

MOUND EXPLORATION IN THE TENNESSEE VALLEY, U.S.A.

THE operations of the Tennessee Valley Authority in the United States of America, by the erection of dams to collect and control the waters of the Tennessee River and its affluents, will inundate to a considerable depth a vast tract of land, which to the archaeologist and the student of the pre- and proto-history of the indigenous peoples of America is one of the most interesting regions of the continent north of the tropics. Unfortunately, in a cultural sense it is still incompletely understood. Though a great part of it, and curiously enough that especially suited to aboriginal pursuits and modes of life, was still unoccupied by surrounding tribes, possibly owing to mutual rivalries, when first visited by the white man in the sixteenth century, nevertheless the whole country abounds in evidence of prehistoric occupation in the form of mounds, shell heaps, stone implements, pottery, old fields, burial caves, and ancient cemeteries. From about 1660 onwards, these vacant lands were occupied successively by Shawnee, Chickasaw, Cherokee and Creeks, with a number of lesser tribes of uncertain affinities.

So early in the history of the Tennessee Valley Authority project as 1933, it was pointed out that the building of the dams and consequent flooding of large areas of the valley would destroy these records of prehistory for all time, unless some plan of conservation could be undertaken. Already the construction of the Wilson Dam, near Florence in Alabama, by the United States Government during the War of 1914-18, had created a lake 23 square miles in area; and to this inundation a further 100 square miles was now to be added. Accordingly, towards the close of 1933, a conference was held at Knoxville which was attended by representatives of the Authority and the Universities of Tennessee and Alabama, with Mr. Niel M. Judd of the Smithsonian Institution as consultant. As a result, archaeological surveys of the areas affected were instituted and a number of excavations have been carried out with moneys provided out of Federal funds for the relief of unemployment, with the assistance of grants from universities and other learned bodies. Reports on the results of the survey work and excavation will, for the most part, be published when ready by the Smithsonian Institution of Washington.

Although the existence of a large number of mounds and other prehistoric remains in the great

river-valley system, Ohio-Tennessee-Mississippi, of the United States has long been known and their character frequently described and discussed, it is only of recent years, thanks mainly to the work of Mr. Warren K. Moorhead and a small band of enthusiastic investigators, that anything approaching real understanding of the mound-culture has begun to emerge. At the moment, the focus of the problem is the distribution affinities and development of the 'Hopewell' culture, of which outstanding characters appear in what follows.

A more general characterization of the culture of these mounds, however, is given by T. M. N. Lewis, of the University of Tennessee, in a preliminary report to the American Philosophical Society on archaeological investigations in the Tennessee Valley during the past five years, to the cost of which the Society had made grants from the Penrose Fund in aid of research¹.

A large quantity of documented archaeological material and skeletal remains was obtained, from which the most interesting result to emerge, pending further and more detailed analysis, was the apparent linkage of the aboriginal peoples of Tennessee with those of Middle America. The large earthworks having the form of truncated pyramids, which have now been meticulously excavated, follow in cruder fashion the methods of construction of the temple pyramids of Central American lands, in which the ruins of temple buildings are found to surmount superimposed sub-structures. Here in Tennessee, however, the sub-structures are not stone-plated, as they are in the south, but are constructed of clay, whereas the super-structures, in which the religious ceremonies and business of government were carried on, were of poles, bark, cane and clay instead of stone. Elevated square or circular fireplaces constructed from puddled clay are always present in the centre of the floors. Occasionally elevated rectangular platforms and seats of hard-burned clay have been found. Changes in architectural details of the superimposed structures suggest changes in cultural occupations, which, as will be seen, are supported by analyses of the evidence. Stairways or ramps lead to the summits of the structures.

In some instances, although these structures were intended to be the town's chief ceremonial house, interments of important individuals in pits beneath the floor-levels were made. Nearly always these are lavishly accompanied by mortuary

offerings of pearl and shell beads, copper ornaments, engraved shell gorgets, and other implements and utensils of bone, stone, shell and pottery.

The villages were small, and only in rare instances could the number of inhabitants have exceeded 1,500 or 2,000 individuals. The huts were small and rude, and in close proximity one to another; the dead were buried either at haphazard throughout the village, as in the Chickamauga Dam Basin, near Chatanooga, or in cemeteries, as in central and western Tennessee.

A detailed report on key positions in the Wheeler Basin of northern Alabama which had been excavated under his direction has been made by William S. Webb, with supplements on the geology and topographic features of the region and their effect on aboriginal occupation, by Walter B. Jones, State geologist of Alabama, a study of the physical anthropology and pathology of the skeletal material by Prof. W. D. Funkhouser of the University of Kentucky, and an analysis of the ceramic material by Dr. James B. Griffin, of the University of Michigan².

On the general character of the relation of aboriginal occupation and geological and topographical conditions, it may be said that as a rule the principal villages or settlements with or without mounds were on level ground adjacent to rivers or lakes. Often there is an amazing amount of kitchen midden material in one or more portions of each settlement. In Tick Island, for example, refuse reaches a depth of 8 ft. for an area of nearly two acres. Other examples are the shell mounds, composed of shells, animal bones, stones, pebbles, flint chips, fashioned and broken objects, potsherds, fish remains, charcoal and occasional human burials. Mounds of this type are often so much as 200 ft. wide, 600 ft. long and 15–20 ft. high, with 60,000–100,000 cubic yards content, all left over from primitive kitchens. An archaeological map prepared on the basis of material collected in a preliminary archaeological survey in 1932 shows 237 sites distributed over six counties. The key sites selected for investigation numbered nineteen.

In general terms, the culture or cultures of these sites, of which the excavation is described *seriatim* in detail, may be characterized on stratigraphic evidence as a sequence. The earliest form is a pre-pottery culture, in which the bow had not come into use. Its place was filled by the *atlal* or throwing-stick. Spear points appear in great number, associated with a broad-bladed flint knife. Apparently bodies were buried without the flesh, though the occurrence of numerous burnt bones need not necessarily denote cannibalism. Above this from a level of 6–7 ft. below the surface was

evidence of a culture in which all burials were in the flesh, and with them were associated marine shells, pottery vessels, and copper. In certain instances burials were in a shell midden containing much flint and many potsherds. Frequently the head was detached and alone buried. It is by no means certain that all the burials in the mounds are of the culture with which they are found.

A burial mound in Tick Island was quite in contrast with other sites in the vicinity, having a number of distinctive cultural traits, which cannot be connected with any other sites or known racial stock. Nothing but pottery, surprisingly, was used, and in quantity, for burial offerings. Some burials were flexed, some extended, but the most common practice was the burial of the detached head. All mortuary vessels were shell-tempered, while detached sherds were all gravel- or sand-tempered. The significance of this will appear later. A very unusual open bowl with much elevated strap handles and rows of protuberances has also been recorded on a number of sites along the Tennessee in north Alabama.

The association of outstanding stone artefacts with copper artefacts, particularly copper reel-shaped objects, leads to discussion of the distribution of these last. The practice of depositing these copper reel-shaped objects in burial mounds is found to centre in a comparatively small area, embracing the counties of northern Alabama. A comparison of the sites produces a very constant complex of thirty-six cultural traits, to which on account of the consistent association of copper, especially the reel-shaped objects, and galena with burials, the name of the 'copper-galena' complex has been given. The people of this culture obtained and worked native copper, buried galena with their dead, possessed many ocean shells, practised ceremonial destruction of artefacts and produced woven fabrics. They were either well on the way towards developing a specialized sedentary culture, or else they represent the degenerate form of a higher cultural complex.

In either event, although neither history nor tradition presents any suggestions for their connexion with tribes who later inhabited this territory, it is noted that they occupied the territory where de Soto (1540) reported the Yuchi to be living; while an examination of the traits here considered to be fundamental in the copper-galena complex leads to the conclusion that it may be regarded tentatively as a manifestation of the Hopewellian phase—a phase centring in the Hopewell culture of Ohio, which was the result of the high development of an able people, who over a long period of time "drew to themselves the best cultural and material wealth from a large

area, and like many a metropolis of modern times, radiated a powerful influence on customs and techniques to all less-favoured areas".

The reference to the temper of the pottery of Tick Island calls for further elucidation. In the report on pottery by Dr. Griffin, it is pointed out that the distinguishing characteristic most easily definable in the analysis of the sherds from six sites submitted to him was the type of temper; it was of primary importance in recognizing and distinguishing the culturally complete ceramic types. As a rule, Dr. Griffin points out, temper is

not a reliable diagnostic trait. Yet there is, for example, no evidence that the makers of the shell-tempered pottery had any cultural contact with the users of sand or fibre for tempering. Although pottery containing limestone has contacts with that containing clay or grit, such evidence is lacking for sand and fibre, although both types of pottery occur on the same site.

¹"The American Philosophical Society: Year Book, 1938" (Philadelphia, 1939).

²"An Archaeological Survey of Wheeler Basin on the Tennessee River in Northern Alabama". By William S. Webb. Smithsonian Institution, Washington, D.C., Bureau of American Ethnology, Bull. 122; 1939.

INTERGRADING AMONG PLANTS IN RELATION TO THE PROVENANCE OF FOREST TREES

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IT has long been known that the geographical source of the seed of forest trees is important if a well-grown and healthy plantation is to be achieved and yield a profitable return. For some years experimental plantations of European Larch have been grown by the Forestry Commission from seed of several Scottish and Continental sources. Attention has been focused to an increasing degree on the question of seed provenance in an effort to obtain varieties capable of giving high yields under a variety of soil conditions in different parts of the country and able to withstand frosts and fungal diseases. With the object of stimulating interest in the question, a discussion on seed provenance and local races of forest trees had been arranged between Sections K (Botany) and K* (Forestry) of the British Association at Dundee, but did not take place before the cancellation of the meeting.

A considerable volume of research on seed provenance in forest trees has been carried out on the Continent, by far the greater part of which has been concerned with conifers, especially Scots Pine, European Larch and Norway Spruce. Much of the work has had a physiological bias. The relationship of seed source to the complex of characters resulting in frost hardiness and the ripening of the shoots has been studied. Rate of growth and growth periodicity are important also and interact on the quality of the resulting timber. Among the morphological characters compared in strains of different origin are the growth habit and the form of the root system, both of which may have a profound influence on the yield under particular conditions, as well as on the form of

leaves, buds and cones. It is not possible here to do more than indicate the extent of the wide field already covered by numerous experimenters, but able summaries are given by Langlet¹ and Kalela². The purpose of this article is to point out the relationship between some recent developments in experimental taxonomy and the question of provenance.

The correlations between morphological characteristics of adult trees of different strains and their silvicultural value so far attempted have been based in the main on the conception of species and varieties as discrete entities, varying but little and more or less easy of recognition. This is a conception related to the classical taxonomy, in which plant forms are often described from one or a few similar individuals. Frequently this is unavoidable, as when the only specimens available have come from a single collecting expedition in isolated or difficult territory. Nevertheless a somewhat static view of the species as an individual results. In settled countries where extensive investigations of the flora have been made, material is available or can easily be obtained for intensive and critical studies of particular species or species groups. Such studies lead to a more dynamic view of a species as a constantly varying population in which the characters of the component individuals intergrade. To enable the foresters to make the most intelligent use of this intergrading, the taxonomist must first produce a classification in which it is embodied. The recent treatment of intergrading is a step in this direction.

Intergrading may occur within a species or between related species capable of interbreeding.