

# INTERIM PROGRESS REPORT

## DENDROCHRONOLOGY OF

### BRISTLECONE PINE

#### I. WHITE MOUNTAINS, CALIFORNIA

C. W. Ferguson  
Laboratory of Tree-Ring Research  
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The National Science Foundation grant of 15 August 1965 received a one-year extension, to 15 August 1968, to utilize unexpended funds. A summary by C. W. Ferguson of the Laboratory's dendrochronological studies of bristlecone pine, Pinus aristata, in the White Mountains of east-central California appeared in Science (159:839-846) 23 February 1968. A chronology of 7117 years was reported, an extension of 460 years since last year's annual report. Concomitant with this extension has been the increased depth of the chronology with the incorporation of additional long tree-ring series. Several weak intervals, such as 2800 to 2400 B.C., are currently being strengthened, so that the resultant, computer-based master chronology will have a relatively uniform depth.

Cooperative radiocarbon studies are continuing. The Science article reported 369 tree-ring dated samples of bristlecone pine prepared especially for C-14 analysis, an increase of only 17 since the last annual report. The total number, as of 3 June 1968, is 426, and more are continually in preparation.

That the radiocarbon aspect of the bristlecone pine studies is important is evidenced by the invitation to C. W. Ferguson to participate in the Nobel Symposium on "Radiocarbon variation and absolute chronology" in Uppsala, Sweden, in August, 1969. Basic tree-ring data also will be presented by Ferguson at the INQUA (International Union for Quaternary Research) conference in Paris in September, 1969.

Work by V. C. LaMarche, Jr., initiated during his tenure with the U. S. Geological Survey, on fluctuations of the upper timberline is being continued at the Laboratory since his appointment to our staff 1 July 1967. His tree-ring specimens, especially those sets collected near upper timberline for detailed statistical analysis, and C-14 analysis of remnants found well above the present timberline strengthen and, in turn, are strengthened by the chronology building phase of the Nevada project, in particular, and also of the White Mountain study.

Laboratory assistance on the bristlecone pine projects has been provided by Susan Bliss, D. O. Bowden, D. A. Graybill, Carole Hemmings, P. G. Marquez, M. A. Parker, Marlene Posedly, G. B. Steelhammer, and R. M. Wulff. Computer analysis has been assisted by V. M. Bockman and F. A. Clontz. Cooperative studies by V. C. LaMarche assisted the bristlecone pine projects in both California and Nevada.

The tree-ring dating potentials of bristlecone pine, Pinus aristata, and singleleaf pinyon, Pinus monophyllum, found in debris flow deposits on the desert floor have been explored by C. W. Ferguson in cooperation with C. B. Beaty, Head, Department of Geography, University of Montana, Missoula. Bristlecone pine remnants that have already been dated, indicate not only the feasibility of dating material found 5000 feet below and 5 to 10 miles from its place of origin, but also the possibility of dating these geologic events themselves.

Packrat middens have been found not only to contain plant material diagnostic of the pre-existent vegetation, but also to be datable by C-14 (Science 143:1171; 155:1640). A current study by C. W. Ferguson with P. C. Mehringer, Jr., of the Department of Geochronology, has disclosed needles of bristlecone pine from a midden in a mountain range where this species does not grow. Three samples are being submitted for C-14 analysis. This evidence may indicate another potential source of datable bristlecone pine tree-ring material of glacial age; such tree-ring data would be of inestimable value.