

## TREE RINGS AND CULTURES IN THE SOUTH-WESTERN UNITED STATES

**D**ENDROLOGICAL evidence, in other words the tree-ring method of dating as applied to the archaeological investigation of early cultural remains in the south-western United States, not only confirms, and is itself confirmed by, stratigraphical evidence, but also serves to afford a clue to at least one among the causes which may have contributed to bringing about fundamental changes in mode of life of south-western peoples, and even the decay of a flourishing civilization. It has, for example, long been an open question among American archaeologists why a people living in small scattered villages should develop a tendency to concentrate in urban communities, which later become the great communal houses of the Pueblo period; and further, why this Pueblo civilization, on attaining a remarkable peak-point in development, should suffer a serious decline, and many settlements be abandoned. At neither point does there appear to be any significant fluctuation in numbers of the population, nor any serious increase in raiding activity of hostile tribes.

It is pointed out by Dr. F. H. H. Roberts, jun.<sup>1</sup>, in a survey of current archaeological knowledge of the south-west, that both these crises coincide with periods of drought indicated by the tree-ring sequence, while the period of greatest expansion in Pueblo civilization is also a twenty-year period of favourable conditions.

In introducing this report on his archaeological investigations in eastern Arizona, Dr. Roberts advances arguments for a new classification and nomenclature in south-western archaeology, to supersede that adopted at a conference held at Pecos in 1927. It was then decided to accept a discrimination in the Basket Maker culture, at that time the earliest differentiated in the south-west, into three stages, and of the Pueblo cultures into five, of which the latest stages were post-Columbian and extended to modern times. Yet, as Dr. Roberts points out, Basket Maker I, the primary stage of a simple nomadic hunting people, leading up to the semi-hunting, semi-agricultural phase of the later Basket Maker culture, is entirely hypothetical, and no relics which can be assigned to it have been discovered. Hence he suggests its elimination, and the substitution of 'Basket Maker' simply for the second stage, the earliest known at present, and 'Developed Basket Maker' for stage III. Pueblo I and II become 'Developmental Pueblo', while Pueblo III-V are covered by Great

Pueblo, the period of greatest expansion, 'Regressive Pueblo', the period of decline, 'Renaissance Pueblo' and 'Historic Pueblo', as more truly in consonance with the history of the development of the culture.

Further, in considering the character of the earliest period, Dr. Roberts distinguishes three types of culture—two major provinces, to which he now adds a third. Of these the first centres in the plateau country of the area comprised in the States of New Mexico, Arizona, south-west Colorado, Utah, eastern Nevada, western Texas, and northern Mexico. For this the name 'Anasazi' is proposed. The second is the culture of the desert precincts and lowlands, to which the name 'Hohokam' is applied, while a third province, hitherto considered a variant of Anasazi, is the 'Mogollon', which centres in San Francisco and the Mimbres River valley in south-west New Mexico.

The main differences between the Anasazi and Hohokam cultures summarily stated are as follows: While the Hohokam practised cremation, the Anasazi buried their dead. The Hohokam built rectangular, single-unit houses of pole, brush, and plaster construction, while the Anasazi progressed from circular, or rectangular, single-unit dwellings of poles, brush, and plaster to multi-storied communal houses of stone. The Hohokam progressed from flood-water irrigation to an extensive canal system for watering their crops; but the Anasazi depended mainly on flood-water, though in some sections they employed small ditches. Both used coiled pottery, but their finishing processes differed, as did the decoration, the Anasazi developing from black to polychrome, while the Hohokam used red on buff.

The Mogollon cultural pattern is that of a sedentary agricultural-hunting complex, in which the hunting aspect is more pronounced than in either Anasazi or Hohokam. As a rule, the dead were buried, but there was some cremation. Houses were rounded and semi-subterranean, followed by rectangular semi-subterranean, and then by the Pueblo type.

While dendrological evidence is available for dating the Anasazi culture, the varieties of timber used in house construction in the Hohokam culture is not adaptable to tree-ring studies; and the determination of period in Hohokam must depend upon pottery types and reference to trade objects of the Anasazi penetration until A.D. 1000, when



Anasazi settlement took place in the Hohokam province. Timbers from the Mogollon houses have been dated, making correlation with Anasazi possible. It is suggested that basic Mogollon, not yet clearly defined, was contemporary with Modified Basket Maker, and its later stages of development with Developmental Pueblo, Great Pueblo, and Renaissance.

Investigation of the relations of the Mogollon

culture to various phases of Anasazi, both Basket Maker and Pueblo, have been in progress throughout the summer of 1939: at Glenwood, New Mexico (Field Museum of Natural History, Chicago); a second expedition working also near Glenwood (Logan Museum); and on a village site occupied A.D. 700-800, south of Showlow, Arizona (Arizona State Museum).

<sup>1</sup> *Smithsonian Inst. : Bur. Amer. Ethnol. Bull.*, 121 (1939).

## OBITUARIES

Prof. H. H. Meyer

THE death of Hans Horst Meyer on October 6 severs perhaps the last direct link with the beginnings of experimental pharmacology as a separate science.

Meyer was born on March 17, 1853, in Insterburg in East Prussia, and studied medicine at Königsberg, Leipzig and Berlin. A story goes that he passed his qualifying examination in all subjects except pharmacology and that it was to rectify this defect that he undertook an investigation under Jaffo, which gave him an introduction to the technique and literature of experimental physiology. Later he went to Strassburg to work under Schmiedeberg, as did nearly all the prospective pharmacologists of the time, and had just been appointed assistant to Schmiedeberg when he was called to Dorpat in 1881. Here he succeeded Boehm, the immediate successor of Buchheim, who had established in Dorpat the first laboratory for experimental pharmacology. In 1884 he became professor at Marburg where he worked for twenty years, after which, in 1904, he became director of the Pharmacological Institute in Vienna. He held this appointment for another twenty years, retiring in 1924. Still active, he was put in charge of a department for standardization of drugs, an appointment to which there was no age-limit and accommodation for which was given in his old laboratory. Up to a year or two ago, he still held every month in his own house a discussion on some pharmacological problem, which all the workers in the Pharmacological Institute, including his successor Pick, attended, and I am informed by one of the staff that up to the end Meyer took a leading part in these discussions, with little impairment of his enthusiasm or of the constructive and critical acuity of his mind.

Like most of the pharmacologists of his time, Meyer was no narrow specialist. His investigations ranged over a wide field, and behind it all was the desire to link up pharmacology with general biology and pathology on one hand and the treatment of disease on the other, towards the establishment of a more rational therapy. His influence is to be measured not only by his achievement but also by the vision which prompted it and by his guiding example of the lines upon which pharmacological investigation

could be profitably pursued. Among the pharmacological problems he investigated were the action of the alkaloids of jaborandi and corydalis, acute poisoning with phosphorus and with metals, especially iron and bismuth, and the action of purgatives and astringents. He also did some pioneer work on the reaction of the blood, on heat-regulation and on the action of diuretics and, resulting perhaps from his early work on jaborandi, he was especially interested in the development of the knowledge of the autonomic nervous system.

Meyer's claim to a permanent place in the history of pharmacology will, however, probably rest upon his contributions to two problems which lay outside the range of routine descriptive pharmacology. The first of these was his theory of the action of narcotics; he sought to explain their action by their relatively greater solubility in lipoids than in water, which led to their accumulation in the cells of the central nervous system with a consequent suspension of nervous activity.

This theory, which was independently and almost simultaneously suggested by Overton, has required subsequent modification, but its importance lies in its being a pioneer attempt, based upon experimental evidence, to solve one of the fundamental problems of pharmacology—the chemical or physical basis for the site and quality of pharmacological action. The other problem to which he introduced new conceptions was the action of bacterial toxins. Especially will be remembered his suggestion that tetanus toxin travels to the central nervous system by way of the motor nerves rather than by the blood stream. He also showed that antitoxins were the more effective the earlier they were given, and were relatively inefficacious once the toxin had combined with the tissues.

Apart from his own work, Meyer profoundly influenced, by his wide knowledge and imaginative power, those who went to work with him from different parts of the world. His scientific eminence was recognized by many universities and learned societies outside his own country. He was the senior surviving honorary fellow of the British Physiological Society and, with J. J. Abel, was the first honorary member of the British Pharmacological Society.

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