

# HARVARD WORK TESTERS QUIT DAM RESERVE

Scientists Who Study Effect of Heat On Work, Finish Experiment

Having completed their summer work in Boulder City, members of the Harvard fatigue laboratory, who have been studying the effect of excessive temperatures and low humidity on Hoover dam workmen, are leaving Boulder City for Boston this week.

The Harvard fatigue laboratory has been engaged for the past six years in a study of industrial fatigue under varying conditions. It is supported from the Laura Spellman Rockefeller fund, and is under the direction of L. J. Henderson, professor of biochemistry, Harvard University.

STUDIES HAVE been made in the laboratory in Boston on reactions of normal men under varying conditions of rest and exercise, with variations in temperature, not only at sea level under normal conditions with a moderate climate, but in varying extremes of temperature, altitudes and humidity. This same group conducted similar experiments to those carried on in Boulder City, at Leadville, Colorado, in 1929, at altitudes of 10,000 to 14,000 feet and in Panama in 1930, where moderately high temperatures are encountered, with varying high humidity.

The expedition of the Harvard fatigue laboratory to Boulder City was enabled to undertake its research program for the summer through the interest of Superintendent Frank T. Crowe, and Mr. Walker Young. The laboratory in the basement of the Municipal building was opened on June 11, 1932, after a week spent in installing equipment. Work was terminated on August 11. The crew, at its greatest number, included six doctors, one chemist and three technicians.

REPORTS OF the intense heat of the summer of 1931 led the investigators to choose Boulder City as the best place in the country for the study of two major prob-

(Continued on Page Two)

# Harvard Work

(Continued From Page One)

lems: (1) the effect upon the body of a large turn-over of water, and (2) study of the chemical changes occurring in the body, due to the ill effects of heat, with the purpose of determining the best treatment for this condition.

The second problem concerned itself with the study of heat cramps and mild cases of heat prostration. Dr. A. V. Bock, in discussing the results of the group's investigations this summer, said in part:

"The striking decrease in the number of heat cases this summer has been due to a number of factors. The first of these is the relatively mild daily temperatures of the summer, as compared with those of 1931, but the main responsible cause appears to be the greatly improved living and working conditions of the men, together with the factor of acclimatization, to climatic conditions, not found outside of the desert.

"**EXCESSIVE WATER** exchange in the body has long been of interest, both to lay people and the medical profession. How much harm is done to the body under conditions in which large amounts of sweat are lost during a working day? How great is the amount of water that may be evaporated through the breath and skin? How much salt and urea may be lost from the body through sweating? What are the methods used to prevent injury to the body under conditions producing great water loss? These are some of the questions involved in a study of the water exchange of the magnitude known to be common among the men engaged in work at the site of Hoover Dam.

"The greatest amount of water evaporated from the body in a single working day found during the present investigation was 20 pints, partly through water lost in breathing, but chiefly through

sweating. On the same occasion a dog lost 5.5 pints entirely through water lost in breathing and evaporation from the mouth and tongue. Sweating is the principal means by which the body regulates its internal temperature. The dog being unable to sweat, after several hours of walking in the hot sun, had a temperature of 106.8 degrees and was exhausted. Fever prostrates the dog under conditions that enabled man to carry on with reasonable comfort.

"Repeated examination of blood during this record turn-over of water failed to show much change from normal. This is attributed to the fact that the man is in good physical condition, has a diet containing plenty of salt and drank water freely during the work. It appears evident that if a man's physical condition is good, his sleep requirement is met, his food properly balanced and containing about four teaspoonful of salt, and plenty of good water is available, he need not worry about the ill-effects of heat.

"SEVERAL OF the investigators ate the same kind and quantity of food at Six Companies Inc. mess hall where the doctors have been eating this summer. It was found that the requirements of the body for salt were adequately met if the food was salted to the taste. A minimum of a quart of milk should be taken daily. A study of fourteen of Six Companies Inc. men at the beginning and end of a working day has shown no appreciable change from the normal, indicating that their working conditions and living circumstances are on a sound, healthy basis.

"A widespread feeling among the workmen is that fresh meat in the diet is harmful during hot weather. There is no evidence for this belief when men are engaged in hard work, and if meat is not taken its equivalent should be made up in such things as milk, eggs and bread. Another bogey is that cold water is bad, but, as Dr. Sausum pointed out in a letter to Six Companies Inc. men last year, it is in fact good for the body. Keep your thirst satisfied with water."

THE INVESTIGATORS have had the full co-operation of the administrators of Six Companies Inc., a number of its men, the hospital and representatives of the Bureau of Reclamation. They expressed their appreciation for many kindnesses and for the cordiality, helpfulness and open door

of the Boulder City organization, which knows how to make strangers in the place feel at home.

Following is the personnel of the group who spent the summer at Boulder City:

Dr. D. S. Dill, assistant professor of bio-chemistry, fatigue laboratory, Harvard University.

Dr. J. H. Talbott, instructor in medicine, Harvard medical school.

Dr. B. F. Jones, tutor in biochemical sciences, Harvard College.

Dr. A. V. Bock, associate professor of medicine, Harvard medical school, and physician Massachusetts general hospital.

Dr. Ludwig Drastich, private-docent, University of Bosno, Czechoslovakia.

H. T. Edwards, chemist, assistant in fatigue laboratory, Harvard University.

S. A. Oberg, technician, Massachusetts general hospital.

W. V. Consolazio, technician, fatigue laboratory.

F. C. Consolazio, technician, fatigue laboratory.

Dr. Jost Michelson, private-docent, University of Leipzig.