PHYSIOLOGY

The plague of high altitudes

Researchers forecast disappointments for Olympic athletes in the Mexico City games

by Barbara J. Culliton

When thousands of Olympic athletes arrive in Mexico City for the 1968 games, scientists will be watching to see how lowland natives perform in a city 7,800 feet above the sea. Unquestionably, Mexico City's thin air—it has only 75 percent as much oxygen as sea-level air—will hinder some competitors.

Since 1964, physiologists have been testing small numbers of athletes in Alamosa, Colo., where the air is as thin as in Mexico City, and in Peru where it is thinner still. In Peruvian mountain towns, some 14,000 feet up, performance declines markedly. In fact, a majority of lowland travelers to rarefied heights suffer chronic mountain sickness, characterized by loss of energy, loss of appetite, nausea and severe headache (SN: 11/25).

The altitude in Mexico City causes none of these serious disorders but, scientists predict, it will keep athletes from breaking any world records in distance running, swimming or other endurance sports. Pole vaulters, shot putters and others in events demanding only spurts of energy will fare better.

At a recent Washington conference on Man in High Altitudes, sponsored by the World Health Organization and the U. S. International Biological Program, researchers from 13 nations discussed the toll Mexico City's air will take on world competitors. Whether or not altitude affects athletic performance depends on the energy system the body must use to work at maximum efficiency, Drs. K. Lange Andersen of the School of Therapy, Oslo, and Rodolfo Margaria, Institute of Human Physiology, Milan, explained.

Human energy is of two kinds: aerobic, which requires oxygen, and anaerobic, which does not. In muscles, the chemical breakdown of phosphorous is an anaerobic source of energy but power is exhausted in about 10 seconds. This kind of energy, Dr. Margaria says, is what man uses for initial bursts of power.

But for anything that lasts a minute and a half or longer, aerobic energy sources have to come into play.

Aerobic energy, he says, "can go on forever as long as there's enough oxygen to fuel it." And this is the problem facing sea-level natives competing in endurance contests at high altitudes—too little fuel.

In pre-Olympic tests at altitudes equivalent to Mexico City's, Dr. Cutting B. Favour of St. Mary's Hospital in San Francisco reports that runners slowed down considerably in distance races "because their legs just wouldn't go anymore."

Swimmers also faced serious problems. Trained to breathe every three or four strokes, they found they had to begin breathing with every stroke in order to get enough oxygen to complete more than a few laps. Although there was some improvement in times during the course of the six to eight-week tests, Dr. Favour says the athletes never performed as well as at sea level.

Whether long term high-altitude training—up to a year—would lead to complete acclimatization is a matter of question, but should not be ruled out. Generally, scientists agree that sea-level natives never fully adapt to high altitudes but subtle physiological adjustments for acclimatization probably continue for long periods of time. In any case, Dr. Favour recommends three or four weeks training at altitude immediately before next year's games—particularly for contestants in endurance sports.

Doping athletes to improve their formance, which some fear may be tried to counteract altitude effects, was dismissed by Dr. Margaria, who says only incompetent doctors think it does any good. "Actually," Dr. Margaria contends, "it is not only against the rules but is totally ineffectual." No known drug will increase energy output in human muscles, he declares; "Dope may keep you awake but it won't make you go faster—and not many athletes fall asleep at the Olympics."