

DESERT REUNION

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Response to stress as modified by age has attracted our attention in recent years. I gave a preliminary account in *THE PHYSIOLOGIST*, February, 1963, of our study of 1962 in which six physiologists returned to high altitudes for follow-up observations after a time lapse of from 27 to 33 years. Last summer an analogous desert study was carried out at Boulder City, Nevada with the support of PHS Grant CD 00056-02. Five participants had been subjects and observers in a desert study in 1932 or 1937 or in both years: in 1964 F. G. Hall and I were at Boulder City from June 22 to July 31; J. H. Talbott, W. V. Consolazio and C. F. Consolazio were there for about a week in mid-July. Three young men helped Hall and me and also served as subjects: E. Earl Phillips, Jr. of the University of Florida, Gainesville, W. van Beaumont of Indiana University and Don MacGregor of the University of California, Santa Barbara. Others participated for short periods: S. M. Horvath, Environmental Stress Laboratory, University of California, Santa Barbara; Klaus Klausen, University of Copenhagen - he is spending a year at Indiana University, and K. D. Hall, Duke University Medical School. K. Schmidt-Nielsen, Department of Zoology, Duke University spent two days with us as subject and observer. In addition, thanks to the efforts of Phillips, 31 Boulder City boys, ages 10 to 19 volunteered as subjects.

Our major interest was in the rate of sweating and in the concentration of chloride in sweat. We sought to establish the relation, if any, between these measurements and the following: acclimatization, skin temperature, body temperature, metabolic rate, individual inherent characteristics and age.

Our standard walk was for about four miles in the mid-afternoon on the high school track. The rate was 3.75 mph or 100 m/min. One day we walked in the nearby desert and on another day, July 25, we went to Death Valley for the standard walk. The daily maximum temperature at Boulder City varied from 34° to 43°C while during our day in Death Valley it was 47.2°C. To vary the sweat rate and skin temperature some walks were done soon after sunrise or 2 hours or more after sunset. The combination of low metabolic rate, low sweat rate and high skin temperature was obtained by sitting in the sun.

In the time available not all the possible inter-relations could be tested adequately although we learned something about most of them. I gave a preliminary report of some of the findings at a seminar on bioclimatology at Sapporo, Japan in November 1964. Papers presenting our findings are in preparation.

Factors that clearly influenced the concentration of chloride in sweat in these outdoor studies in dry heat were: sweat rate, inherent characteristics and age. The degree of acclimatization was a factor in some but was not evident in others. However, some of us had been exposed to high temperatures prior to reaching Boulder City. Under the condi-

tions of our studies there was no obvious relation between sweat chloride concentration and skin temperature, body temperature or metabolic rate.

I learned from a preliminary inquiry that the Desert Research Institute of the University of Nevada is prepared to embark on ecological desert research. Dr. Wendell A. Mordy, Director of the Institute arranged for an interchange of ideas about such a venture. This was held at Las Vegas, July 20 and 21, and included a visit by USAF helicopter across the Virgin River to the Golden Butte area. President C. J. Armstrong of the University and several members of his faculty at the Southern Regional Division, Las Vegas attended. Among visiting physiologists were Scholander, K. Schmidt-Nielsen, George Bartholomew, F. G. Hall, J. H. Talbott and myself. Two members of the Board of Regents took part, Fred M. Anderson, M.D. of Reno and Juanita White, Ph.D. of Boulder City. Curtis Bowser of the Bureau of Reclamation, and Charles A. Richey of the National Park Service provided information about Lake Mead and contiguous desert areas. Interested observers were George Sprugel, Jr., Chief Scientist of the National Park Service, David B. Tyler and Josephine K. Doherty of the National Science Foundation, David L. Patrick, Director of Research, University of Arizona and Dade D. Parker, ecologist, University of Utah.

In the closing session it became clear that the University should explore the possibility of insuring for future generations of biologists the availability of a large area of Nevada desert adjacent to Lake Mead and reaching to an altitude of 7000 feet. It was further agreed that the University might well add to its faculty a senior biologist qualified to develop the field of desert biology, funds being in hand for such an appointment. I was delighted to learn recently from Dr. Fred M. Anderson that Dr. Frits Went is leaving his professorship at Washington University to accept this appointment, effective February 1, 1965.

Finally a word about the good friends at Boulder City who helped us realize our plans: Wm. McCormick, principal of the Boulder City High School with agreement of the Clark County Board of Education made available to us the air-conditioned biology laboratory and gymnasium in the high school and the high school quarter-mile track. The air-conditioned Boulder City Inn, Mr. and Mrs. Beaugureau, proprietors, provided excellent food and comfortable rooms. We enjoyed the hospitality of Dr. and Mrs. Elmer Lee and Drs. Tom and Juanita White. Thanks to these and many other friends the eleven of us had good fun and a successful summer.



Those who returned: C. F. Consolazio, U. S. Army Medical Research and Nutrition Laboratory, Denver; D. B. Dill; J. H. Talbott, Editor JAMA; W. V. Consolazio, National Science Foundation; and F. G. Hall. The first four were in the Harvard Fatigue Laboratory for many years.