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BUILDING A BETTER HEMISPHERE SERIES NO. 9

Dust in the Lungs

By

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POINT 4 IN ACTION

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TECHNICAL COOPERATION ADMINISTRATION

Peruvian engineer César Macher (right) takes an air sample to evaluate the dust content

Mining camp in the barren fastnesses of the high Andes

Highland Indians' enlarged hearts give them a corner on mining jobs—a dubious advantage in view of the hazards they face

the pneumoconioses, of which silicosis is the gravest. Young men of the high altitudes are refusing to work in the mines nowadays because they have seen what silicosis has done to their fathers.

Silica, forming around sixty per cent of the earth's crust and, in some areas of the world, entire mountain ranges, is one of the commonest minerals. Five million particles per cubic foot of air is considered a safe concentration of free silica content. In some Andean mine operations up to seven hundred million particles per cubic foot swirl around the heads of the unlucky miners.

The miners live in unlovely villages, whose streets string drably along the base of bare, towering mountains. Their homes are one-room adobe or stone houses, without sanitation, without grace. An occasional glowing geranium, a plant that loves the altitude, points up the ugliness of the human habitations.

Peru's compensation laws date from 1935. Funds are provided by government and industry. A miner permanently disabled by silicosis may receive a maximum of ten thousand soles (about $666 U.S.) from the workmen's compensation fund. Such a worker is released and is further entitled by law to severance pay from the company—two weeks' salary for each year worked. Obviously, industrial hazards are expensive. One company in a recent year paid out some eighty thousand dollars in compensation for occupational diseases. The same firm spent another sixty thousand dollars in bonuses to workers for staying on hazardous jobs. A company employing nearly twelve thousand workers had 271 cases of silicosis certified by its medical department for payment in one year.

Dr. Ramón Vallenas, the silicosis specialist in charge of the Department of Industrial Hygiene medical examinations, has investigated industrial medicine on several trips to the United States. He studied at Harvard and at the University of Chicago and in the famous laboratory at Saranac Lake, which is a center for the investigation of respiratory conditions. Dr. Vallenas was especially impressed to find that the New England states had nearly eliminated silicosis, for at one time it was a power in the dusty stone quarries there. He has returned to Peru from each trip eager to see his country begin the preventive measures that have been so successful elsewhere. In every miner sent back to the mines with the simple diagnosis "more fibrosis than usual," he sees a man who will later return with silicosis.

Although the department was set up in the Ministry of Public Health and Welfare in 1940, it rocked along for several years without a real program because it lacked technicians. In 1942, the Institute of Inter-American Affairs, a U.S. Government agency, began its cooperative health program with the Peruvian Ministry of Public Health and Welfare. Five years later the ministry and the institute added industrial health to their joint program. The institute agreed to provide the technical experts to train workers and begin the campaign of prevention in Peruvian industries. The Peruvian Govern-

ment provided the necessary backing by passing law 10833 (March 12, 1947), making an industrial-hygiene program mandatory, to start in the high central mining area, and laying a tax on the industries of that region to support it.

Down from the United States came John Bloomfield, an industrial-hygiene engineer from the U.S. Public Health Service and one of the best of men to serve as consultant for the new endeavor. A stocky, brisk man, he can organize in his mind a complex forty-page report, complete with figures and descriptions, and dictate it in a nearly polished state. Mr. Bloomfield began his engineering life some thirty years ago studying silicosis in U.S. mines. Often he went in unwelcome, for both managers and workers thought that making dust counts was a busybody affair that was no concern of people working hard for a living. Mr. Bloomfield reminisces cheerfully about those rough days of the young industrial-hygiene movement, with which he grew up professionally, for he has taken prevention into mines, mills, and factories across the United States and seen his successes registered in the descending rates of industrial illnesses and accidents. In South America his pioneering instincts are again called into play, and he is especially on the lookout for silicosis.

Also from the United States came industrial-hygiene engineer Marion Trice, whom the institute borrowed from the Tennessee Department of Health, and Amedee Landry, industrial-hygiene chemist from New Hampshire. Up to the United States went Dr. César Carlin, the first Peruvian to receive an institute scholarship in industrial medicine.

Two years after the law was passed, a staff was ready. In those two years Mr. Landry established one of the best-equipped industrial-hygiene laboratories to be found anywhere and trained three chemists in dust counting, dust analysis, and other aspects of the work. César Macher, an engineer, was educated in his end of the job. Dr. Carlin came back from his year in the States. Dr. Mario A. Espinosa and Dr. Roberto Weiss B. were added to the staff.

The Department of Industrial Hygiene moved into its own quarters, the house on Manuel Gómez Street, with bright green tiles along the walks and bougainvillea clambering over the high white patio wall in the rear. The doctors occupy the rooms on one side of the center hall, the chemists and engineers, the other half of the house. As soon as the opening celebration was over, one day early in April 1949, the first team sent out by the industrial-hygiene staff headed into the altitude to make their first study of a mine and its workers.

In Peru, people often speak of the altitude as though it were a place. It changes existence for the lowlander. He feels the altitude in his organism and he feels it psychologically. So people often announce a trip by saying, "I'm going into the altitude" instead of "I'm going to Cerro de Pasco," or "I'm on my way to Jumasha."

I recently went with a group from the Department of Industrial Hygiene to the highest vanadium mine in the world, at Jumasha, where a team of engineers and chemists was completing a three-month study. We left Lima at eight in the morning, breathing easily in the damp air of sea level. By eleven we were above seventy-five hundred feet. Shortly after noon we were seeing our first llamas, which do not descend much below nine thousand feet. From then on, we watched each other turn purple—even Dr. Vallenas, who is a high-altitude specialist—as the altitude sickness called *soroche* gripped us all. We crossed the western cordillera of the Andes at the Ticlio pass, nearly sixteen thousand feet above sea level. While taking a photograph of a vicuña I suddenly felt my knees vanishing and retreated quickly to the station wagon while they were still in a mood to operate.

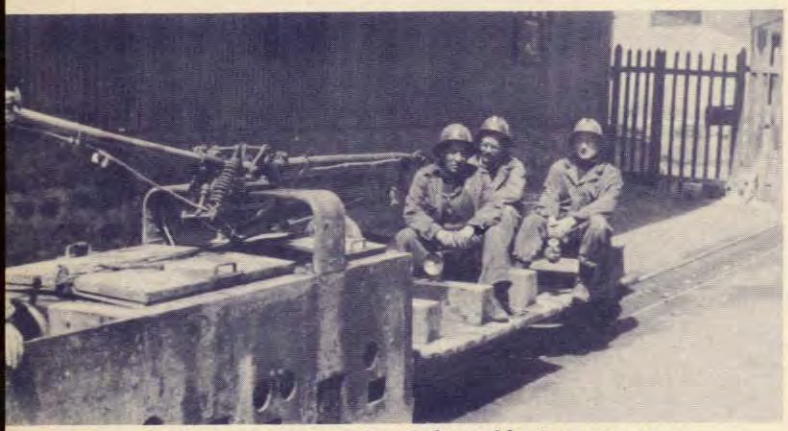
Beyond the cordillera is a vast plain. It's a sad place, but grand, this plain on top of the world. Its only vegetation is the patches of yellow grass on which the llamas feed. The homes are rude stone huts with thatched

People bound for the Peruvian mining centers must travel up roads like this

Dr. Roberto Weiss and engineer Macher of Peru's Department of Industrial Hygiene give driver a rest at Chonta, 15,697 feet high

Famous for its metal since colonial days, Peru ranks first in world vanadium and bismuth output, fourth in silver production

Separating lead mineral by hand from rock impurities



Study crew entering mine. Industrial-hygiene experts are gradually winning the cooperation of operators and miners

roofs. Indian women and children are tiny moving figures following their sheep and llamas over this flat surface beneath the brilliant blue sky. The women up there wear a white, somewhat mannish, straw hat, with a high crown decorated with a black ribbon laid on in a peaked design. Their faces beneath are shy and withdrawn, but often we would hear them giggling as we passed. The haughty llamas simply looked down their noses at our elegant blue station wagon.

The second day we crossed the plain of Junín and saw in the distance the solitary monolith commemorating a decisive battle in the Peruvian struggle for independence. The Peruvians, we were told, simply led the Spanish army up where they would get *soroche*, and the rest was easy. At a station of the Vanadium Company of America we exchanged our wagon for a dilapidated old Chevrolet mounted on rails, and rode for an hour across more plain to an enchanting blue lake set among brown hulks of the Andes. We traveled down the lake in a Noah's ark for about an hour until, turning up a hidden channel, we saw the smokestacks and low dun-colored buildings of Jumasha.

Jumasha is a place where strong men who win regularly at poker grow wretched with homesickness and flare up in sudden quarrels. The altitude is 14,421 feet and seven inches. We sat there gingerly, hearts pounding, feeling as though we might be coming apart at the seams, and watched the Indian trot in to make a fire. Surely he should wear some vanadium embroidery on that dirty jacket. As night falls, one feels queer in this high, alien place, with his heart and lungs fighting for oxygen. And he may wake an hour after he has gone to bed in the grip of a terrible melancholy.

The door opened and in walked tall, smiling Enrique Quino, one of the industrial-hygiene chemists, whom I had last seen on Pennsylvania Avenue in Washington one hot day twelve months before, just after he had arrived in the United States to begin a year's study. "It was wonderful," he told me. "I learned so much at the laboratories at Saranac Lake, and in the other places—Tennessee and Georgia; I liked Georgia best of all." Dr. Vallenas left to change into mining garb and go with the others to the mine, which is 15,500 feet above sea level.

The doctors had already finished their work and returned to Lima. As this article is being written, they are adding up their findings at headquarters. Out of what they learned will come a report on the physical condition of the eight hundred workers and the environmental conditions under which they work, plus recommendations for improvement. In making a study of a mine, the doctors work above ground examining the men, while the engineers and chemists go underground to investigate the mechanical hazards, the dust content, the possibilities of poisoning from noxious fumes and dusts.

The workers at Jumasha were friendly in talking with their industrial-hygiene visitors, Dr. César Carlin told me. When the first study was made in 1949, the men came in reluctantly for examination because they were told to, but they were often suspicious. "In later investigations," said Dr. Carlin, "when we picked up an X-ray and began to discuss it, the workers, talking in Quechua among themselves, would notice and gather round. Those who knew Spanish would ask questions. Of course, they had been seeing us around for several months and felt acquainted with us, and I think they believed we were really interested in them." The Jumasha study in 1951 was made at the request of the workers, who sent a petition through their labor union to President Odría. The toxicity of vanadium is not known, but the number of respiratory illnesses among the Jumasha workers indicates that something is affecting them.

The examination of claimants for compensation is a legal responsibility of the department distinct from the mining studies, and a total of 2,268 claimants have been examined since 1948 in Lima. Since the first industrial-hygiene team went into the altitude in April 1949, the department has examined 4,243 men at the mines and discovered that about twelve to thirteen per cent had silicosis. Complete studies have been made in seven

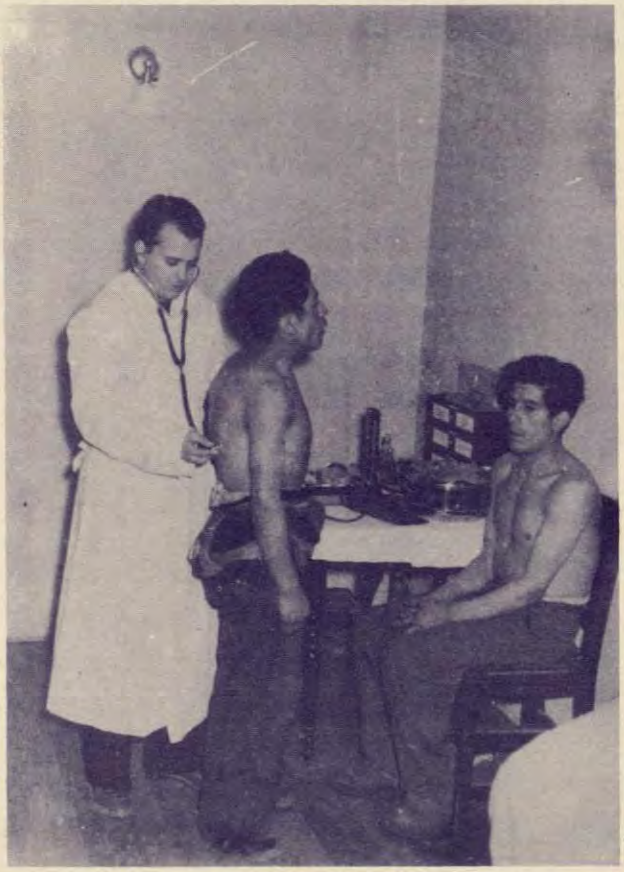
mines, and either the engineering or the medical surveys have been finished in thirteen others.

The industrial-hygiene personnel are now returning to mines already studied to note the changes that have been made and to help in further improving the environment. Wherever they see a drilling operation done with water that was once done dry amid clouds of silica dust, they have the satisfaction of knowing that in that spot they are checking silicosis. It is much too early for a miracle report, though each ban on silicosis is a bit of miracle for the man who in the course of time would have been its victim. There exists, of course, an accumulation of cases among the mining force, and considerable dust control is necessary before the disease can be shown running downhill on a graph. The department had to start from scratch and make studies to show the extent of occupational diseases among the workers and analyze the conditions causing them. The department has also had to preach that prevention is cheaper than compensation plus bonuses to encourage workers to endure the health hazards. Gradually the idea is gaining ground. Industries of various types are inviting the department to send in its industrial-hygiene experts to show them what should be done. The present staff of sixteen—doctors, engineers, and chemists—is too small to carry the work forward rapidly enough, but in time the program will be introduced into industries of all kinds. Although silicosis is the leading occupational disease, the total program aims at protecting workers from dusts, poisons in the materials they handle, vapors that cause stomach ailments, excessive heat, unnecessary noise, slippery floors, dangerous machinery, and all other industrial hazards.

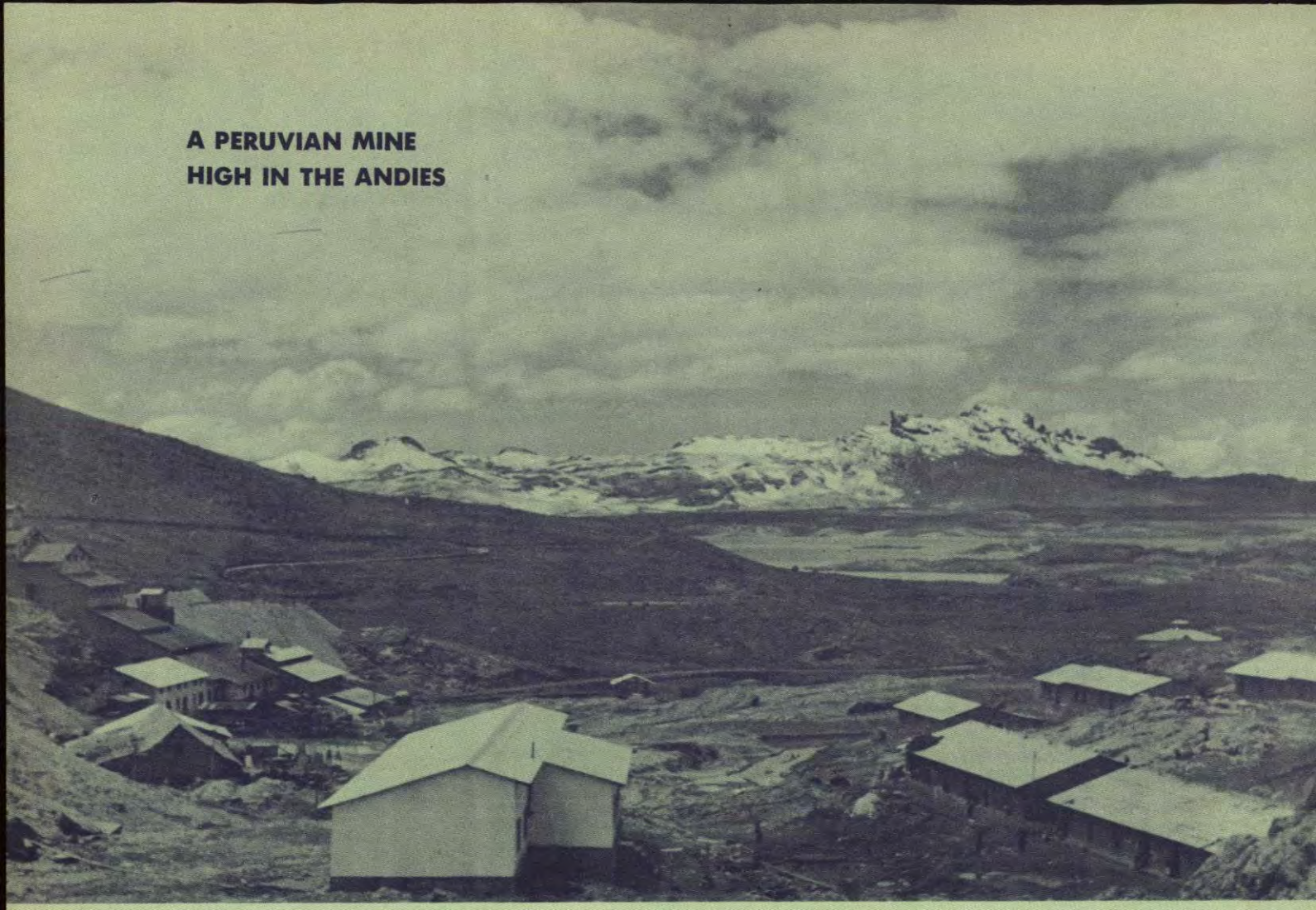
The visitor at the house on Manuel Gómez Street steps into a friendly atmosphere. The chemists are always glad to initiate one into the mysteries of their dust-counting apparatus, or show off the machine that swallows a sample of air from a mine and identifies its toxic components. The engineers model their fancy array of safety devices. After an hour's learned discourse, Dr. Espinosa can always pull out one more X-ray photograph and say happily: "But you must see *this*. It's a beautiful X-ray." They are as eager as pioneers to whom the morning is fresh and the trip exciting.

They *are* pioneers. Theirs is the first industrial-hygiene program in Peru, the first at such high altitudes anywhere in the world. It is important to their country's efforts to attain a higher standard of living.

Perhaps the altitude where they spend much of their time has something to do with their own make-up. For men who have spent three months at Jumasha, who have traveled the high plain of Junín in that old Chevrolet mounted on tracks far from its native Detroit, who have steamed down that lovely blue lake thirteen thousand feet high among those wicked mountains, and who have survived that lonely camp where they studied the dust in miners' lungs—these men will never be quite like ordinary lowlanders again.



Doctors examining high altitude miners.



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