying crabs and other seafoods. A generation ago nothing seemed to diminish the Bay's bounty too seriously, and we needed to know only how to take it.

"Times have changed," said William J. Hargis, Jr., director of the Virginia Institute of Marine Science at Gloucester Point on the York River, opposite the Yorktown battlefield.

"We've been expecting H. L. Mencken's 'protein factory' to serve also as a seaway for commerce, a playground, and a sewer. We need scientific studies to determine the effects of one use on another.

"How much household detergent can be dumped on white perch without killing them? Will the James River remain the Bay's best seed oyster ground if the channel to Richmond is deepened? How many marshes can be drained without crippling fisheries?

"Given more time, I believe scientists in both states will come to understand the Chesapeake better. This will help the Bay states to

Last Working Sailboats in the United States Dredge the Bay for Oysters

As a conservation measure, Maryland law prohibits use of motorized dredges in public waters. Only wind-powered craft such as these skipjacks may "drudge" the Bay's floor, and then only during the rugged November-1-to-March-15 season. Oysters grow fine and fat in winter and spring; in summer, when they spawn, they lose weight.

reap greater and more varied riches than can be imagined now."

If the blue crab is the leading citizen, the sea nettle, a stinging jellyfish, is No. 1 pest of the Bay country. In wet years, when rainfall reduces the Bay's salinity, you seldom see a nettle. In dry summers, they ruin the swimming clear to head of tidewater and cause economic distress by driving vacationists away from the Bay.

I asked the University of Maryland's Chesapeake Biological Laboratory at Solomons Island (where the Marines trained for their World War II invasion of the Pacific Solomon Islands, incidentally) if they had a sea-nettle cure. They said no, but they were working on the problem.

These days the lab is studying soft-shell clams, known on the Bay as maninoses or mannoes. Baymen have always known these long-necked shellfish live in the Chesapeake bottom thick as barnacles on a piling, but ignored them except as fish bait.

Suddenly they learned that New Englanders actually ate the things, steaming them together with lobsters and corn for the regional feast known as the clambake. Their oyster industry fallen upon hard times, Baymen turned gratefully to the catching of mannoes for Yankees, whose own steamer-clam beds showed signs of depletion.

The catch has been good ever since Fletcher Hanks of Oxford, Maryland, invented an efficient power dredge that scoops mannoes up out of the sand. The Solomons lab sought to learn what happens to undersize mannoes the dredgers dump back into the Bay.

To this end a biologist dug clams out of the bottom of a tank and watched to see if they could dig themselves back in.

"They can," he reported, "especially the little ones. Fletcher can relax. His way of harvesting doesn't destroy small clams."

Oystermen Still Work Under Sail

Though clamming prospers, the Bay's oyster business is in an unhappy state indeed.

"Maryland oystermen caught 14 million bushels in 1875, their best year," I was told by Dr. H. C. Byrd, head of the Commission on Chesapeake Bay Affairs. "Last year they took a little more than a million."

Overfishing depleted the finest natural oyster beds known. As a conservation measure, Maryland clings to fishing methods little changed since colonial times.

In the wintry dawns the men go forth in two fleets. One, using long, rakish power-

Stacked like cordwood, frozen albacore

boats, combs the shallows with long-shafted tongs (page 372). The other, under sail, goes to deeper waters and scrapes with towed dredges (preceding page).

Law requires dredgers to rely on wind alone, lest they take too many oysters too quickly. Result: The Chesapeake is the last place in the country where one may see a working fleet of sailing vessels. Each carries a small powered skiff, called a yawlboat, on davits astern; it is used to push the larger vessel in and out of harbors or homeward in a calm.

Most of the boats are very old. Each year the fleet dwindles. No Chesapeake schooner or pungy still works the oyster rocks, and only skipjacks and a few bugeyes remain.

I miss them all very much. In summers of my youth, before the trucks took over the cargoes, they hauled the wheat, watermelons,

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER BATES LITTLEHALES © N.G.S.

taken by a British ship in the Atlantic await canning in a tuna plant at Cambridge, Maryland.

and produce to Baltimore. Carrying far on calm nights, the thump of their one-cylinder yawlboat engines used to lull me to sleep.

Because I owned and lived aboard a bugeye for a number of years, I grieve in particular each time one goes off to die in a shallow cove. My *Col. R. Johnson Colton* was some 70 feet long from sharp stern to end of long bowsprit and had the two raking masts and keen lines of the Baltimore clipper schooners, to which she was true blood cousin.

Marcellus Davis of Solomons Island designed her by "rack of eye"—without plans—as was the custom among Bay builders. In 1886 his shipwrights, masters of broadax and razor-edged adze, timbered and planked her of Maryland white oak over a sweet-gum keel.

My youngest daughter learned to walk on her decks of rift-sawn pine. Happily, the old hooker still survives, as an Annapolis yacht broker's floating office.

And so nostalgia went with me to Cambridge, Maryland, one cold night just before last Christmas. In the morning, photographer Littlehales and I were to join the *Edna E. Lockwood*, one of the last working bugeyes, on the Choptank River oystering grounds.

At dawn we set the *Lockwood's* reefed canvas to the nor'wester and shoved her, frisky as a bluewing teal, through the mush ice of the harbor mouth. I took the wheel when Capt. Bill Jones went forward, and carried her on out to the oyster beds.

Bill let me make the first "lick" over the beds. I kept her full, and with a 10-foot rise to the sheets she fairly flew, but the dredges came back aboard empty.

"The way you drive her, the drudges never

"**Be quiet, they'll hear you!**" The whispered command silences a boatload of youngsters experiencing the pure pleasure of dipping for blue crabs near Oxford, Maryland. A hard crab can move like a flash in the water. Only by grasping him firmly and cautiously from the rear can one handle him with impunity. In season, from late May to late October, the entire Bay area enjoys a long and glorious feast of crab meat.

Backward, sideways, and sometimes upside down, blue crabs scuttle out of the starting trough and claw their way down a sloping plywood racecourse at the annual Hard Crab Derby in Crisfield, Maryland. Numbers painted on the shells identify entrants. The winner's owner receives a bronze crab.

Poke-bonneted miss goes to a sidewalk art show in St. Michaels. Each August townspeople put on 19th-century costumes to celebrate the repulse of the British in the War of 1812.

get to hit bottom," accused Cap'n Bill. "Let a workin' arsterman have her."

I have spelled the words as Shoremen say them. It is very close to Devonshire English.

Luffing the bugeye until she went slower, the master filled the dredges next lick. Most of the catch was empty shell, planted here by the State as a conservation measure.

Oysters hatch from eggs as free-swimming larvae, called spat. When the time comes to settle down and become an oyster, the spat must find an object upon which to anchor, or "set." Spat would rather set on the bones of ancestors than anything else.

"But I've caught 'em on stones, old gum boots, and a set of false teeth," said Bill Jones as the shell was dumped back overboard.

The salt spray burst at the bow. It froze on the anchors hooked over the rail, and on the men's oilskins. Even for the Bay country it was a bitter day. The wild swans and canvasback ducks, although they love winter weather, rafted for shelter in coves and lees.

Occasionally they leaped into the sky, thousands upon thousands all at once, and on the river all of us stopped work to watch until once again the sky was empty of flashing wings and wild trumpetings.

$15 for a Cold Day's Work

Back at the Cambridge wharf we hoisted five "tallies" to the buyer's truck: 25 decent bushels, culled from perhaps 200 that were mainly illegal small oysters (under 3 inches

long), rocks, shell, and an occasional flapping toadfish. Each man took home $15 for his cold day of backbreaking work.

Many Virginia watermen have been permitted to lease oyster plots on public grounds for cultivation and harvesting as they please —even to dredging the beds with powerboats. One result has been the disappearance of the forest of bugeye and skipjack masts that used to rise from the harbor on Virginia's Tangier Island.

You may have read of Tangier Island, most isolated place in the Bay country. Tangier women long wore poke bonnets against the summer sun and frowned shorts-clad female visitors back to the yachts or the Crisfield ferry that brought them.

Visiting Tangier town in *Betelgeuse*, we found the code relaxed; the first girl we encountered was wearing shorts. We saw many poke bonnets. They were on sale in a handicraft shop that caters to tourists.

Automobiles remain unpopular on this island of sidewalk-width streets, but the motor scooter has landed in force (below). The people drive them with singular abandon. But there seems little risk; if you fall off, you will fetch up at least half the time in soft marsh or a salt-water slough.

"Must be a million of the darned things," I said, expecting to please a grizzled islander we found weeding his flower beds behind a white picket fence. He fooled me.

"You can shade that quite a bit, stranger," he said severely. "And they beat walking any day."

As we started away, I noticed a shiny new scooter in his back yard.

Ballast Bars Weight Tobaccoland Plows

During the War of 1812 an English amphibious force occupied Tangier. The redcoats based their entire Chesapeake campaign on the island, including the unsuccessful bombardment of Baltimore's Fort McHenry that inspired Francis Scott Key to write "The Star-Spangled Banner."

From Tangier, Rear Adm. George Cockburn's forces sailed across the Bay and up the Patuxent to burn Washington, D. C. Unable to fight ships of the line with gunboats, American Commodore Joshua Barney of Baltimore retreated upriver and scuttled his flotilla.

Bates and I had planned to take *Betelgeuse* to Pig Point and dive for Barney's guns. First, however, I went to the National Archives in Washington and read documents of the period. Barney's sailors recovered the guns after the war, I learned, so we dropped our project. But in the Patuxent tobacco country we saw plows weighted with iron pigs that could only have been ships' ballast.

"Divers raised the iron from sunken hulls off Pig Point," the farmers told us.

On Tangier no signs of the old war remain. Works of man have no permanence on land so little higher than the Bay waters that the people bury their dead above ground and build their frame houses without cellars.

But the art of 20th-century warfare is very much in evidence. Jets streak across the Bay from the Patuxent Naval Air Station to bomb target ships beached off the island. They pull out of their runs directly over Tangier town.

In the Chesapeake beyond the targets lies the wreckage of the old battleship *Texas*, renamed *San Marcos* so another ship could bear her name. An early Army flyer, Gen. Billy Mitchell, bombed her to prove the effectiveness of aerial attack. Bates dove to the wreck with an Aqua-Lung and drifted about in an eerie tangle of twisted plates.

He found a school of rockfish in residence, also many sea nettles. The tide, running full, nearly swept off his face mask.

I thought it a daring enough venture until, in Wenona, we met two young watermen who had rescued a nest of fledgling fish hawks from one of the target ships. They had accomplished their mission of mercy between bombings—using a fast boat!

Wenona, a delightful village of watermen on Deal Island, has a tiny harbor so crowded with local craft that yachtsmen usually pass it by. But a sailor can always get a berth in any small Bay harbor if he knows how to handle his boat. Come in fast with everything set, aim for the berth you fancy, then drop the sails on the run at the very brink of disaster.

Now throw a line to the Baymen watching critically from the wharf. At the same time call out calmly: "Would you kindly snub her, cap'n?"

Somebody will snub her. Baymen like to see a sailboat handled smartly.

Scooters and Bicycles Outnumber Cars on Tangier Island's One Narrow Road

Isolated Tangier, a dot of low-lying marshland in the lower Bay, lies 12 miles from Crisfield. One passenger-mail boat daily provides its only regular contact with the mainland, and the thousand islanders, who draw their livelihood from the water, would have it no other way. Capt. John Smith first sighted Tangier in 1608. Islanders say their ancestors bought it in 1686 from the Pocomoke Indians for two overcoats.

Crisfield Packs—and Races—Crabs

From Wenona we sailed down Tangier Sound to Crisfield for the annual Hard Crab Derby, a big event in a town that calls itself "Seafood Capital of the World."

The slogan comes close to truth. Crisfield packs every Chesapeake seafood from shad roe to conchs dredged in the Bay mouth, but especially crabmeat. Packing houses line the busy canal that leads to the new Somers Cove Marina. Passing along the canal, which handles more traffic than the town's main street, we heard the women crab pickers singing spirituals as they worked.

The entrants in the Hard Crab Derby raced down a ramp before an audience of hundreds (pages 390-91). Trouble was they scuttled any direction they chose, and had not one big fellow representing Governor J. Millard Tawes of Maryland gone straight to the finish line, the race judge might have been in trouble.

I was the race judge. They pick a stranger for this dangerous post.

Governor Tawes, himself a Crisfield native, sportingly gave the prize to the second crab, representing the Commonwealth of Virginia.

The summer south wind hurried *Betelgeuse* up Tangier Sound. In Hooper Strait, leading to the Bay, frantic gulls signaled feeding blue-

Skipjack sail takes shape under the skillful hands of Albert Brown in a loft at Wenona, Maryland. Members of this sailmaking family have sewn canvas for Bay craft since 1870.

Hazy September moon lights the docks of Wenona, a haven on the Eastern Shore where working boats lay up for the night.

Striped spinnaker billowing, a Lightning-class sailboat slices through the Choptank River during the Tred Avon Yacht Club Regatta on Maryland's Eastern Shore. First mate takes over the tiller while the skipper peers through a plastic panel in the mainsail.

fish. Shortening to jib and mizzen, we trolled feather jigs and caught what we needed for supper.

Through the soft night, past the winking channel buoys, we coasted the tall Cliffs of Calvert, on the Western Shore of the Bay. An ocean covered this part of the world in middle Miocene times, three to ten million years ago. Whales swam in this sea, and huge sharks and crocodiles.

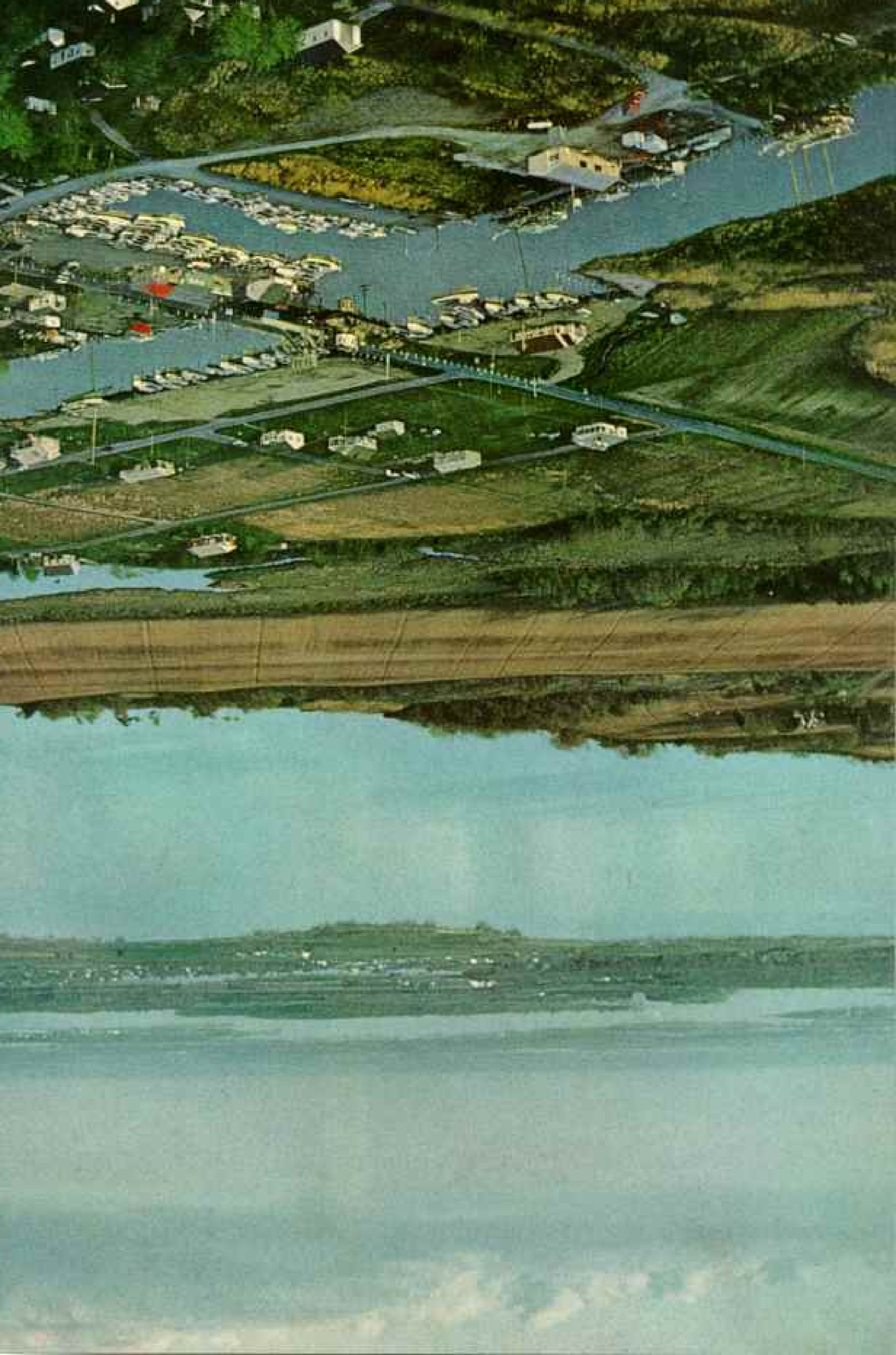
The ancient beasts died and the bottom mud swallowed them. Now, walking the beach after an eroding rain, one fills a bucket with fossil sharks' teeth in the course of a pleasant morning.

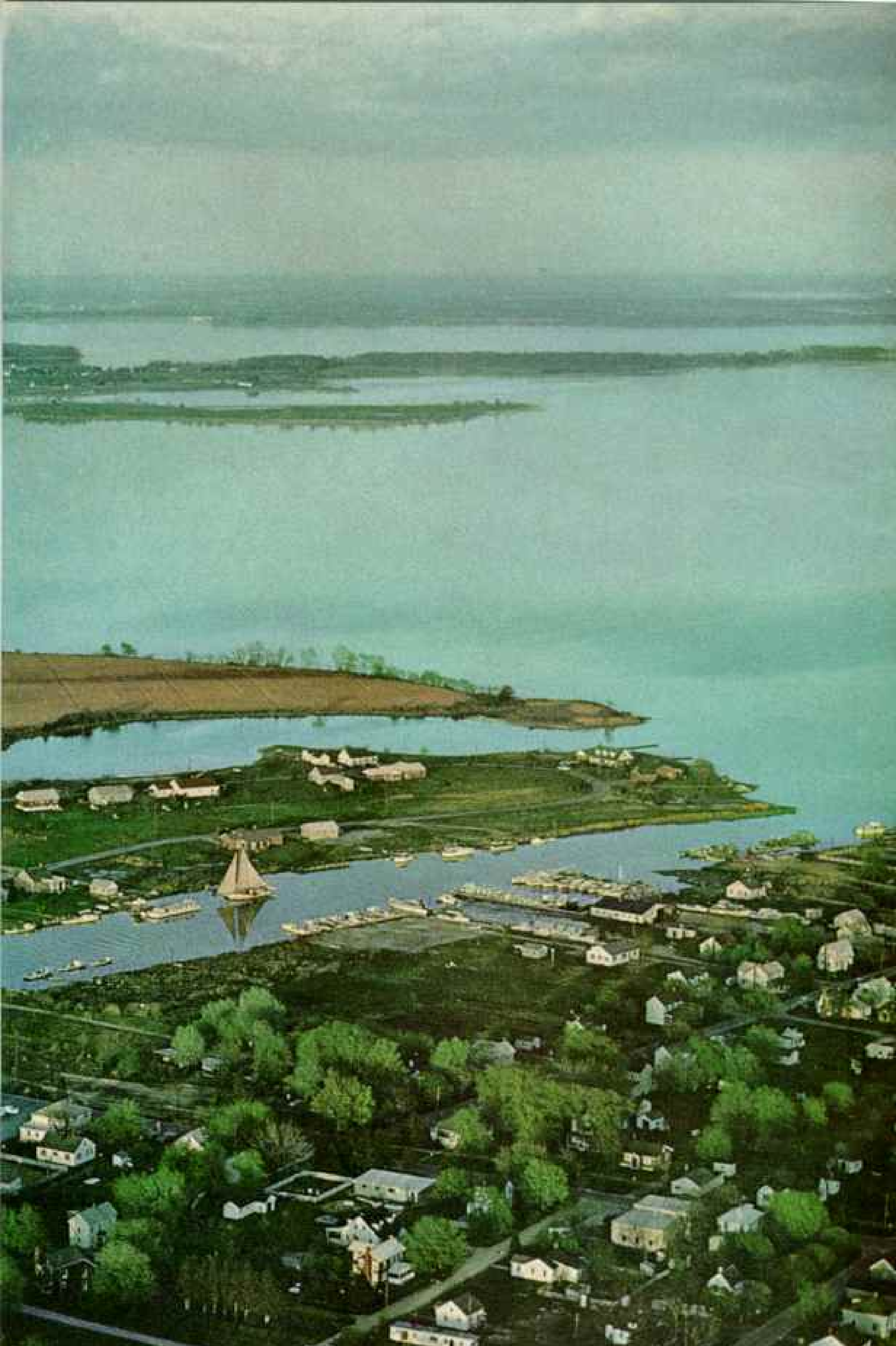
Scientists came to study the fossils and built a community they call Scientists Cliffs. North of it Parker Creek meanders to the Chesapeake from the tobacco farms of Calvert County. The last few miles flow through a broad marsh that invited an expedition in

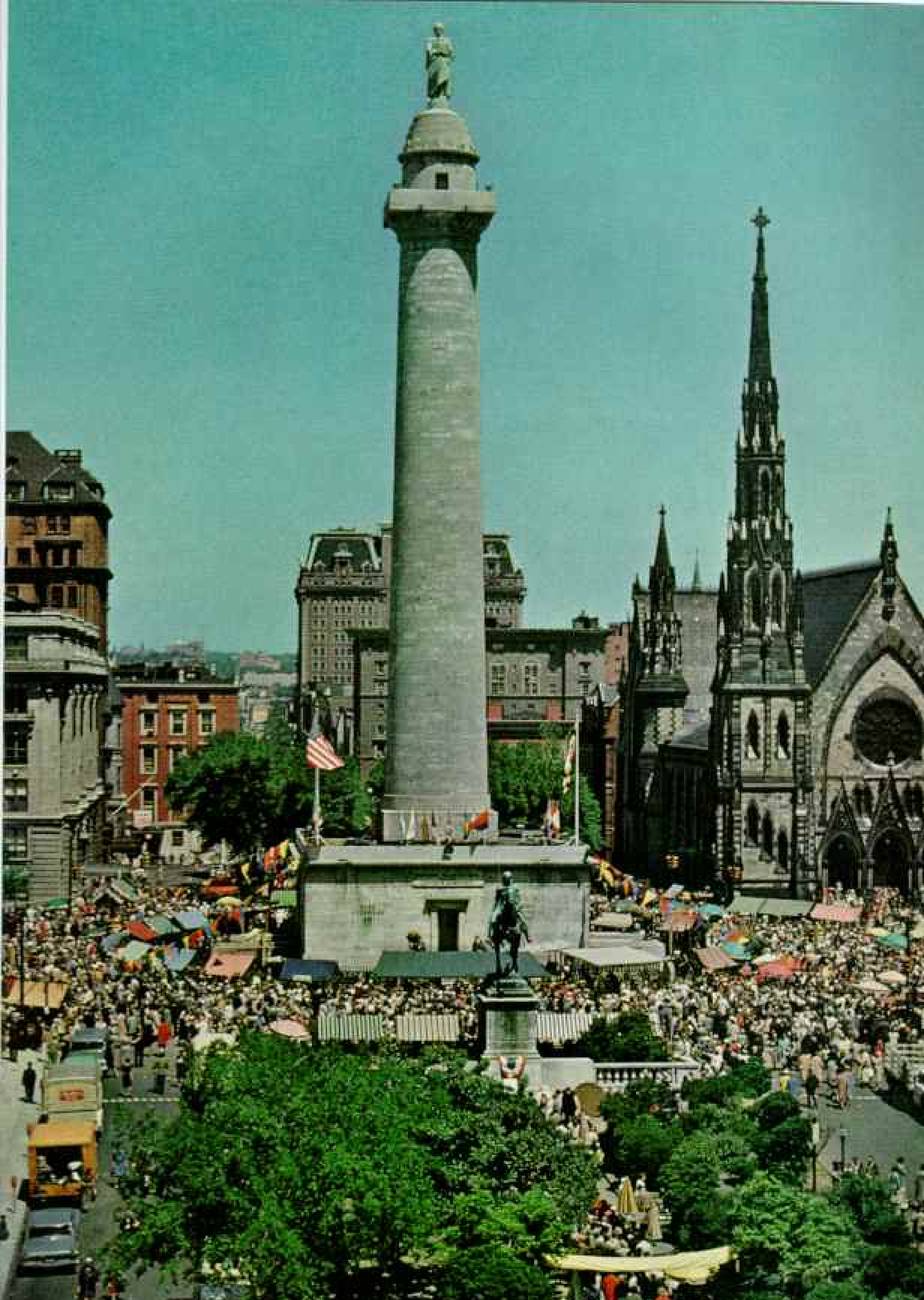
Knapps Narrows Bisects a Peninsula to Create Tilghman Island

Tilghman, west of the town of Oxford, typifies the small secluded harbors that lend charm to Maryland's tidewater country. Drawbridge opens for boat traffic in the 7½-foot-deep channel. The camera looks east over labyrinthine waterways of the Eastern Shore.

Matthew Tilghman, whose name the island honors, served as a delegate to the Congress of 1776. His cousin, Lt. Col. Tench Tilghman, became famous as the Paul Revere of the Eastern Shore when he carried the news of General Cornwallis's surrender from Yorktown to Philadelphia.







Betelgeuse's dinghy. Giant carp raced ahead of our noisy outboard, otters peeped through the reeds, bald eagles sat their nest in an old bull pine.

Parker Marsh is swamp primeval. Its deer and birds and turtles see few men. We soon learned why. Snags sheared the propeller pin. The dinghy grounded in mud too thick for oars, too deep for poling. Somehow we rocked her off and took the ebb tide back to the Bay.

North of the Calvert Cliffs we entered what I think of as the middle Bay country, where peaceful rivers with a wealth of quiet coves flow in from both sides. Thousands of upper Bay yachtsmen cruise and race in these waters, and know them so well they steer by marks as the waterman steers—a church steeple here, a clump of cedars there.

Log Canoes Race on Miles River

Threading the maze of crab-pot buoys in Poplar Island Narrows, we joined a hurrying procession of yachts in Eastern Bay, all headed for the Miles River Yacht Club's annual regatta.

Here race powerful log canoes, some nearly 100 years old. So tall are their rigs that without the weight of their crews aboard they can capsize in still air. Modern boats are here too: Stars and Comets and Penguins and Lightnings, spangling the river with colorful sails.

In front of the yacht club, spectator boats filled Long Haul Creek until one could almost walk from bank to bank on their decks. We kept on up the creek and tied up to Sam Shannahan's wharf.

Sam owns the 34-foot log canoe *Valiant Lady*, in which I have sailed as outrigger man, the crewman who, to keep the rudder down, perches on a boomkin overhanging the stern. The *Lady* beat any canoe I ever saw for leaking. Sam's crew, weary of bailing, finally mutinied, and Sam retired *Lady* to the lawn that slopes to his wharf.

Taking aboard all the people *Betelgeuse* could carry, we powered out into the river to see the racing. We watched the canoes storming along at 12 knots and more, huge sails swelled to the wind, sometimes a dozen men perched on springboards extending over the windward rails (pages 370-71).

One capsized in normal fashion, beaten down by the fresh breeze. Another went over spectacularly to windward when a hard flaw let up suddenly. Men on the springboards had no time to scramble in; their weight dumped the slim hull and left them spluttering in the white-capped river. Old-timer Bill Green

Peppermint stick inserted in a lemon refreshes a visitor to the Flower Mart in Baltimore's Mount Vernon Place (opposite).

Baltimore goes to the Flower Mart. Each May, bedecked booths raise money for civic improvements. Band music by students from Peabody Institute entertains crowds beneath the Washington Monument, started in 1815, 33 years before the one in Washington, D. C. Statue of the Marquis de Lafayette, a Baltimore favorite, faces south on Charles Street.

Teataster at work: Sipping from cups ringing his table, William Hall decides which flavor, bouquet, and body make the ideal blend for McCormick and Company, world's largest spice and extract house. Windows look out on busy piers where freighters unload exotic cargo from around the world. In total tonnage, Baltimore ranks fifth among U. S. ports.

Birthplace of "The Star-Spangled Banner," star-shaped Fort McHenry lies at the mouth of Baltimore's inner harbor. From a ship, Francis Scott Key watched the British fleet attack on September 13, 1814, and saw by the light of dawn his country's flag still "gallantly streaming" after 25 hours of cannonading. A national monument and historic shrine since 1939, the fort on Whetstone Point attracts more than half a million visitors a year. It is one of the few places in the United States where the flag flies 24 hours a day. Others include Flag House Square in Baltimore and the Marine Corps Memorial (Iwo Jima Statue) in Arlington, Virginia. Reseeding of McHenry's lawns created the swirling patterns in this aerial view.

Molten iron flows from a blast furnace at the Bethlehem Steel Company's Sparrows Point plant near Baltimore, largest in the country. Worker in aluminized asbestos suit oversees loading of a refractory-lined "submarine car" below the floor, which carries fiery metal to open-hearth furnaces for refining.

spluttered, too, when powerboats speeded to pick them up.

"In the old days, when we raced *Mary Rider*," he snorted, "half the crew jumped overside to lighten her if the wind came ca'm. There weren't any speedboats to rescue us. We swam home."

More than 6,000 sailing log canoes took Baymen to their oystering and crabbing grounds in 1880. About a dozen still carry sail, although many live on, unrecognized, as powerboats. Some owners who race their boats have fiberglassed the hulls to hold the tired timbers together.

Luxury Beckons Yachtsmen to Marinas

Monday morning Long Haul Creek reverted to its customary peace and quiet.

We ran upriver to St. Michaels and tied up for supplies at one of the modern marinas that everywhere in the Bay country furnish yachtsmen all the conveniences of home. To one accustomed to anchoring nights in deserted coves, these marinas are a little incredible.

Preening Canada goose, so artful it seems actually to be ruffling its feathers, is the creation of the brothers Lemuel (left) and Stephen Ward of Crisfield. Every week they produce one decoy, each a collector's item.

Chesapeake Bay retriever, a native American breed, sloshes ashore with a duck gently held in his mouth. Decoy geese bob in the Miles River. Belle Kennels in Easton, Maryland, trains Buck with the aid of a tame mallard; the bird, tied wing and foot, patiently endures its undignified role.

Great Oak Lodge on Fairlee Creek, upper Shore, is perhaps the most luxurious of them all. In addition to hotel, restaurant, and swimming pool, it offers horseback riding and goose shooting in season.

There is another near Great Oak, on Worton Creek—and Worton was a youthful haunt of mine in a day when few yachts rounded its guardian sandspit. With friends like Vannort Chapman of Baltimore and Phil Clarke of King George, Virginia, I sailed to Worton in a tiny skipjack I called *Bloody Hand*, after an obscure pirate vessel.

We spent the summer in and out of Worton Creek, living off the land. Phil had a trick of fishing for chickens, using a grain of corn on a line cast from the shelter of a bush. Local farmers likely blamed 'coons and 'possums.

Betelgeuse's crew found St. Michaels in early 19th-century costume, celebrating the repulse of British marines who tried to sack the town in 1813 (page 390). The redcoats marched with excuse enough: Town shipyards turned out some of the best of Yankee privateer schooners and gunboats.

But the British attack broke against determined militia, leaving the shipyards intact, although time did for them eventually. Today's villagers claim their ancestors invented the blackout during the 1813 action. They darkened their houses and hung lanterns in the trees beyond; British cannoneers overshot the town.

The British later landed a party near Worton's Creek. It marched inland, and at Caulk's Field the American militia defeated it, killing Sir Peter Parker, enemy commander.

History gives scant details of the action. However, the Captain Caulk who owned the battlefield was one of my ancestors. I fancy he fought with valor. Who wouldn't in defense of his own hogs and chickens?

Sir Peter Parker's party may have been

Seagulls in search of worms swoop behind the tractor of a farmer harrowing his cornfield

Flower-lined walk leads to a Chesapeake show place, the Alexander Rogers residence on Gibson Island, Maryland. Some 100 families make the island their year-round home.

headed for Chestertown, which had been an English garrison town before the Revolution. I had promised my crew a trip up a river as far as we could go, first under sail and then on auxiliary power. We could have chosen the Patuxent, the great Potomac, the James, the Rappahannock, or any of the long Bay rivers. We picked the Chester. It is peaceful and beautiful, and I know every inch of it.

Tidy farms and the restored manor houses of old plantations front the water. Cows stand in the river at midday, shaded by weeping willows. Noisy kingfishers keep minnow-watch on tumbledown steamboat wharves, long disused.

Rounding a bend in the narrowing stream, we came to Chestertown and anchored off the old custom-house. They say George Washington knew this building, and here the story is probably true.

A college was founded in Chestertown in Washington's time. It asked the first President for permission to name itself after him. Washington College. He assented.

I promised the crew hardhead fillets for breakfast, certain I could catch all I wanted in an hour. But I fished half the night and hooked only eels. Once the most abundant bottom fish of the Chesapeake, the mainstay

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS BATES LITTLEHALES (ABOVE AND LOWER RIGHT) AND GEORGE F. MOBLEY © N.G.S.

near Easton, Maryland. The Eastern Shore's rich soil produces bumper crops.

of the party-boat business, the hardhead is rare these days. No one knows for sure what happened to these unpredictable migrants.

Next morning we powered past Chestertown until *Betelgeuse*, with her draft of more than five feet, could go no farther. After that we took to the dinghy. No need for rowing: We caught the fast flood tide up and came back on the ebb.

Crew and Boat Take a Bath

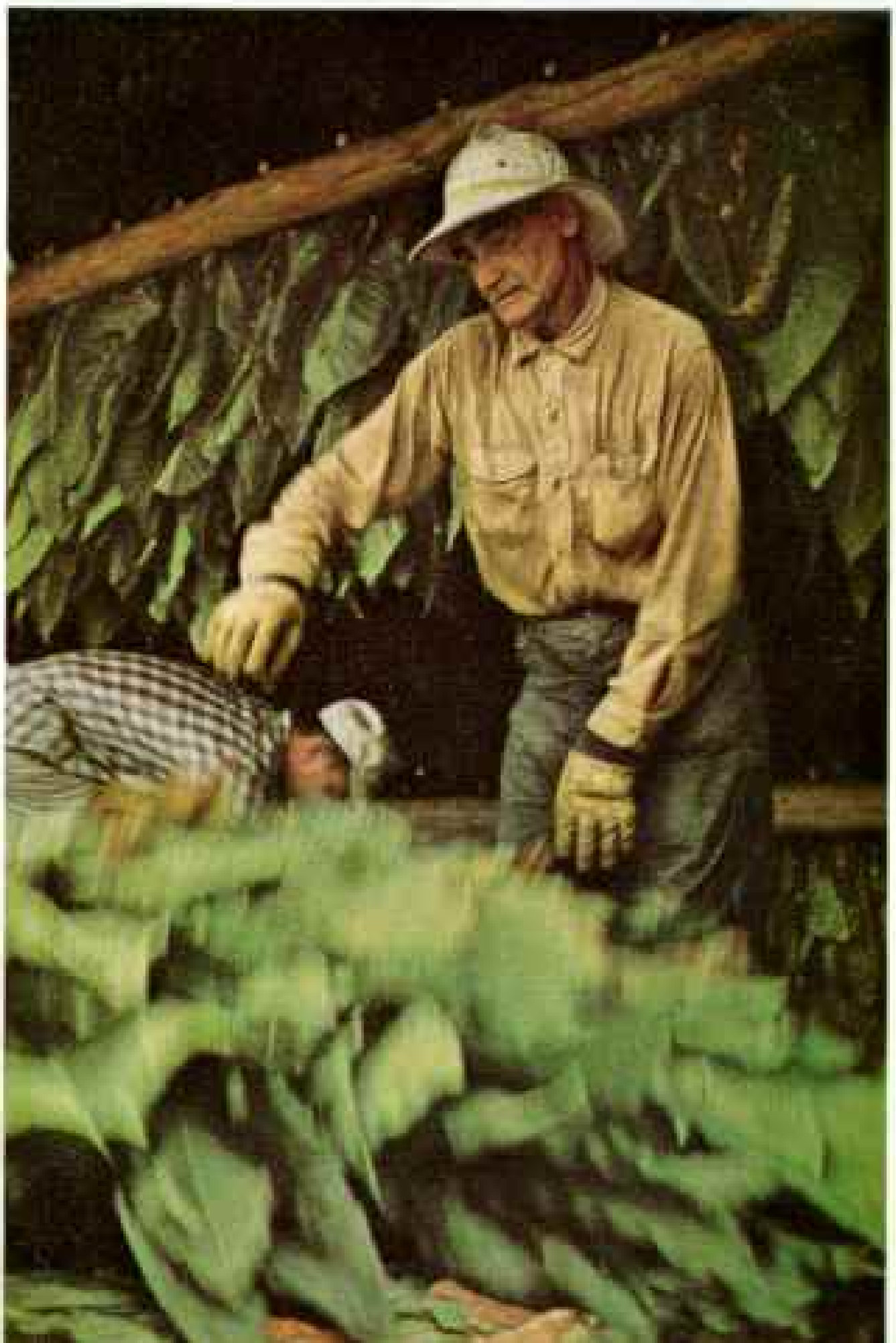
One looks for peace and quiet rather than adventure at the heads of the Bay rivers. Muskrats splash in the tall marsh grass. Mallard ducks convoy their young, watching the water for snapping turtles.

If it is the right time, the water monsters that will become dragonflies climb up at night to cling to the topsides. There they shed their swimsuits, and the emerging dragonflies ascend the rigging to dry their wings in the summer sun.

Chesapeake river headwaters are fresh. Fresh water kills the worms that riddle wooden planking, so *Betelgeuse* benefited from the sojourn. So did her crew; we gloried in our biggest bathtub of the summer. All sweet and clean, we departed for Baltimore.

Its grassy ramparts manned only

Tobacco farmer stacks freshly cut stalks in a curing barn at Barstow in southern Maryland's Calvert County, famed since colonial days for its fine-burning Type 32.



Not as old as it looks, the Governor's mansion in Annapolis, Maryland, facing the State House (opposite), rose in 1866. In 1936 it underwent remodeling to make it better conform with centuries-old structures in the capital. Today Annapolis fights to preserve its colonial look amid proposals for modern high-rise buildings in historic areas.

by sightseers, Fort McHenry let us pass (pages 400-401). The Star-Spangled Banner still waved, an exceptionally large one.

Like most of the world's big cities, Baltimore has changed drastically in the past few years. Sailing into the inner harbor, I looked in vain for the old wooden piers on cobblestoned Light Street whence the white steamers sailed to the Chester and the other rivers. Light Street is a wide asphalt highway now. Grass of a new park grows at water's edge.

Baltimore Reshapes Its Skyline

Of the familiar skyline, only a few of the more substantial buildings remained. One could see farther uptown, across the rubble of landmarks bulldozed to make way for new structures, than anyone has seen since the Great Fire of 1904 leveled downtown Baltimore. Practically the entire grimy heart of the old city has been swept clean in a vast urban-renewal project.

"You remember Peanut Joe's Saloon?" asked veteran newspaperman George Dorsch. "Where we waited standing in an inch of peanut hulls for the Sunday bulldog edition to come off the presses? Well, it's gone."

Mayor Theodore R. McKeldin, a long-time friend, told me Baltimore is spending more than a billion dollars on a city-wide modernization program.

I expressed sadness at the passing of the likes of Peanut Joe's. The Mayor agreed, at least about some old landmarks.

"But go see the new Civic Center," he said. "I do that after I've watched another old building fall."

I went, and it cheered me, too. Daringly modern in architecture, the center houses a 90,000-square-foot exhibition hall and a coliseum that will hold 13,500 spectators.

I took the *Betelgeuse* crew on a tour and found some things that have not changed and likely never will. The tall brick Shot Tower, for example, still stands. In the old days they poured molten lead through colanders in the top of this curious structure. Falling into a water tank, the metal became round shot.

McCormick and Company still gives the

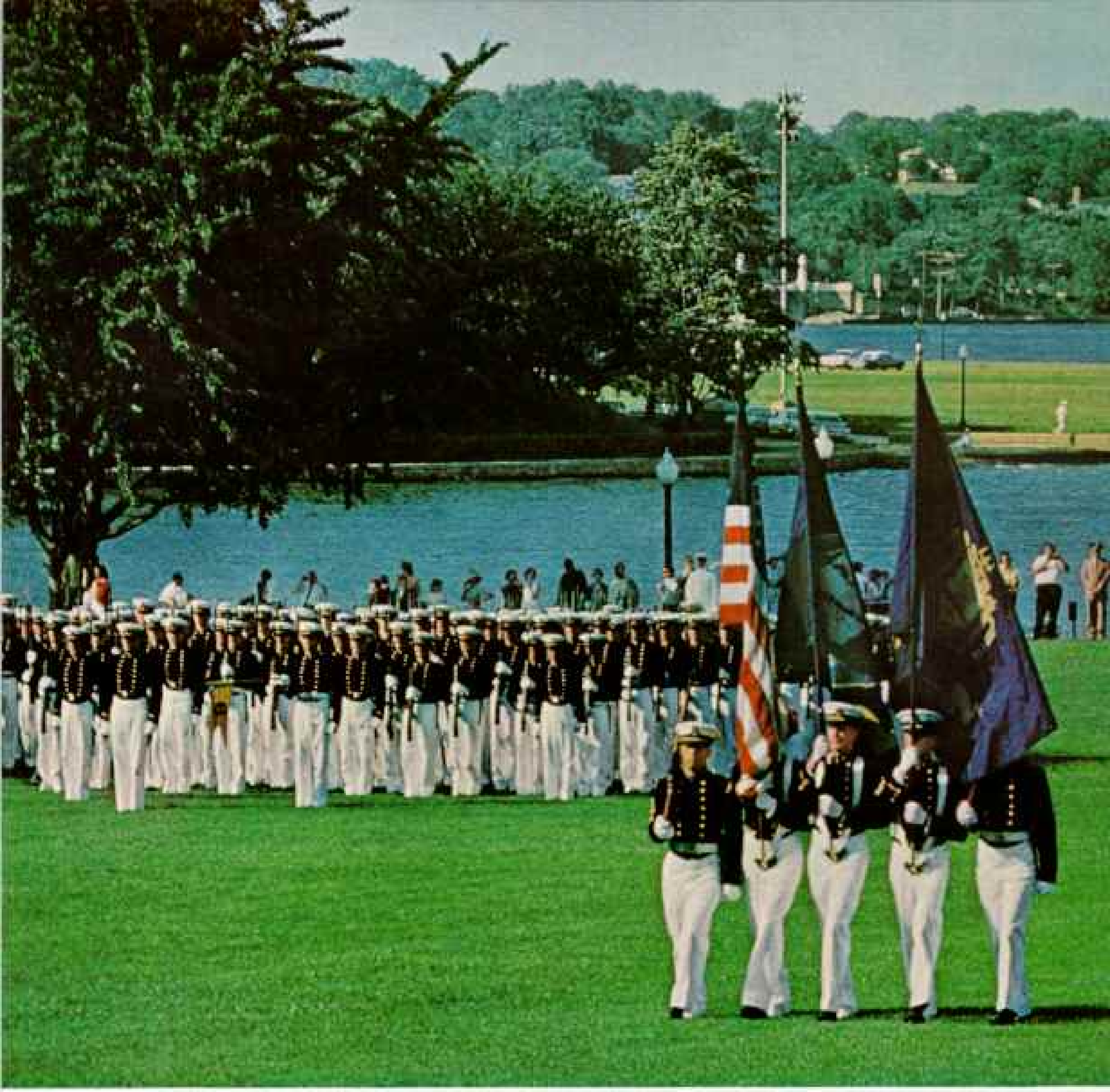
MARYLAND STATE HOUSE

BUILT 1772 - 1779

CAPITOL OF THE UNITED STATES
NOVEMBER 26, 1783 - AUGUST 13, 1784

IN THIS STATE HOUSE OLDEST IN THE NATION STILL IN LEGISLATIVE USE, GENERAL GEORGE WASHINGTON RESIGNED HIS COMMISSION BEFORE THE CONTINENTAL CONGRESS DECEMBER 23, 1783. HERE, JANUARY 14, 1784, CONGRESS RATIFIED THE TREATY OF PARIS TO END THE REVOLUTIONARY WAR AND, MAY 7, 1784, APPOINTED THOMAS JEFFERSON MINISTER PLENIPOTENTIARY. FROM HERE, SEPTEMBER 14, 1786, THE ANNAPOLIS CONVENTION ISSUED THE CALL TO THE STATES THAT LED TO THE CONSTITUTIONAL CONVENTION.

A REGISTERED NATIONAL HISTORIC LANDMARK
MARYLAND HISTORICAL SOCIETY



waterfront the spicy scent of distant lands it has had ever since clippers returning from China raced up the Bay under stuns'ls and moonrakers. Close your eyes at Pratt and Light Streets when the wind is south; you are in Zanzibar at clove-harvest time.

Bethlehem Steel Company, whose Baltimore plant is the largest in the country, still lights up the night sky for miles around, when cars coming from the blast furnaces dump the molten slag (page 401).

"Half the city must be on fire!" strangers exclaim in alarm.

And in a single block of the old German section of Highlandtown, we counted three young women on their hands and knees, scrubbing the white marble steps known the world over as the hallmark of my native city.

After Baltimore I had planned to cruise the Chesapeake headwaters—the Middle and Bush Rivers on the Western Shore, the Bohemia, Sassafras, and Elk on the Eastern. It is delightful country, but a land of wide rivers rather than salt marshes. Delaware and Pennsylvania yachtsmen keep their boats here, and many marinas and shipyards have been built in recent years to serve them.

Unfortunately something occurred to change our plans. I quote from the *Betelgeuse* log: "Wind NW, strong and cold. Lit the coal range in the cabin. Had to take in the mizzen, reef the main, set the forestaysail in place of the big genoa. Two strings of geese flew down from the north. This means autumn. We will call only in Annapolis before going on to winter quarters at Oxford."

June Week at the Naval Academy in Annapolis: Midshipmen in dress uniforms parade on Worden Field. In the Severn River beyond, boats of the Navy's training fleet maneuver under sail.

When the Academy opened in 1845, entrants were required "to read and write well and be familiar with geography and arithmetic." Today the curriculum offers 180 courses ranging from social science to nuclear physics.

Navy's All-American quarterback Roger Staubach looks for a receiver in the Navy-Maryland game at Annapolis, November 9, 1963. He ran for two touchdowns and passed for a third, helping Navy triumph 42 to 7. At season's end Staubach won the Heisman Trophy as the Nation's outstanding college football player.

In the lee of the Western Shore we reached south. We passed Gibson Island, where soon the wintering swans would fill the yacht harbor at my mother's doorstep. Sheeting home the sails, we raced into the Severn River with the lee rail buried.

The United States Naval Academy's fleet of blue-hulled sailing yachts still lay at moorings, although private yachts already were going under winter covers. Tough sailormen, these Atomic Age midshipmen. They race their craft all over the Bay, and they sail until snow flies.

Football practice on Farragut Field beyond the sea wall reminded me of all the games I have watched here without benefit of ticket. My brother and I used to sail into the river, anchor our boat, and cheer the Navy teams

Four-mile-long Chesapeake Bay Bridge, completed in 1952, opened a major new artery linking the Eastern Shore with Baltimore and Washington. These twilight anglers fish for striped bass off Sandy

from the rigging. Sometimes, while spending my own college vacations sailing the Bay in *Bloody Hand,* I cadged free showers and even a few meals at the Academy. Friendly plebes lent me bits of their uniforms for disguise.

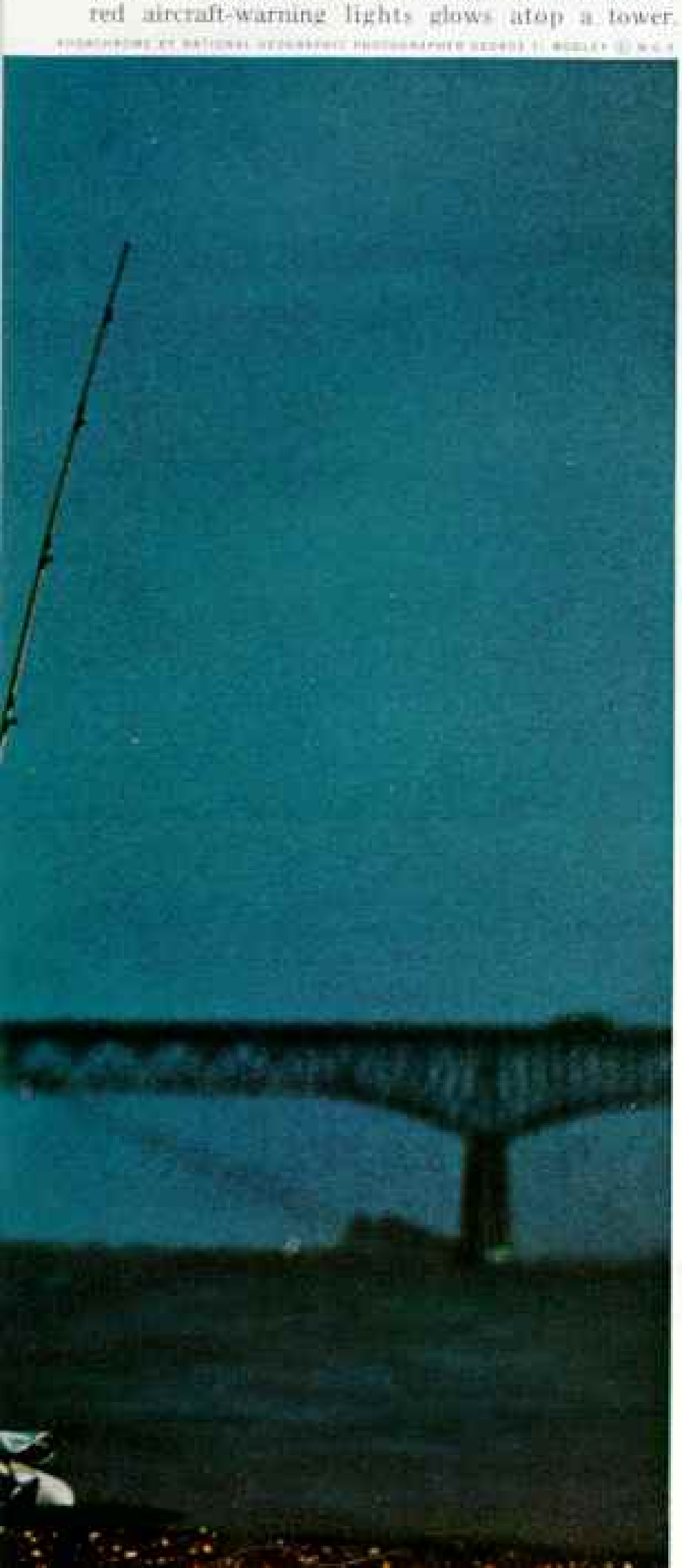
Annapolis, of course, is Maryland's capital. The General Assembly still meets in the old domed State House where George Washington appeared before the Continental Congress in 1783 to surrender his commission as Commander in Chief of the army (page 407).

Annapolis has streets with names like Prince George and Duke of Gloucester, and some of the finest Georgian colonial buildings in the country, including the famed Hammond-Harwood House and the buildings on the St. John's College campus.

Colonial brick sidewalks still serve, bumpy with age. Annapolitans habitually step high to avoid the puddles formed at every rain, and claim they can recognize their fellow townsmen in New York or Paris simply by noting how they walk.

From Annapolis we sailed a bit sadly across the Bay to Oxford, a tidy village on the Tred Avon River, and in Town Creek nosed *Betelgeuse* into her winter slip. We doubled her lines and packed our gear and left her.

I headed for Washington. Once across the Bay Bridge, I had an impulse and turned the car south. An hour or so later I stopped on a high bluff, and there at my feet sparkled the St. Marys River, where in 1634 the English led by Leonard Calvert, brother of the second Lord Baltimore, stepped ashore from the *Ark* and the *Dove* to found a colony that would command the allegiance of my ancestors.



Point, Maryland. Beyond them, one of the bridge's red aircraft-warning lights glows atop a tower.

Land Little Changed in 300 Years

As at Jamestown, nothing remains of old St. Marys City, although a replica of the first State House was erected in 1934 to the original plans. But the parallel with Jamestown ends in the fields beyond the vanished city, for in southern Maryland tobacco remains the principal crop, and so I think the look of the land must not have changed greatly.

I stopped at Barstow, in Calvert County, to see Oscar Bowen. I found him in his tobacco barn holding a blighted leaf.

"Look at it, Cousin Nat," he said. "All green spot and won't fetch the fertilizer price."

Oscar knows we are no kin, but we have fished and hunted together for 25 years, which in the Chesapeake Bay country is next best to blood relationship.

"Tell you," he continued, "a Bowen took up tobacco land here 300 years ago. He worked it with oxen and raised turkeys to pick off the worms. But I bet he made tobacco every bit as good as this. You think we've made any progress in the Bay country?"

"I don't know," I said. "Any yellow perch in the creek these days?"

"Yessir," said Oscar, "and some right nice pike too."

We started to the house for the oars and fishing tackle.

THE END

Embattled train cuts through South Vietnamese jungle beneath the eye of United States Air Force pilot Don C. Johnson. When he spots Viet Cong raiders from his reconnaissance plane, Captain Johnson fires a target-marking phosphorus rocket and radios for air support. The 689-mile route, vital artery of a war-torn land that has few roads, suffers constant attack by Communist guerrillas.

Slow Train Through Viet Nam's War

Article and photographs by HOWARD SOCHUREK

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IT WAS JUST AS THE COOK had predicted. The Communist guerrillas, he had said, probably would attack our train as it approached the town of Sa Huynh.

We were traveling on the Viet Nam Railway—the single narrow-gauge track that snakes east from Saigon through dense jungle toward the South China Sea, then arrows northward nearly to the border of Red-held North Viet Nam.

Earlier, while serving breakfast, the cook had advised us on how to survive while under fire by the Viet Cong, the Communist infiltrators of South Viet Nam.

"In case of ambush," said the amiable gold-toothed Pham Van Giau, "go to the far side of the car. Keep wood between you and the bullets. Never leave the car. Most people are killed or injured when they leave the car."

Mr. Giau's remarks were delivered in Vietnamese and then relayed to me in French by Nguyen Phuoc Hau, my government escort.

The cook refilled my coffee cup.

"One and a half months ago," he said, "on train No. 5, thirteen people were killed and eighteen wounded when they fled the cars."

The tragedy was made even worse by the fact that many of the dead and maimed were

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The Author: A photographic officer on Gen. Douglas MacArthur's staff in World War II, Howard Sochurek subsequently covered the Korean conflict and in 1953 was the first American correspondent to enter Dien Bien Phu, France's last stronghold in Indochina. He reported the Malayan revolt, the Suez crisis, and the Congo fighting. His war coverage has won many awards.

women and children, innocent noncombatants who played no part in the civil war.

Mr. Hau and I digested these gloomy facts while gazing out the window at the rocky coastal landscape. Mr. Giau imparted more survival lore.

"If the train hits a mine," he said, "grip something solid, try to keep your balance, and wait. If a mine explodes under your car, the car will stop immediately."

The train rocked along, each click of the wheels bringing us that much closer to the notorious danger zone of Sa Huynh. Mr. Giau told me to move from the window on the left side of the dining area. Recently, he said, a French technician sitting in the same place had been wounded.

Mr. Giau closed the wooden shutters on the left side and retreated to the kitchen of our private car. As he did so, the firing began. It sounded close, and as if it came from automatic weapons. Mr. Hau and I hit the floor. The cook stood unconcerned in the open door on the rear right side of the car, smoking and observing the countryside.

Then all hell broke loose from the armored car just to our rear. Troops aboard this car had located the source of the attack, and now

Trigger finger caresses an automatic rifle as a South Viet Nam civil guard keeps watch through the porthole of an armored car, one of three for each train on the railroad. Despite 30 guards to a train, Viet Cong guerrillas take a fearful toll: Mines and ambushes have killed or injured hundreds of passengers, railroad employees, and soldiers, and have wrecked scores of cars and engines.

Anxiety Shrouds Faces of Young and Old Who Risk Their Lives for a Ride

Household goods, building materials, fruits, and vegetables pack a third-class car where passengers ride for about a cent a mile. The railroad schedules two expresses daily; in addition, locals provide farm-to-market and village-to-village transport. These people travel between Da Nang and Hue.

they were replying hotly with Browning automatics, M-1 rifles, and carbines.

Soon, above the rattle of small-arms fire, we heard the heavy crump of 105-mm. artillery support, which our defenders had called for by radio. Shellfire bracketed the train.

"Like Chewing Rocks," Official Warns

From my prone position on the floor, I could see the cook, impassive, take another long draw on his cigarette. It was 10:16 a.m. on Monday, April 6, 1964.

Wryly reflective, I reminded myself that my own journalistic enterprise—or perhaps folly—had put me aboard the ambushed train. With long moments for second thoughts, I recalled the words of railway president Pham Minh Duong, in Saigon, when I had asked permission to make the journey.

"It's just too dangerous," Mr. Duong said. "It's like chewing rocks."

But he had talked freely about his embattled railroad that ends just south of the 17th parallel (map, next page). There, in 1954, the Geneva agreements divided war-torn Viet Nam, formerly French-governed, into Communist north and pro-Western south.

The railway parallels the historic trade

Coast-hugging lifeline, the Viet Nam Railway follows the old Mandarin Road, trade corridor from Saigon to China. Opened in 1936, the narrow-gauge route was cut repeatedly during World War II and the eight-year French Indochina War that followed. The Viet Cong continue to sabotage the rebuilt system.

Rail tracks and tile-roofed station buildings in the heart of Saigon, capital of South Viet Nam, mark the start of the author's trip. Boulevards fan out to the River of Saigon.

route—the Mandarin Road—from Saigon northward to China. Carrying nearly 500,000 tons of freight and 2,000,000 passengers annually, it forms South Viet Nam's major artery of transportation.

Thus the railway binds together a politically and geographically diverse area that historically has seldom been unified. Moreover, it symbolizes the Saigon-based government among agrarian people not always either aware of or closely linked to that government.

Toward the end of World War II, when the Japanese temporarily ousted the French administrators, the Vietnamese Communist leader Ho Chi Minh consolidated his anti-French movement, the Viet Minh. With Communist China's help, Ho at the 1954 Geneva conference (following the French military defeat at Dien Bien Phu) won roughly half the territory that was formerly Viet Nam.*

After the Geneva conference, Ho's forces in the south were brought north. But soon he reintroduced cadres into the south, recruited local forces, and waged a military and political campaign to undermine the pro-Western government of Ngo Dinh Diem. A coup d'etat in November, 1963, toppled Diem and his adviser brother Ngo Dinh Nhu, who were killed.

A second coup, on January 30, 1964, brought Maj. Gen. Nguyen Khanh into power.

Since 1961 the United States has vastly increased its military and economic commitments to South Viet Nam. Today about 16,000

By flickering lantern light, stationmaster checks the make-up of a train that will leave at dawn.

*See, in NATIONAL GEOGRAPHIC: "Strife-torn Indochina," by W. Robert Moore, October, 1950; "Indochina Faces the Dragon," by George W. Long, September, 1952; "South Viet Nam Fights the Red Tide," by Peter T. White, October, 1961; and "Helicopter War in South Viet Nam," by Dickey Chapelle, November, 1962.

Sails furled, fishing boats anchor in the harbor of Nha Trang; the fleet's catch of grouper, mackerel, and snapper rides the train to market. An aura of peace pervades this afternoon scene, but Communists frequently terrorize the coast. Last June, at a spot 10 miles south of here, guerrillas blew up four railway cars, killing 20 passengers and injuring 40.

In a bowl-like boat made of gum-calked bamboo, fishermen of Nha Trang paddle quiet waters to check their nets.

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U. S. officers and men serve as advisers to the Vietnamese army. The cost of our aid runs to about $1,500,000 daily.

Yet the government remains unstable. Viet Cong pressure grows, there are rumors of another coup, and signs point to an even greater U. S. commitment.

Despite the discouragement I encountered in official Saigon quarters, I still believed that a ride on the Vietnamese railway would make a good and important story. U. S. Secretary of Defense Robert S. McNamara, during a visit to South Viet Nam, had called the railroad "a vital transportation link in the conduct of the war."

So I persisted. In one week I sent letters to 12 government bureaus and personally visited eight. And always the answer was, "No—too dangerous."

It was the same reply that had been given to all correspondents and photographers since the increased activity of civil war in 1960.

Then one Saturday night the charming honey-voiced girl switchboard operator in Saigon's Hotel Caravelle advised in soft Vietnamese-accented French that a guest was coming to my room. Soon a tiny man, delicately thin, scarcely five feet tall, wide-eyed and somewhat drawn, entered and introduced himself as Nguyen Phuoc Hau.

Mr. Hau explained that he had been sent by the Vice Premier, Dr. Nguyen Ton Hoan, who had approved my request. Together with Mr. Hau, I was to leave at 5 a.m. Monday

No man's land borders both sides of the track that carries 200 seasoned soldiers in wooden troop cars to duty at Da Nang. Sitting targets, many hang out windows to keep cool.

morning on train No. 2, the Saigon-Hue Express. I would be the first journalist to ride the railroad in four years!

Clearly, this would be no joy ride. In 12 months there had been more than 300 Communist attacks against the railway. Since 1961, mines and ambushes had killed 27 railroad employees and seriously injured 228 others; 128 locomotives had been damaged, eight of them all but totally wrecked.

Passengers Dwindle as Risks Increase

Last year 23 new diesel locomotives were bought with funds lent by the U. S. Agency for International Development; four months later a dozen had been mined or derailed.

Handbills found at the scene of one derailment, where two passengers were killed and 14 injured, had boasted: "Our first target is to destroy all American railroad equipment."

At the time of my visit, 122 passengers had been killed since 1961 while riding the railroad. In addition, service on an 88-mile line between Saigon and Loc Ninh had been suspended indefinitely.

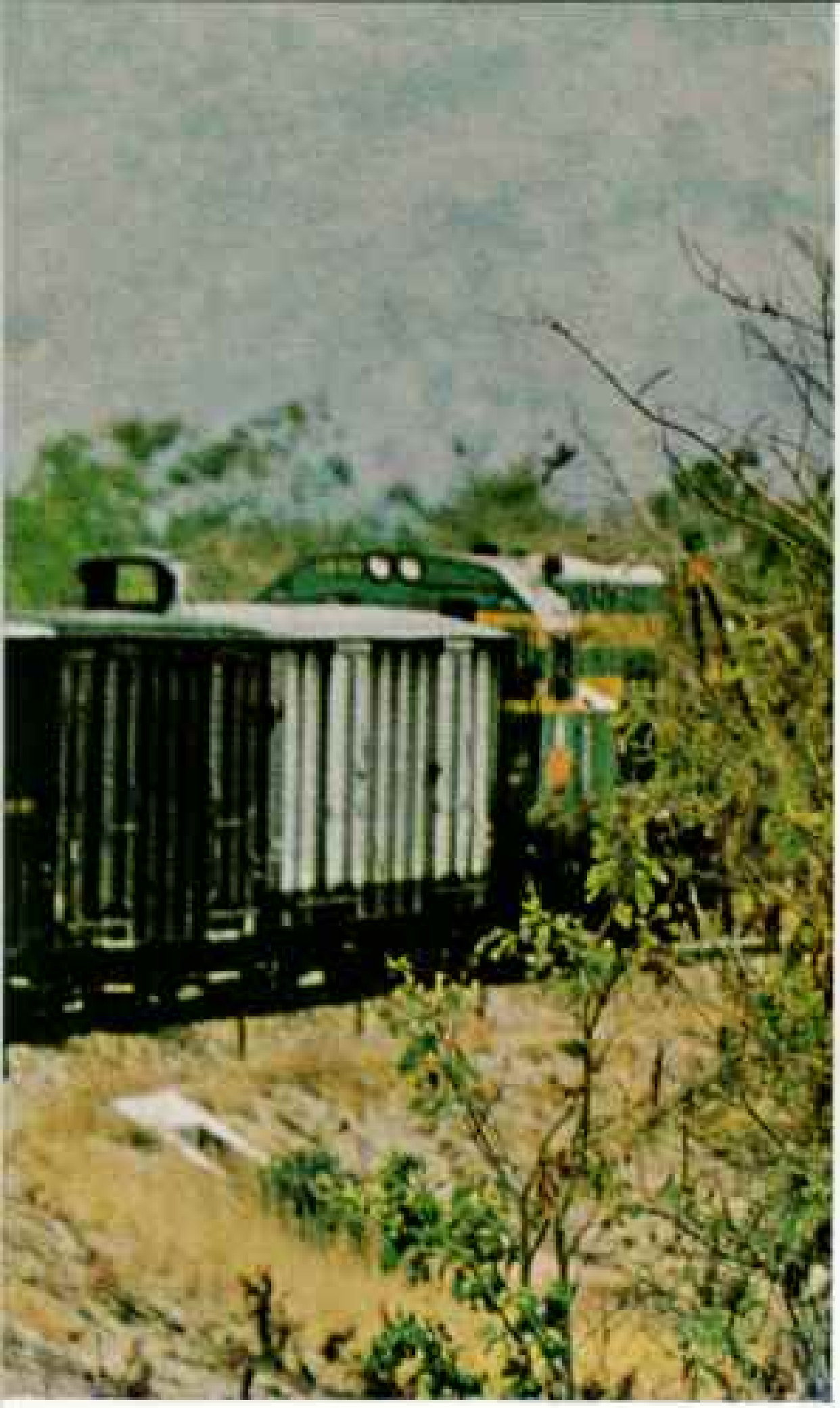
Passenger traffic had decreased by 50 percent over the entire system. As chief of operations Nguyen Ngoc Lam put it, "It's the most dangerous and difficult line in the world to operate, and it's getting worse."

Mr. Hau met me at the Saigon Passenger Station (page 417) just before 4:30 a.m. on Monday morning. We had been assigned a "service car," usually used by railway inspectors and more comfortable than the regular accommodations.

With Mr. Hau was his beautiful silk-gowned wife. Red-eyed and sobbing, she held his hand. They had been united only four days earlier, after several months of separation—she in Cambodia, he in Viet Nam. Mrs. Hau was convinced that bad fortune would haunt us on our trip. She had spent the night pleading with Mr. Hau not to go.

Mr. Hau announced he had engaged a cook,

(Continued on page 425)



Telephoto lens squeezes an armored car where guards on roof man a gun turret.

Bowl of rice and bits of meat satisfy a trooper en route to Da Nang. Lacking dining cars, trains stop for food at stations.

Brave smiles and smothered sobs from girl friends send soldiers off to duty. But in Viet Nam the front line is everywhere.

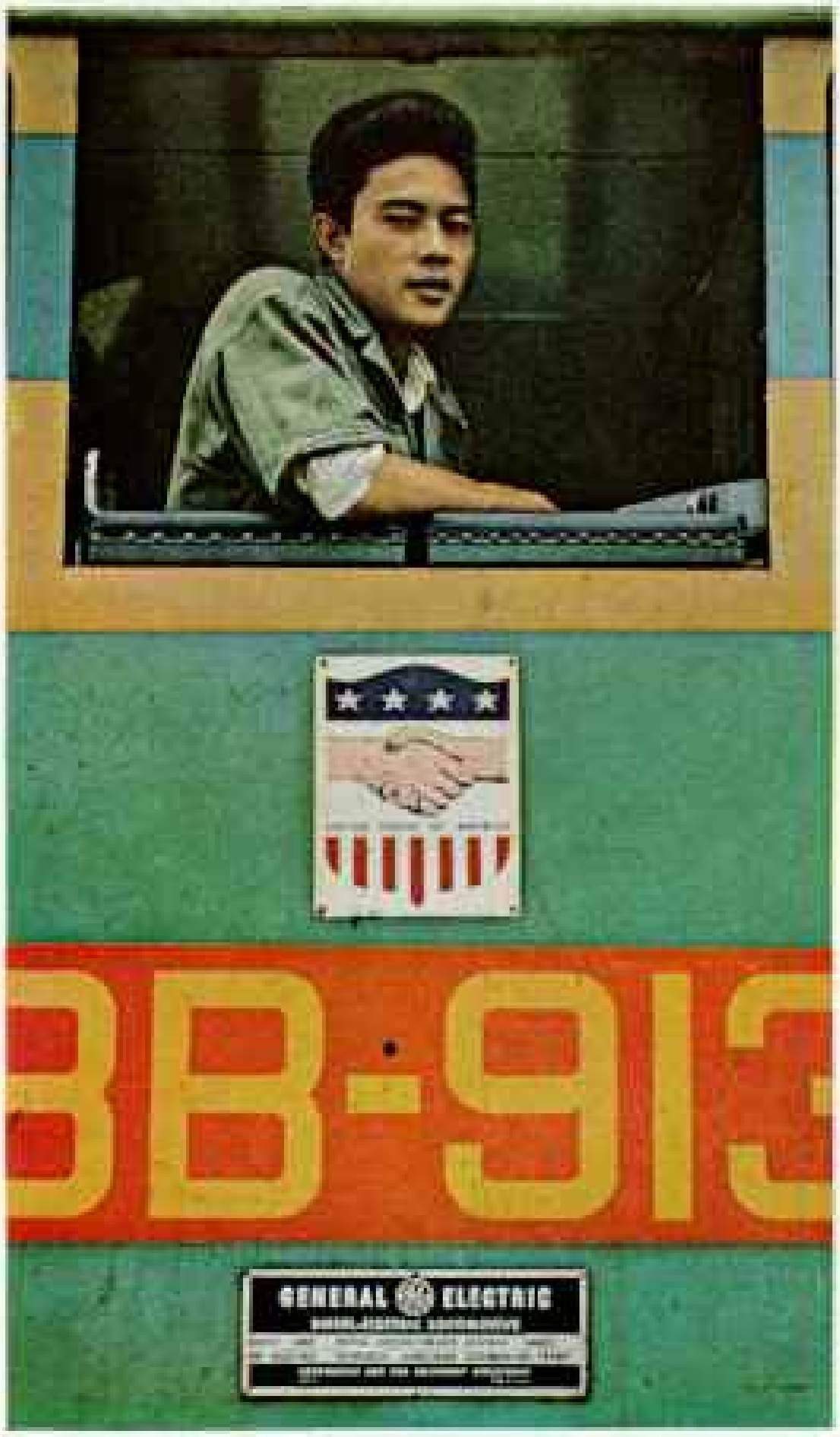
Terrain of terror

Rails and road often run side by side along the coast between Da Nang and Hue. Here the tracks tunnel across the tip of a wave-washed promontory opposite the village of An Cu.

Knifing through a patchwork of diked rice fields near Quang Ngai—one of the most dangerous zones along the railroad—the track crosses a green irrigation canal at lower left.

PHOTOGRAPHED BY HOWARD SOCKBURN © N.G.S.

Target for ambush. Despite the manned fort, saboteurs hiding in this wooded ravine near Lang Co mined the track last April and derailed an engine and four cars (next page).



Youth marks the engineer of today; death and injury have claimed many of the more experienced men. Clasped-hands emblem proclaims that the new diesel-electric engine was purchased with funds lent by the U. S. Agency for International Development.

Twisted steel and splintered wood litter the roadbed near Lang Co after a Communist mine derailed a locomotive and four ammunition carriers. Repair crew cleared the track in 18½ hours.

Crumpled remains of a U. S.-made engine blown up by a mine at Trang Bom stand in a repair shop at Chi Hoa. Beyond salvage, the locomotive will yield spare parts. The train wreck claimed two lives.

and soon Pham Van Giau arrived carrying a wooden icebox from his own home for our comfort. An ice chest was not standard equipment for service car VS 3732.

The station was alive with predawn bustle and excitement. Baggagemen, sweating in the humid 90-degree calm of morning, darted between the oil lamps of black-pajamaed saleswomen offering breakfast snacks to departing passengers.

Our train guard, 30 men evenly distributed in three armored cars spaced along the length of the train, noisily banged their steel-sided cars as they loaded ammunition. The train also was carrying 200 soldier replacements to Da Nang, 580 miles northeast.

Mr. Hau led me to meet the stationmaster. As we talked, the phone rang. It was a call from the trackwalker who had preceded the train out of the station. He reported that the track was clear of mines on the first five miles beyond Saigon.

At exactly 5 a.m. we boarded. Mrs. Hau cried, left us briefly, then hurried back with a bag of bonbons for her husband.

Our wooden French-built car was quite comfortable. At one end the cook was installed in a little cubicle with his ice chest and a two-burner bottled-gas stove. Then came two more cabins, each with double-deck bunks and washroom; another sleeping compartment with a double-deck bunk, and finally a dining area with a table that seated eight.

Peasants Flee to Safety in Saigon

At the head of the 12-car train were three flat-bed "sleepers," ballast cars that would detonate any pressure mines and save damage to the engine. Immediately behind the flatcars came the spanking new General Electric lo-

comotive, valued at $133,000. Next, and in the following order, rode a freight car filled with 105-mm. ammunition; a car encased in half-inch-steel armor plate; two third-class passenger cars carrying army enlisted men; a second armored car; a stand-up-style buffet car; a second-class passenger car carrying civilians; our service car, and finally a third armored car as a rear guard.

We passed quietly and quickly through the congested outskirts of Saigon, with its population-choked shanty towns. These were occupied by peasants who had fled the Viet-Cong infiltrated countryside to the relative security of the big city.

Twenty miles out, we passed several large French rubber plantations. Their evenly spaced, well-tended trees made a clickety-click pattern of sound as we passed. Farther on, at a French plantation near Dau Giay, men were clearing ground for new trees.

To survive, Mr. Hau commented, the French planters had to pay protection money to the Viet Cong.

The cook, always hovering near, brought us hot coffee. I asked him to sit down and join us. He did, and proved a delightful and interesting companion.

Cook Tells of Narrow Escapes

Pham Van Giau, 47 years old, had joined the railroad in 1947 when it was under French management, and had survived 19 attacks. "So many times I don't remember." He lives in Saigon, has six children (two boys, four girls) ranging in age from 3 to 19. He earns 3,300 piasters, about $45, a month. He had been successively a clerk, a brakeman, a switchman, a conductor, and now a cook.

His narrowest escape came one day when a mine exploded directly under the armored car in which he was sleeping. Two soldiers

Trainmaster and switchman in Quang Ngai await the uncertain arrival of a convoy from farther down the beleaguered line.

below him in the lower bunk of a double-decker were instantly killed. "The steel floor of the car was rolled up like a carpet, with the soldiers inside," he said.

His most memorable experience occurred in 1947, he said, shortly after he had become a brakeman on the railroad. The French system was to run as many as four trains over a given stretch of track at the same time, each in sight of the other, and traveling 15 miles an hour. On this day, the cook was in the last armored car of the first, or pilot, train. The car contained 12 Cambodian soldiers commanded by a French sergeant. Its main weapon was a Bofors gun mounted in a turret.

At Bau Ca, in jungle country 37 miles east of Saigon, three battalions of guerrillas waited in ambush. They let the first train through, then blew a mine that halted the second. In succession they then detonated 30 mines, stopping all four trains.

During the confusion the cook jumped under his car and saw four men running toward him. They were blown to bits when they prematurely detonated the plastic explosive that was to destroy the Bofors gun. Mr. Giau lay within 50 feet of the explosion.

The French sergeant radioed for help, and a fighter plane arrived. It strafed the surrounding jungle, but by then the attackers had already entered the train and were killing every Frenchman in sight.

The Vietnamese passengers were given an indoctrination lecture and released. The guerrillas then looted the train, taking all weapons and supplies, even clothes and shoes off the dead soldiers. In 45 minutes they had completed the mission and disappeared as suddenly as they had come, back into the jungle.

Mr. Giau told of an incident that occurred on October 30, 1963, between Song Phan and Muong Man. The rails at this point squeeze

Sheath of steel with machine-gun turret protects a "Wickham trolley"—an armored car originally developed by the British during their war with Communists in Malaya. The author traveled in a service car (far left), normally reserved for railway inspectors.

through a cut of rock that overhangs the train, barely permitting its passage. The train was guarded by one platoon of defense troops deployed in three armored cars. Against them was an ambush force of one battalion of emplaced Communists.

As the train entered the rock cut, 10 mines, electrically detonated, halted it.

In short order mines were then detonated just ahead of the train and just behind it, to prevent any troop reinforcements.

From the rocky overhanging ledges, the Viet Cong threw gasoline through the gun slits of the armored cars and later ignited it with grenades and Molotov cocktails. Of the 24-man guard, 21 were killed—trapped and cooked in the armored coffins.

Mr. Giau, whether by design or not, related these stories at precisely those times when our train passed the exact places he described.

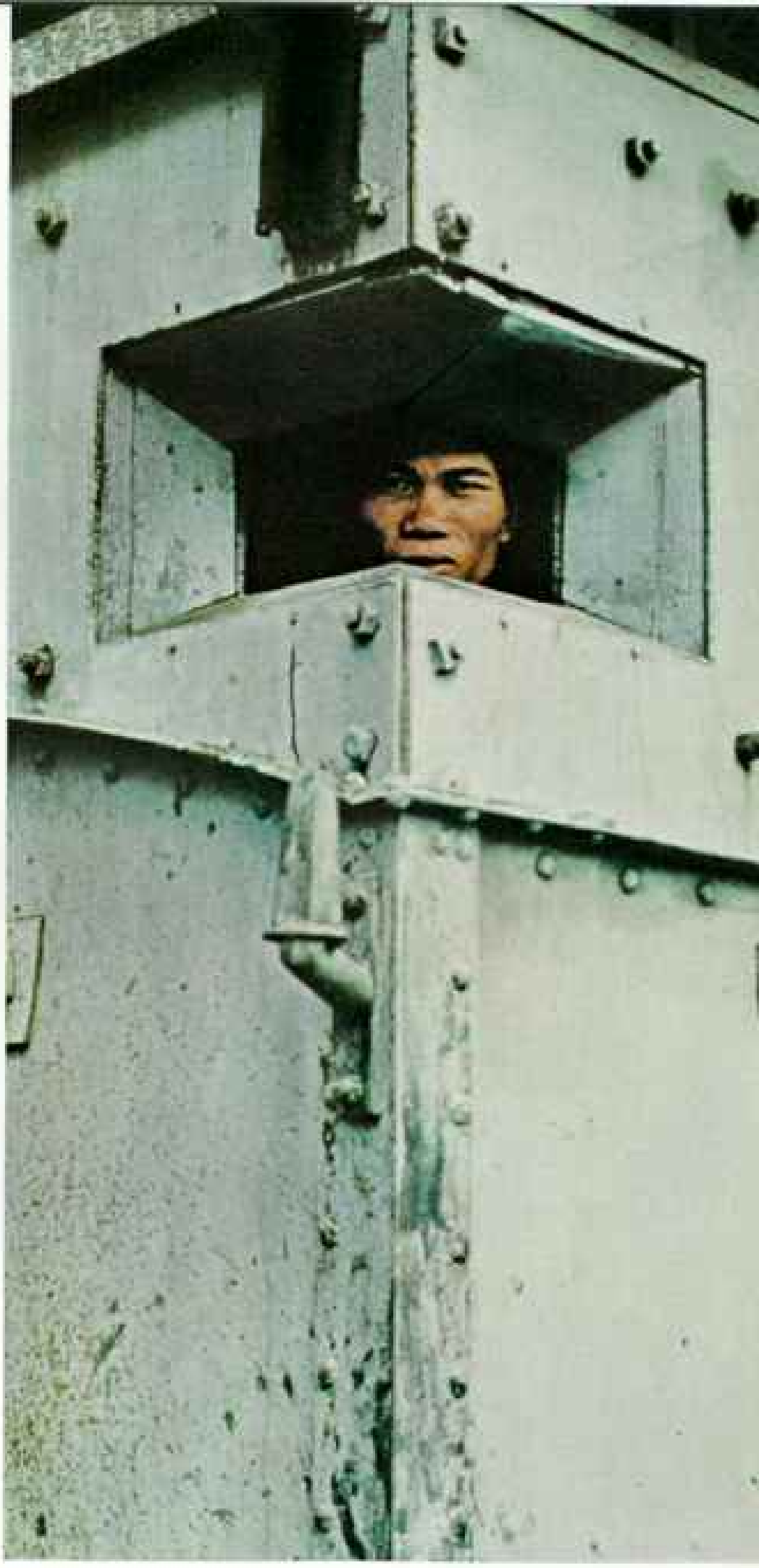
After we had been on the railroad for 14 hours, we were hot and dusty and tired. The stories of battle, the destruction, the loss of life, the effect of 20 years of war on a people fighting for their independence, had left me depressed and concerned.

It was late in the day, and the evening glow of sunset was tingeing the beautiful ridge of

Hands lifted in reverence, children of railway employees killed by the Viet Cong pray before a memorial at Chi Hoa (page 444). Between 1946 and Mr. Sochurek's visit, 75 trainmen died in service.

Hardened veteran of 16 years of war, Sgt. Nguyen Huu Lap peers from a bullet-dented armored car. He helped fight off a machine-gun attack against the author's train near Sa Huynh. Lap first went to war in 1948 as a soldier in the French Army.

Pain-tormented face of a brakeman epitomizes the suffering that railway employees must often endure. He was injured when two Wickham trolleys collided.



mountains that hems the coast from the sea near Cam Ranh Bay.

A little one-armed girl stood beside the track. She smiled as we approached. Smiling, too, were her classmates, who had just finished outdoor evening instruction. Her two-armed sisters jumped and waved at the rare sight of the white-faced, long-nosed foreigner traveling by train through their village. Finally she, too, raised her remaining arm and gave me a solitary salute.

That salute brought to mind once more the real tragedy of South Viet Nam: the senseless and seemingly endless misery and suffering endured by the innocent civil population.

It brought to mind, for instance, a day nearly a decade ago when I entered the valley of Dien Bien Phu. In one shattered village where the bodies of women and children lay charred and smoking, I looked into a half-destroyed lean-to. From a corner came the plaintive cry of a newborn child, now suddenly and pathetically motherless.

A French colleague stood with me. "When will these people explode," he asked bitterly, "under this impossible burden?"

By nightfall we had covered 250 miles. Our train was to move on through the night to

Qui Nhon, this part of the coastal area being relatively secure. An armored patrol train would precede us, and our speed was not to exceed six miles an hour.

Thus reassured, I folded my six-foot-four frame into a five-foot-eight bunk.

The following morning we arose early to an excellent breakfast of fried eggs, cheese, and French bread. It was at this time that the cook had begun our primer course in how to survive though being shot at. And we were no more than two miles from Sa Huynh, the point of attack predicted by our knowing cook, when the firing I described earlier erupted with savage suddenness.

While I hugged the floor, the firing continued. A nearby South Viet Nam mortar battery began lobbing shells into the hill overhanging the track to the west. Mr. Hau, lying beside me, said this was the 14th day of attack at this spot; there just weren't enough troops available to oust the Viet Cong from the area.

During a brief lull in the fighting, Mr. Hau translated new tidings from the cook: "He expects more firing."

He was right. Back and forth it went, continuing for six minutes. Looking out the open door on the right side of our car, I saw that we had passed through a cut and were rolling along parallel to National Road No. 1, the main coastal road.

Sixteen Bullet Holes Pock Locomotive

Bouncing along beside us, on a Lambretta motor scooter, was a black-clad Vietnamese wearing a white sun helmet. As I watched, he became so frightened by the firing that he jackknifed his front wheel and went flying head over heels when the bike overturned.

Two minutes later, as we approached the Sa Huynh station, all firing stopped abruptly. Mr. Hau translated Mr. Giau's final communique: "The cook is satisfied with the response of the train guard. He said today they performed well."

Mr. Hau then commented on Mr. Giau's sagacity in predicting the attack: "It's as if the cook announced in the menu at what part of the meal the firing would begin."

At Sa Huynh I jumped off to make pictures of the engineer and excited travelers. We counted 16 holes in our new engine, but nothing vital had been hit.

That evening our bullet-pocked locomotive pulled us into the overnight stop at Da Nang, rail center, fishing port, and headquarters of I Corps, the northern command group of the South Viet Nam Army.

We were met at the station by Capt. Joe Ross from Wister, Oklahoma, U. S. Army rail security adviser, and Capt. Van Huu Thuyet, Viet Nam Army rail security officer. Captain Ross's greeting summed up our adventure.

"It's like riding the Santa Fe during the Indian wars," he said, adding that he never used the railroad for personal travel.

Americans Advise on Train Defense

With the help of United States advisers, a three-dimensional defense has been worked out for the railroad. For defense in length, armored escorts from eight companies of civil guards are provided. For defense in height, air-cover and air-strike support come from joint United States and South Viet Nam Air Force operations. For defense in width along the rail line, such as protection of bridges, the system depends on provincial and territorial forces.

Other techniques suggested by United States advisers have been helpful. Since the Communists usually are emplaced only 150 yards or less from the railway line, mortars were proving of little effect when fired from the train. Now the defenders rely chiefly on fast-firing automatic weapons.

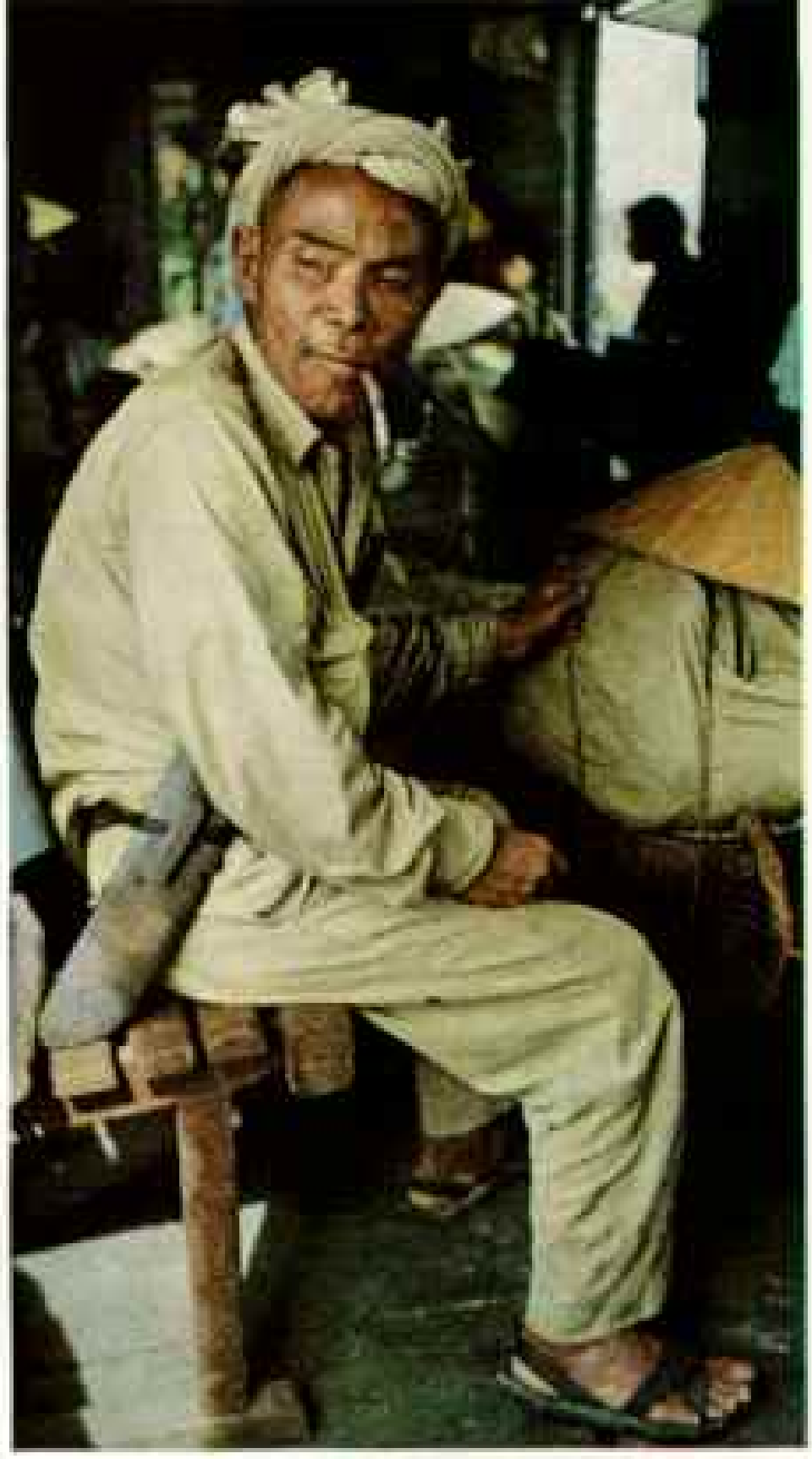
Also, the armored cars have been redesigned. The Viet Cong use the powerful bazooka-like recoilless rifle as a major attack weapon, so rock fill has been put between two layers of armor plate on each car. And it has been effective in resisting close fire.

From Da Nang Captain Ross arranged for us to ride a "Wickham trolley," one of three to precede the main train as an advance armored patrol.

The Wickham was designed by the British to safeguard jungle railroads during the Communist revolt in Malaya. It is a diesel-powered armored box with a machine-gun

Mistress of a cafeteria-in-a-pipe tidies up after serving rice and tea to construction workers on a new water line for Saigon. The Viet Nam Railway delivers supplies to the pipeline project, which runs parallel to the track from the Be River to the capital. Taking a siesta in the midday heat, one of the laborers sleeps off his lunch.

Hollow cheeks and tired eyes reflect the struggle for survival of a rice farmer near the North Viet Nam border.



Fresh cabbages from Da Lat, garden center of South Viet Nam, bow the back of a porter at Buu Son.

Turban identifies this rider from Hai Ninh as a Moslem Cham, whose ancestors emigrated from Malaya centuries ago. He carries a knife in his wooden sheath.

Fear Rides With a Family After a Gunfire Duel

For 14 days in succession, Viet Cong soldiers on a hill south of Sa Huynh fired on passing trains. On the April day the author made his journey, an exchange of fire with the enemy lasted eight minutes. This mother and her four daughters huddled on the floor of a wooden car during the fighting. When the train stopped at Sa Huynh, they crowded to the door, eyes wide and wondering.

Unaware of danger, small travelers sprawl in sleep, rocked by the rhythm of wheels on rails.

turret amidships (page 427). In addition to the turret gunner, three men with automatic rifles stand watch at small ports.

Captain Ross and I sat on benches in the center of the third Wickham. At Hue we picked up a brakeman being sent to join a train in Quang Tri. Because of crowding I took a standing position, looked out of a hatch, and watched the view up the track.

We were clipping along at 30 miles an hour, about 100 yards from the Wickham up ahead. Suddenly the car in front stopped dead. Instead of applying the brake, our driver panicked. I saw the inevitable coming, ducked back into the car, and braced against the forward armored wall. With full force we crashed into the stalled Wickham. Ammo belts and stray shells and beer bottles crashed about. The poor brakeman, unsuspecting, was thrown head first into the steel pillar that supported the turret machine gun.

Captain Ross was bounced about, too, but the brakeman was in bad shape, with a head injury and a crushed chest (page 429).

As the sergeant in command berated the driver in white-lipped fury, we crawled out the bottom door to assess the damage. Our front end was badly dented; headlights were no more. Two men in the stalled car that caused the accident had head injuries.

Decade Later, Street Still Without Joy

Gathering up the injured, we walked back to a station called My Chanh. Thirty minutes later, with the damaged Wickhams pushed to a siding, we boarded a freight train for Quang Tri. Captain Ross noted that our accident had occurred at the same place that the French had dubbed, just before their 1953 Operation Camargue, "The Street Without Joy."

I could only say, "Me, too."

Because of our accident, we were delayed

Mme Ngo Dinh Nhu's summer home in Da Lat gave her an empress's luxuries in wartime. House with secret escape tunnels, heated pool, and gardens once tended by 50

overnight in Quang Tri, the northernmost provincial capital. From the station, ever-thoughtful Mr. Hau called the province chief, Hoang Xuan Tuu. Ten minutes later a jeep arrived to take us to Mr. Tuu's home.

Our host, a tall ascetic man, received us on the porch of a decaying cream-colored, two-story colonial mansion, once the seat of the local French administrator. Mr. Tuu and Mr. Hau greeted one another emotionally. I learned later the why of their special relationship, and gained some insight into the present situation in Vietnamese politics.

Both Mr. Hau and Mr. Tuu were early leaders of an anti-French, anti-Communist party, the Dai-Viet (Greater Viet Nam). Mr. Hau was also an active leader of the Hoa Hao sect, an armed and organized religious minority. When Ngo Dinh Diem took power in 1954, his first act was to suppress and destroy all political opposition.

The Dai-Viets opposed Diem, so their members were jailed. Hau escaped capture and fled to Cambodia. There, Hau told me, Diem agents convinced Prince Norodom Sihanouk that he was politically undesirable, that he was at the center of a plot to kill Prince Sihanouk, and he was jailed in Phnom Penh. That accounted for his frail appearance.

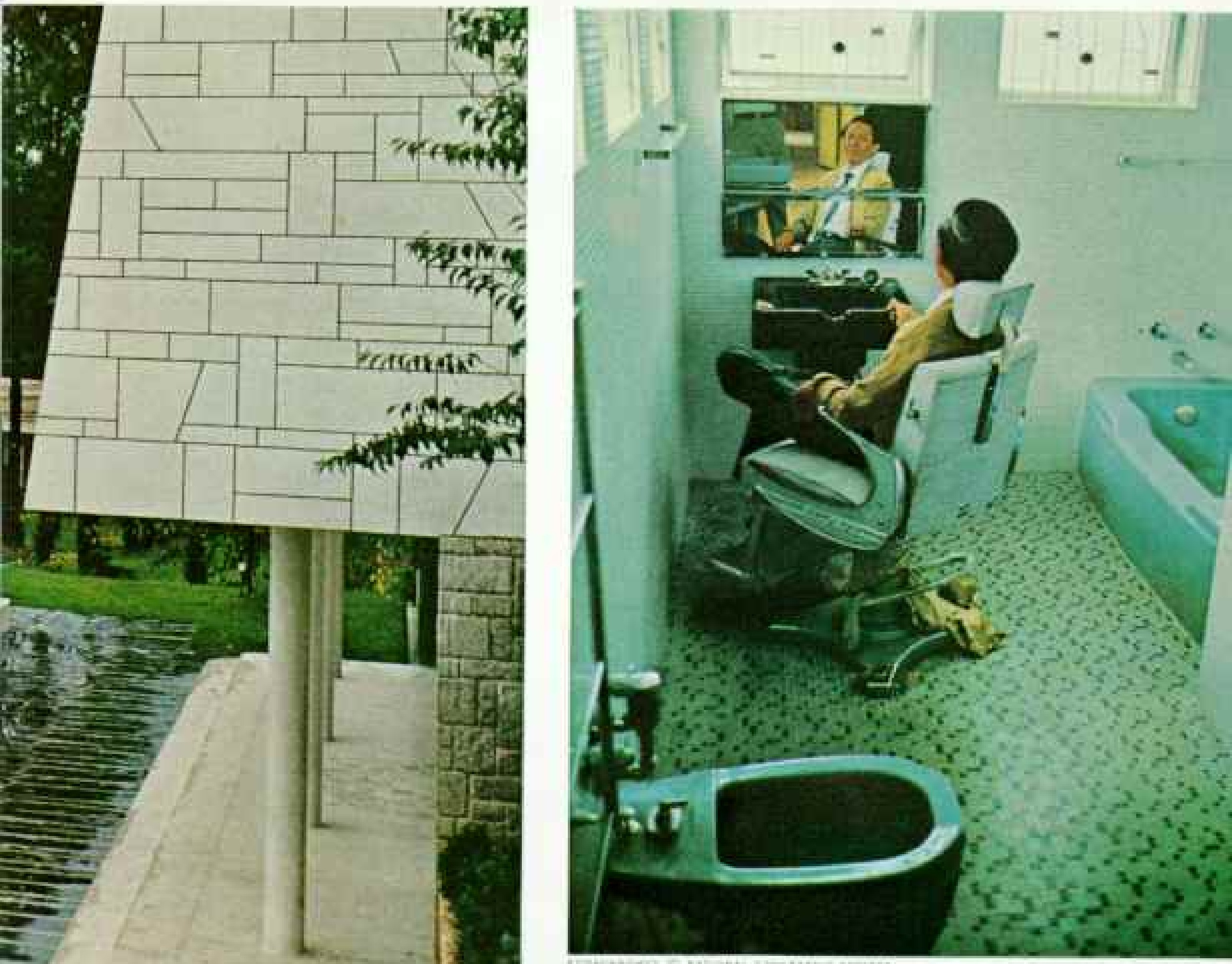
Mr. Tuu spent seven years in a Diem political prison near Hue. Released in March of 1964 after the second coup, Tuu was immediately made chief of the province. In the short time since then, he had brought order and honesty to the provincial government.

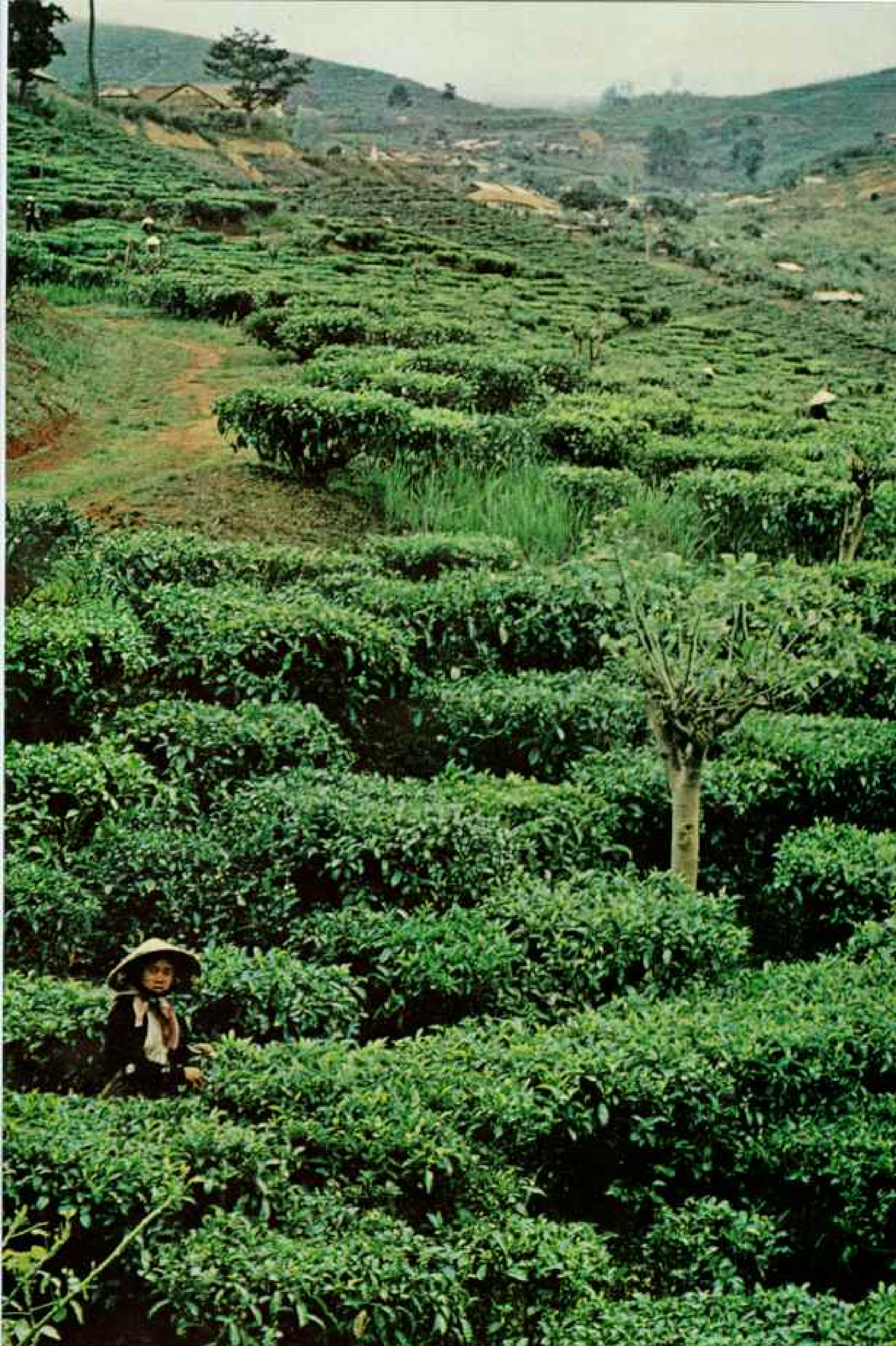
Over a meal of shrimp, crab, and beef cooked in native style, Mr. Tuu explained his system. When he took over, he said, the civil servants were corrupt. Out of fear of the Viet Cong they seldom went out to the villages they supposedly administered; they

(Continued on page 443)

men composed the retreat of slain President Diem's sister-in-law, a power behind his regime.

De luxe barber chair kept Madame Nhu comfortable during hairdressing sessions.



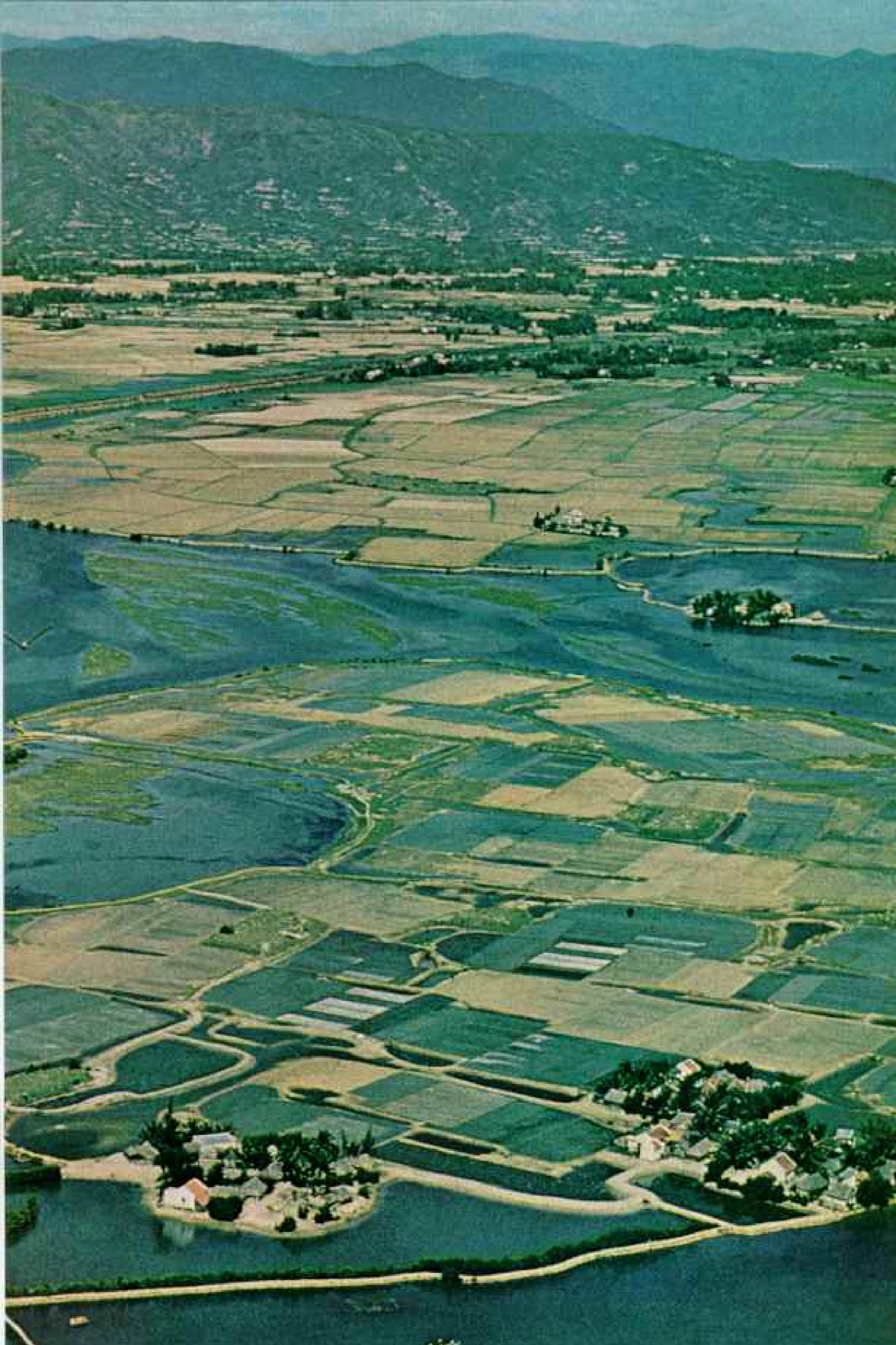


For the hungry, bags of processed wheat leave the train at Muong Man. Since 1954 the United States has given South Viet Nam three billion dollars in aid, most of it designed to bolster the economy. President John F. Kennedy, in a letter to the President of Viet Nam, expressed the reasons for such assistance: "We have been deeply disturbed by the assault on your country. Our indignation has mounted as the deliberate savagery of the Communist program of assassination, kidnapping, and wanton violence became clear. . . .

"The United States, like the Republic of Viet Nam, remains devoted to the cause of peace, and our primary purpose is to help your people maintain their independence."

Teen-age tea pickers glean leaves from a railside plantation between Cau Dat and Da Lat. At the height of the harvest, they can make about $1.50 a day. A Vietnamese corporation recently bought the plantation from French owners for $4,000,000.

Sea of rice fields surrounds village isles near Qui Nhon; railway bridges the River Cai and crosses the flats at upper center.



Raw recruits in Da Nang bring a smile to their departure. All 18 years old, they march to the train that will carry them to a camp at Qui Nhon, where United States military advisers will help turn them into soldiers.

Walled and Moated Hue Dreams of Its Days of Imperial Glory

Once capital of Viet Nam, Hue erected its French-style walls in the early 19th century. Within them, emperors of the Nguyen dynasty built vast tiled and painted palaces. Nearby, they erected elaborately carved tombs. Today the seat of government has passed to Saigon in the south and Hanoi in the north. Military headquarters occupies the compound at upper right. The Imperial Palace, once forbidden to all save the elite but now open to the public, lies within its own moat and out of the picture at top. Fishing sampans, often used for pleasure, line a canal that flows into the Huong Giang (River of Perfumes) at upper left.

sat in offices in the provincial center "reading movie magazines," as Mr. Tuu put it.

Under Mr. Tuu, all officials must now spend 40 out of every 60 days in the field living with the villagers.

In a moment of Oriental philosophy, Mr. Hau explained how Vietnamese judged Westerners by their facial dimensions. "If the distance from bottom of nose to point of chin is great, and greater than the distance from mid-forehead to point of nose, beware. You will be taken by that man. But if the distance is short, you have a true friend."

We talked until past 11:00. Long after we retired, Mr. Tuu remained in his office, clicking his abacus, phoning, stamping official papers. When I went for my bath at 6:30 the next morning, I saw him at his desk, fully dressed and conferring with his staff.

No Needles in Northern "Paradise"

Before leaving, we breakfasted on *banh bao* with *nuoc mam*, small meat dumplings dipped in fish sauce; *cha lua*, a kind of fried pork sausage; and *banh beo tom*, a shrimp paste that looks like pâté.

Mr. Hau told a final story. While in Cambodia he was friendly with a man whose wife had remained in Communist North Viet Nam. One day his friend invited him to read a letter that he had that day received from her in Hanoi. In it his wife extolled the virtues of Ho Chi Minh and the success that had been achieved under his leadership. She spoke of the "paradise" that was now her home. But after the signature was a small note requesting the husband to slip some needles in the next letter he sent to her from Cambodia.

Hau finished his story with, "You see, there are no needles in paradise."

After breakfast with Mr. Tuu, Mr. Hau and I drove up the line in a jeep to the northernmost station at Dong Ha. In the depot next to an old French Army guard tower, a lonely stationmaster awaited a freight train that linked Dong Ha with Hue.

Beyond the station I walked rails that were rusted and overgrown with weeds. No train had rolled over these rails since 1954.

Just north of the station a black decaying bridge, its spans fallen into the Bo Dien River, marked the last of the track (opposite).

Before returning to Saigon, there was one more thing I wanted to see. There is a small cog-and-rack branch line that climbs through dense jungle for 50 miles from Buu Son to Da Lat, a mountain resort built up by the French. Here I could visit the once-secret retreat of Madame Ngo Dinh Nhu, now living in exile in France.

As Ngo Dinh Diem's sister-in-law and official hostess, Madame Nhu was the most powerful woman in South Viet Nam. Her house, on a wooded hill overlooking a beautiful mountain valley, is named Lam Ngoc, which means "Forest Jewel." Today it is a museum, and anyone may enter for the equivalent of about 13 cents (pages 434-5).

A huge gray guard tower housed Madame Nhu's private security force. In all the principal rooms are secret trap doors leading to escape tunnels that run under the swimming pool to a nearby house. A secret ladder under her bed leads to an underground room with a huge vault and safe.

The main house contains five fireplaces, each flanked by trophies of animals killed by Madame Nhu's husband. The $20,000 stainless-steel kitchen, complete with infrared broiler, has its own connecting underground escapeway. The garden is studded with imported herbs, each with a marker showing its origin. Trees, grass, plants of a hundred varieties were flown in from all over the world.

Mme Nhu's House Took 5 Years to Build

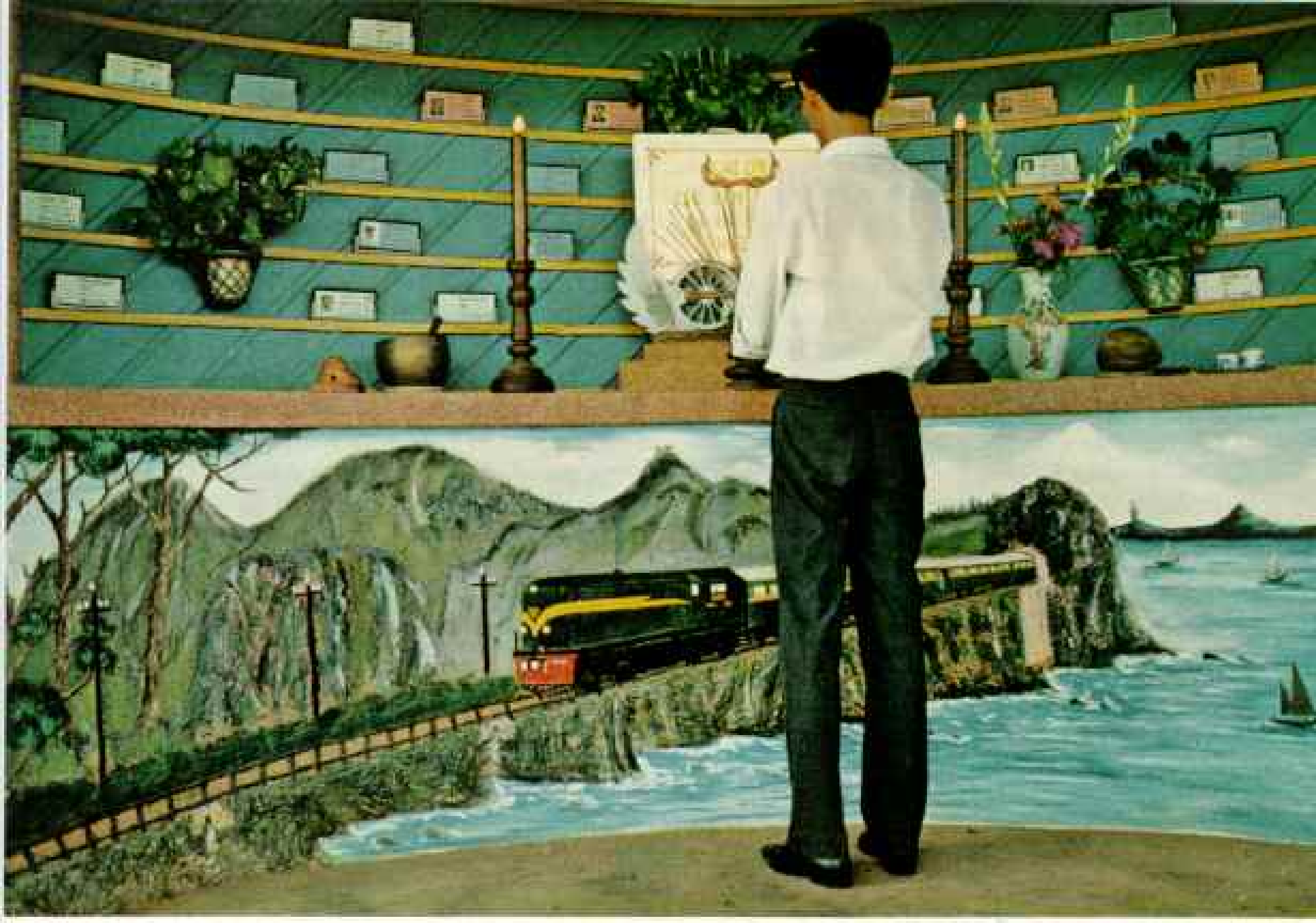
I talked to Pham Van My, who told me he was one of 50 gardeners hired in 1959 by Madame Nhu. During visits to the site, she always shouted orders and threatened the workmen, Mr. My said, but she had an inordinate fear of worms. Many of the gardeners, he went on, picked up worms and put them on her plants just to frighten her.

A hundred carpenters, masons, and technicians labored on the house for more than five years. Every other week the President, Ngo Dinh Diem, accompanied his sister-in-law to the site. Mr. My said President Diem was always quiet, but the "spitfire" woman once angrily threatened to have the gardener beheaded.

"She was a difficult lady," said Mr. My, who was paid $20 a month.

End of the Line: A Railroad Bridge Lies in Ruins Close to North Viet Nam

On a hot spring day, girls bathe in the Bo Dien River near a span that has seen no trains since guerrillas wrecked it in 1954. Because the structure could serve no useful purpose in a divided country, South Viet Nam declines to repair it.



Memorial to railroad heroes, a candlelit shrine at Chi Hoa treasures names and pictures of 75 who gave their lives. On the wall, a painted train skirts the South China Sea.

The picture he painted for me was that of an elegant but fickle woman, seldom happy with herself or those around her. She rebuilt the front entrance door eight times before being satisfied, and a corner window ten times before it pleased her.

Railroad Costs Mount Alarmingly

Back in Saigon after a safe return trip over the same route, I dropped in to see Nguyen Ngoc Lam, chief of operations and maintenance. He told me of the increasing number of incidents; how in one month of this year 18 engines had been immobilized; in another, 12. He said that the Communist problem and sabotage were far worse than during the fighting with the French.

And, in spite of more than $25,000,000 in American aid to the railroad since 1955, it remains in serious financial difficulty. The cost of repairing sabotaged equipment runs 1½ million dollars annually; already this year the Viet Cong have done more than a million dollars' worth of damage to U. S. locomotives.

In 1963 the budget for the railroad was $5,800,000. Its revenues amounted to only $4,600,000. The railroad loses about $100,000 monthly.

This is little compared to the human loss. At the Chi Hoa repair shops in a suburb of Saigon, on the occasion of the 2,508th anniversary of Buddha's birth, I visited the shrine that was recently built in memory of the 75 Vietnamese railroad employees who have been killed since 1946 (above).

At a memorial ceremony I attended that day, 218 children of the deceased workers joined in the Buddhist rites (page 428). They had formed the Chanh Phuoc (Real Happiness) youth group.

In the final prayer the youth leader intoned: "We pray for the peace of their souls. Let us follow the example of their sacrifice for the salvation of our country."

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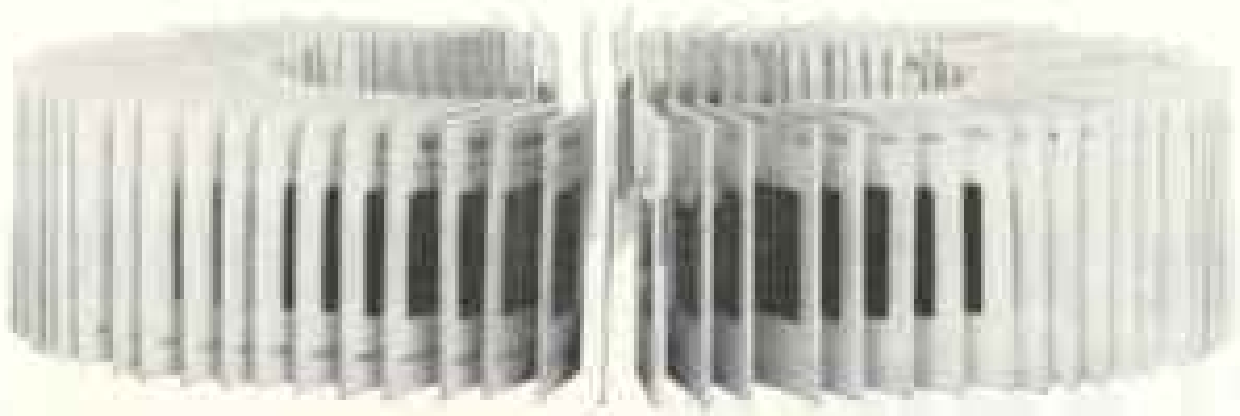

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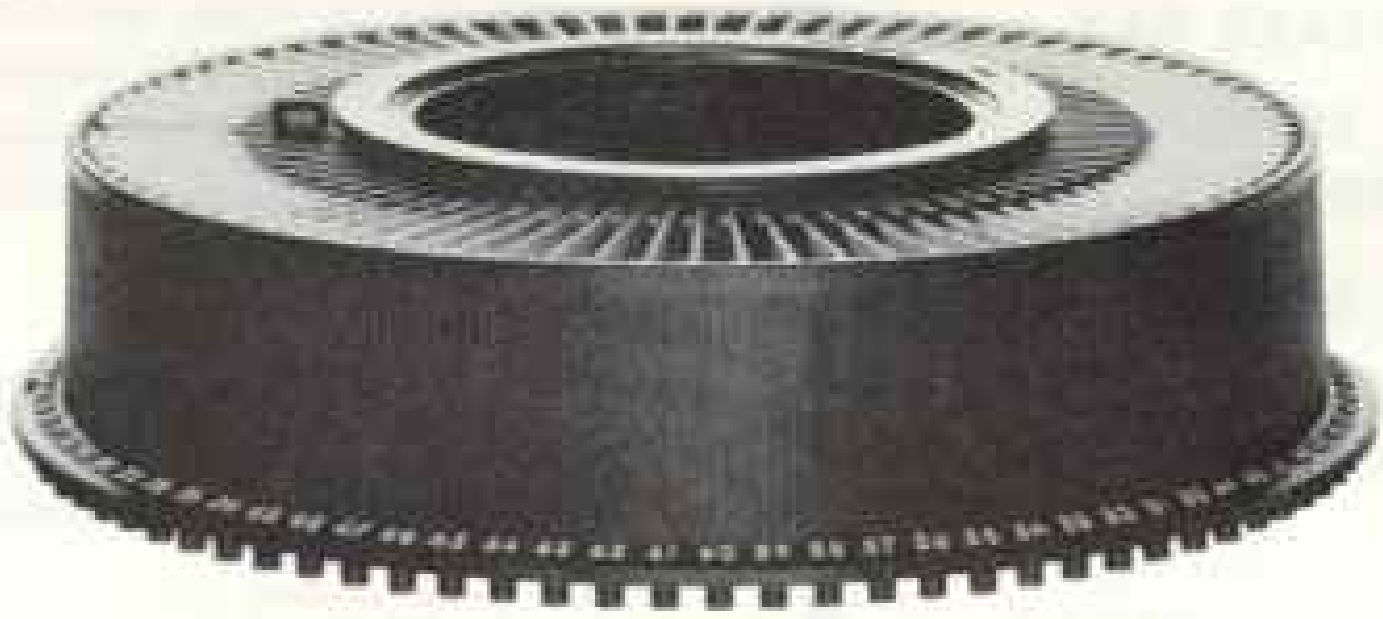

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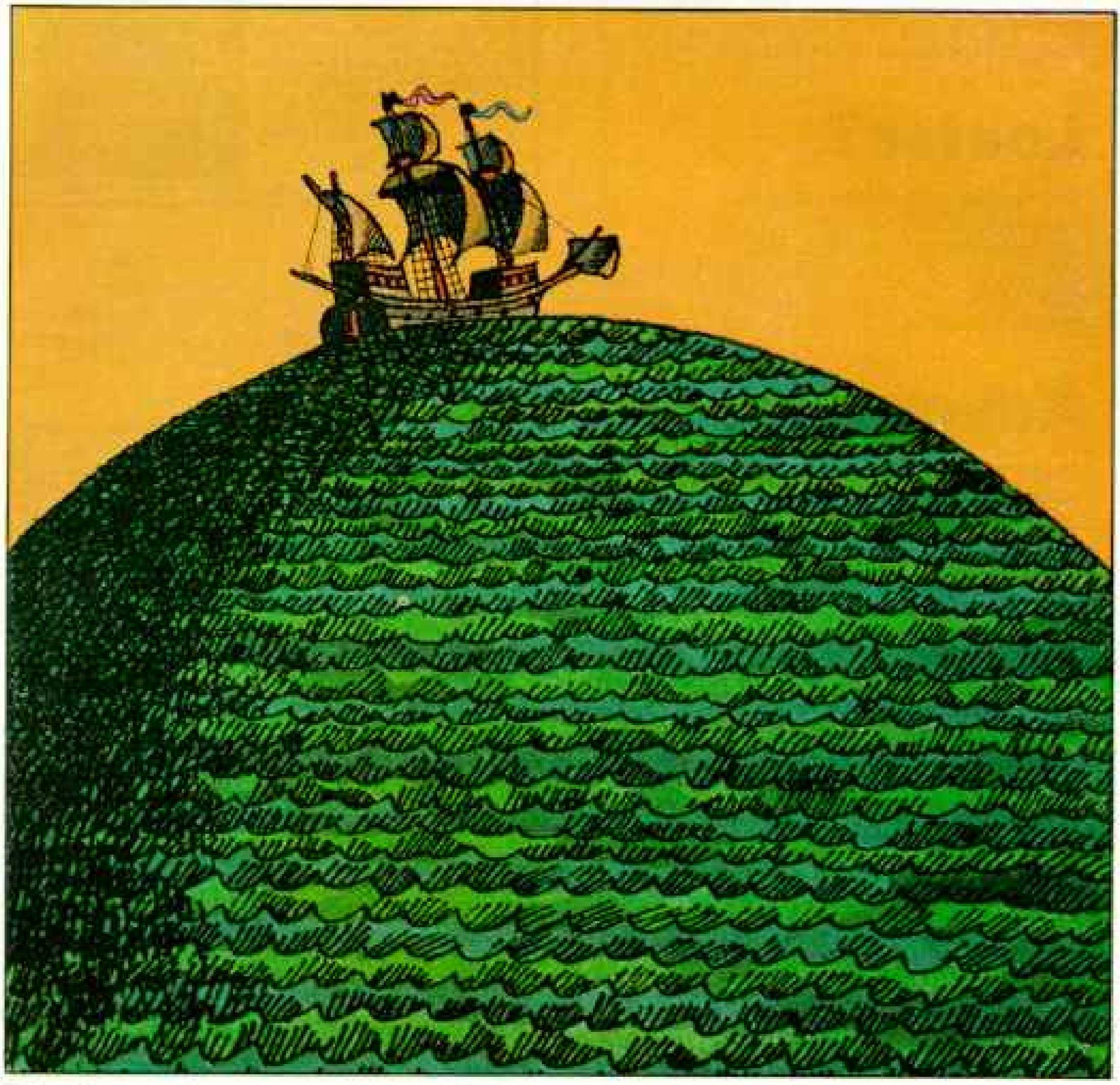

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Eleanor Enright of Burneff's Holly Hill Nursery (address on request)

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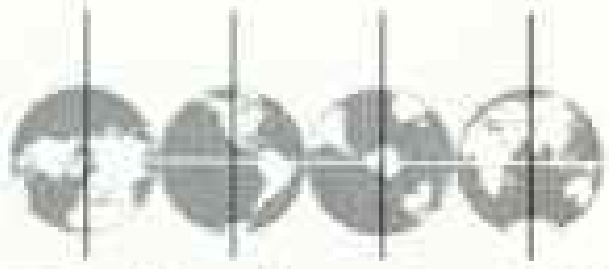

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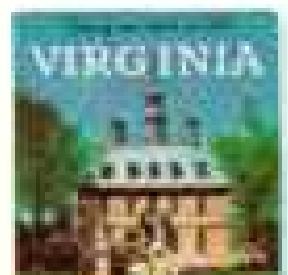

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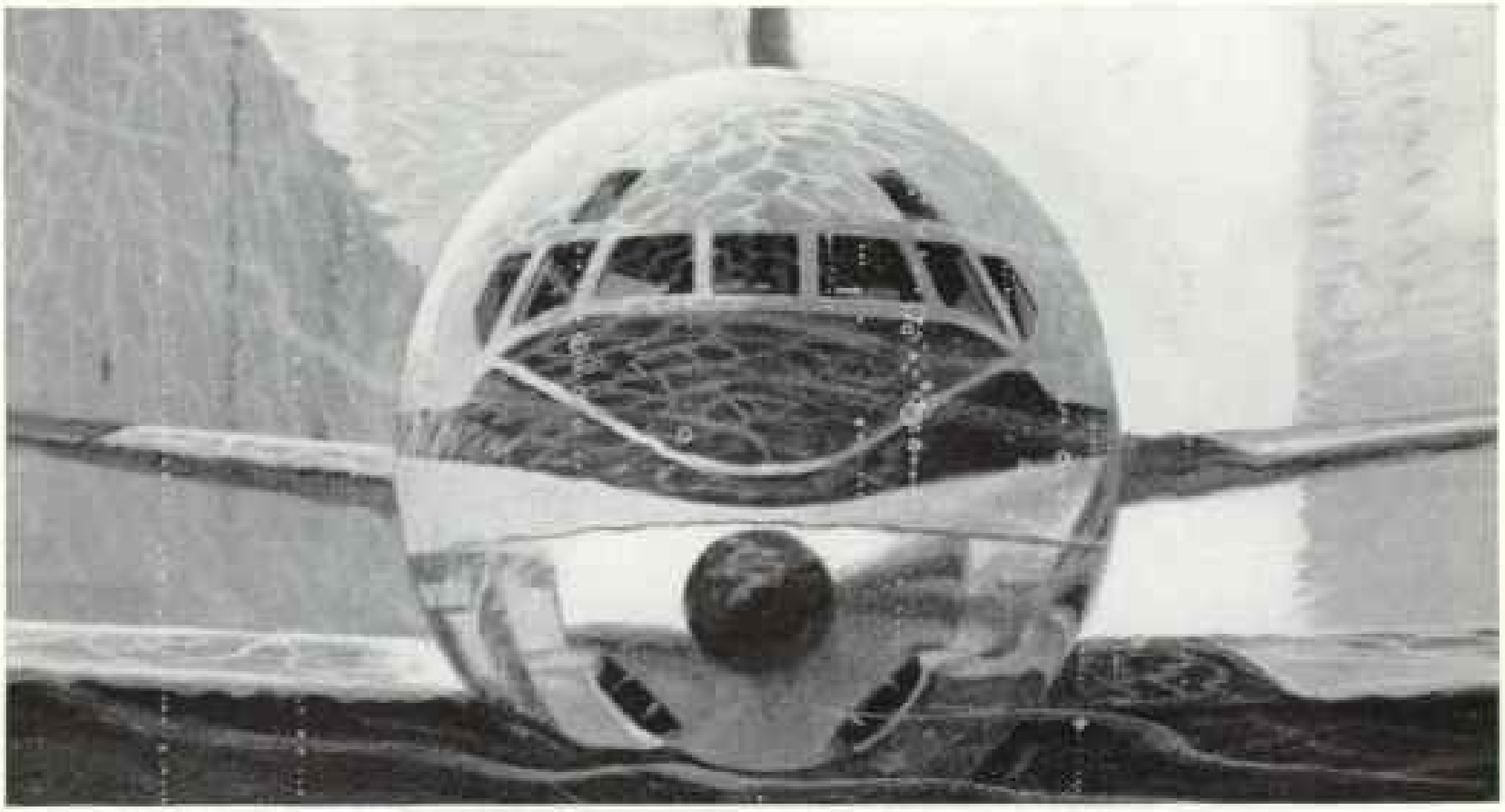

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