GENERAL SCIENCE

Lofty Research Laboratories

High on mountain tops all over the world, scientists are battling glittering snow and howling gales to carry on research in all fields of science.

By ANN EWING

➤ HIGH ON wind-swept mountain tops all over the world, scientists are battling howling gales, or learning to live with dazzling snow and the unearthly silences of these remote places.

They have made themselves modern mountaineers in lofty research posts, located on mountains in the Alps, in the Rockies and in the Andes. Here they are doing experiments, particularly in cosmic ray research, that can not be duplicated in laboratories at lower levels.

Some high altitude laboratories, for instance, are giving astronomers a chance to study the sun without interference from haze, dust or dense atmosphere. They can train coronagraphs, instruments for getting man-made eclipses, on the solor disk more accurately when the atmosphere is clear, not cluttered up with smoke and dust particles.

From such lofty spots, meteorologists can make continuous records of such information as the wind's speed and direction, the humidity and air pressure. Better weather forecasts may result, for these stations are helping to give a world-wide picture of the weather.

Medical scientists and biologists are studying the effects of high altitudes on the heart, on blood counts, on breathing and on the functioning of the various glands.

6,000 or 7,000 Feet High

When scientists speak of high altitude laboratories, they generally mean stations above six or seven thousand feet. At or below this height, there are many large cities with adequate facilities for all types of research, Denver and Salt Lake City in the United States, for instance.

Nairobi in Kenya and Arequipa in Peru are among examples of cities in other nations located at or well above the mile-high level.

In the altitude level from about 9,000 to 12,000 feet, there are a number of good stations equipped for cosmic ray and other research. Among the finest of these is the Jungfraujoch at 11,000 feet in Switzerland, which was built before the discovery of cosmic rays.

In 1880, the Jungfrau Railroad Company applied for a charter from the Swiss government and received it on the condition that the company establish a laboratory on the mountain.

Many governments have aided in its upkeep since that time. Beginning in 1947, UNESCO—the United Nations Educational, Scientific and Cultural Organization—has given it international financial support.

At Jungfraujoch there is avaliable not only the good supply of electricity needed for cosmic ray research, but workshop facilities for making equipment, a darkroom and a kitchen where scientists can cook their meals.

At almost exactly the same altitude in the Alps as the Swiss laboratory is the Italian station at Testa Grigia. Another outpost at this approximate altitude is in France's part of the Alps, on the side of Mont Blanc.

In the United States, there is a high altitude laboratory at Echo Lake, Colorado, with facilities comparable to those at Jungfraujoch. At 10,700 feet above sea level, Echo Lake is almost exactly two miles high, yet it can be reached by highway the year round. Thus getting equipment to the laboratory is quite easy.

Cosmic Rays at Climax

Also close to Denver is the astronomical observatory at Climax, Colorado, where some cosmic ray as well as astronomical research studies are made.

The Peruvian government runs the Huancayo Observatory, located on an 11,000-foot plateau some 12 miles west of the town of Huancayo in the Andes.

A recent addition to stations at this level is the Sacramento Peak station in southeastern New Mexico. At 9,300 feet it can be reached by road from Alamogordo, scene of the first man-made atomic explosion. Also at exactly this same altitude, 9,300 feet, is France's Pic du Midi Observatory in the central Pyrenees.

In the altitude level that centers about 3,000 feet higher, or about the 14,000-foot level, research stations are fewer and less well distributed. The United States possesses the only continuously operating facility—the Mount Evans Laboratory in Colorado. Located at 14,156 feet, this station is also within a short distance of Denver and it can be reached by road, though this road is not now kept open during the winter.

In Peru, at Morococka, about 90 miles from Lima, there is a high altitude laboratory—The Institute of Andean Biology—devoted primarily to a study of the physiological effects of high altitudes. The Institute building, at 14,900 feet, is easily reached and well equipped.

From this location, heights up to 17,000 feet can be gained without having to engage in any mountaineering regarded as difficult.

In both North and South America, many peaks are suitable for future high altitude laboratories. Because scientists have found that cosmic rays are affected by latitude, they would like to see a string of research posts down the western coasts of the two continents.

In the United States alone there are more than 50 peaks over 14,000 feet high, although the highest spot in this country, Mount Whitney's peak in California, is only 14,495 feet. Three of these lofty mountains already have roads to their summits.

High peaks fairly easy to reach also abound in South America. At many of these high altitude places, mining communities already exist, making access and setting up much easier.

Three Areas Left

Since the Caucasian mountains are not now open to scientists from the western world, Africa, Australia and India are the only areas left for future establishment of high altitude laboratories.

Stations in all three of these areas would be most welcomed by scientists and would provide valuable data. Probably the mountains of India promise the best opportunity of furnishing a high altitude laboratory in the near future. Cosmic ray scientists, particularly, would find such a station of special value, because it would be half way round the world in longitude from the Americas.

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PLANT PATHOLOGY

Name Changes But Oak Wilt Still Kills Trees

➤ THE FUNGUS that causes the dread oak wilt disease, tree killer now felling oaks over much of northeastern United States, will have a new name. The disease it causes will still be known as oak wilt, however, and it will still be just as deadly.

Reason for the name change for the fungus is the discovery of a new stage of the spore, the first time such a stage has been reported. Dr. T. W. Bretz of the Department of Agriculture's Experiment Station at Columbia, Mo., discovered the ascospore, or sexual, stage. A part of the name of any fungus shows the highest stage of development it has reached, and the just-discovered stage is higher than those previously reported for the oak wilt fungus, now known as *Chalara quercina Henry*.

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