grams, and of the treated plants 6.6 grams, the average increase due to the manganese being 30 per cent.

Manganese was apparently about equally effective whether injected into the tissues of the leaves or applied to the soil. Also, the control plants in Pot 15, which alternated with the injected plants in the same pot, were benefited neither in weight nor appearance by the treatment of the adjoining plants. So it is quite safe to conclude that this lime-induced chlorosis was cured by the action of the manganese within the body of the plant. The changes brought about in the soils by additions of manganese may be beneficial, but such changes were clearly not necessary for the recovery of the spinach in these experiments, while the injection of manganese solutions into the plants was clearly beneficial.

This method of injection of solutions into the leaf tissues through the stomata may be advantageously employed in the study of other diseases of plants suspected to be due to deficiency of soluble substances.

FORMAN T. MCLEAN

RHODE ISLAND STATE COLLEGE

SOUTHWESTERN ARCHEOLOGICAL CONFERENCE

ON August 29–31, 1927, there was held at the excavation camp of Phillips Academy, Andover, at Pecos, New Mexico, an informal gathering of workers in Southwestern archeology and related fields. There were present: C. Amsden, Southwest Museum; Monroe Amsden, Southwest Museum; Lansing Bloom, Museum of New Mexico; K. M. Chapman, Museum of New Mexico; H. S. Colton, University of Pennsylvania; C. B. Cosgrove, Peabody Museum of Harvard; Harriet Cosgrove; Byron Cummings, University of Arizona; A. E. Douglass, University of Arizona; Clara Lee Fraps, University of Arizona; Charlotte Gower, University of Chicago; O. S. Halseth, Arizona Museum; M. R. Harrington, Museum of the American Indian; E. L. Haury, University of Arizona; E. L. Hewett, Museum of New Mexico; Walter Hough, U. S. National Museum; N. M. Judd, U. S. National Museum, National Geographical Society; A. V. Kidder, Carnegie Institution and Phillips Academy; Madeleine A. Kidder; A. L. Kroeber, University of California; T. F. McIlwraith, University of Toronto; H. L. Mera, Indian Arts Fund; Paul Martin, Colorado State Museum; S. G. Morley, Carnegie Institution of Washington; Frances R. Morley; E. H. Morris, Carnegie Institution of Washington; Ann A. Morris; J. L. Nusbaum, National Park Service; Frank Pinkley, National Park Service; E. B. Renaud, University of Denver; Oliver Ricketson, Carnegie Institution of Washington; Edith B. Ricketson; F. H. H. Roberts, Jr., Bureau of American Ethnology; Linda Roberts; J. A. B. Scherer, Southwest Museum; H. Shapiro, American Museum of Natural History; Leslie Spier, University of Oklahoma; Erna Gunther Spier; H. J. Spinden, Peabody Museum of Harvard; J. B. Thoburn, Oklahoma Historical Society; T. T. Waterman, University of Arizona; R. Wauchope, University of South Carolina.

The purposes of the meeting were: to bring about contacts between workers in the Southwestern field; to discuss fundamental problems of Southwestern history, and to formulate plans for coordinated attack upon them; to pool knowledge of facts and techniques, and to lay foundations for a unified system of nomenclature.

The morning of Monday, August 29, was spent in inspecting the academy's excavations in the pre-Pecos site at Bandelier Bend, and in visiting the main Pecos ruin. Monday afternoon and the mornings and afternoons of Tuesday and Wednesday were devoted to the business of the meeting, less formal campfire gatherings being held each evening. On Thursday, September 1, several members of the group visited the excavations of the School of American Research at Puyé by invitation of Director E. L. Hewett.

In the preliminary discussions, special attention was paid to the classification of Southwestern culture-periods. There was entire unanimity in regard to the general nature of Southwestern culture-growth, *i.e.*, that its basic element, maize agriculture, was derived from the South; that from time to time certain other highly important elements such as cotton-growing, loam-weaving, and probably pottery-making, were also introduced from the same source; but that little more than the germ-ideas of these elements penetrated to the Southwest; and that the development of its culture was essentially autochthonous.

There was practical unanimity as to the course of development, *i.e.*, that agriculture was taken up by a previously resident, long-headed, nomadic or semi-nomadic people, who did not practice skull-deformation, and who already made excellent coiled basketry, twined-woven bags, sandals, and used the atlatl; but whose dwellings were of perishable nature. The newly acquired art of agriculture led to a more settled life and to the development of more permanent houses. For some time, however, pottery-making was unknown. At a later date pottery was introduced, or possibly independently invented, houses of the pit type were perfected, and became grouped into villages, and the bow-and-arrow began to supplant the atlatl. The long-headed race, however, still persisted.

At a still later period there appeared certain important changes: skull-deformation was initiated (the majority of those present at the conference believe that a new, broad-headed strain supplanted the ancient long-heads); dwellings emerged from the ground, the rooms became rectangular, and were grouped more closely; structural rings (corrugations) were for the first time left unobliterated on cooking vessels. From then on the development of the culture was rapid. After a period of wide extension, marked by small-village life, there was, perhaps a decrease in amount of territory occupied, and surely a concentration of population in certain areas, together with great architectural and ceramic achievement and strong regional specialization. Subsequently large areas were abandoned, there appears to have been a considerable shrinkage of population, and there was a definite cultural degeneration. This period was brought to a close by the settlement of the Southwest by the Spanish about 1600.

The meeting attempted, as a basis for more precise definition of culture-stages, to arrive at agreement as to diagnostic culture-traits. A sub-committee prepared a chronological tabulation of elements, which was used during the subsequent discussions. Architecture was considered to be of much value as an index of growth; as were village-types, sandals, pictographs, etc. Much further information, both as to nature and distribution, was decided to be needed, however, before these categories can be used with full confidence. Pottery, it was agreed, is at the present time the most abundant, convenient and reliable criterion, and the cooking wares the simplest type for preliminary chronological determinations. Discussion brought out the following outline of development in this class of ceramics: first, plain wares; later, neck corrugations produced by leaving unobliterated the upper structural rings; still later, spiral corrugations ornamented by indentations and covering the entire vessel; again later, a degeneration of the corrugated technique, and, finally, disappearance of corrugations and return to plain-surface pots.

During all the discussions leading to development of the above outlines, there kept arising questions of period nomenclature. Entire unanimity was not achieved, but the following terms for chronologically sequent periods proved acceptable to the majority:

Basket Maker I, or Early Basket Maker—a postulated (and perhaps recently discovered) stage, pre-agricultural, yet adumbrating later developments.

Basket Maker II, or Basket Maker—the agricultural, atlatl-using, non-pottery-making stage, as described in many publications.

Late Basket Maker, Basket Maker III, or Post-Basket Maker—the pit- or slab-house-building, pottery-making stage (the three Basket Maker stages were characterized by a long-headed population, which did not practice skull-deformation).

Pueblo I, or Proto-Pueblo—the first stage during which cranial deformation was practiced, vessel neck corrugation was introduced, and villages composed of rectangular living-rooms of true masonry were developed (it was generally agreed that the term pre-Pueblo, hitherto sometimes applied to this period, should be discontinued).

Pueblo II—the stage marked by widespread geographical extension of life in small villages; corrugation, often of elaborate technique, extended over the whole surface of cooking vessels.

Pueblo III, or Great Period—the stage of large communities, great development of the arts, and growth of intensive local specialization.

Pueblo IV, or Proto-Historic—the stage characterized by contraction of area occupied; by the gradual disappearance of corrugated wares; and, in general, by decline from the preceding cultural peak.

Pueblo V, or Historic—the period from 1600 A. D. to the present.

As a by-product of the effort to define the various Pueblo periods, the following definition of a pueblo as an architectural type was arrived at: A pueblo is an agglomeration of essentially rectangular living rooms of adobe or masonry construction, generally flat-roofed and built above ground.

There was much discussion of the term "kiva" and of such parts of kivas as the ventilating passage, the fire-screen or deflector, etc. It was agreed that ceremonial rooms varied so greatly in form and in interior arrangement, and that the types shaded into each other so imperceptibly that no valid distinction as to essential function could be drawn between, for instance, round and square, or between above-ground and subterranean examples. The following very broad definition was therefore adopted: A kiva is a chamber specially constructed for ceremonial purposes.

It was hoped that the meeting could devote attention to the nomenclature of areas, of pottery types, pottery forms, elements of decoration, etc.; but so many matters of greater immediate interest were brought up that these questions were deferred with the idea that they should be kept in mind by those present and gone into at a possible future gathering. It was, however, thought well to consider the advisability of a binomial ware-nomenclature; the first name to be indicative of the locality of highest development, the second a technically descriptive term; for example, Sikyatki yellow, Mimbres black-on-white, Upper Rio Grande incised, etc.

There was no opportunity for consideration of the difficult and at present very confused question of names for design-elements, but Mr. K. M. Chapman,

of the New Mexico State Museum, Santa Fe, who has given this matter much study, offers to act as clearing-house for suggestions as to the nomenclature of design and to prepare a preliminary report as basis for further discussion.

A survey was made of work now in progress or in contemplation, and areas under investigation were plotted on a map of the Southwest. This brought out the fact that although certain central areas are under intensive study, the peripheral regions, with the exception of Nevada, are being neglected. Information is badly needed as to the extent and nature of remains in southwestern Arizona, Sonora, Chihuahua, and eastern New Mexico. Of the central districts, the Little Colorado in general and the Hopi country in particular deserve attention. Chronologically considered, the field is being fairly well covered, but Basket Maker I and II, and Pueblo I and IV should be more strenuously attacked. It was emphasized, however, that in spite of the need for much more work, it should become a practice to operate intensively rather than extensively, to make each excavation a model of care and thoroughness, and to leave undisturbed large parts of all important sites in order that they may be studied by the better-equipped students that the future is certain to produce. It was brought out that our present methods for the preservation of skeletal material leave much to be desired.

Mr. J. L. Nusbaum, who has recently been appointed archeologist for the Department of the Interior, and been given supervision of the many ruins on the lands administered by that department, led a discussion of the issuance of permits, the handling of expeditions, the treatment of ruins during and after excavation, and the publication of results. Mr. Frank Pinkley, of the National Park Service, who is in charge of Southwestern monuments, offered valuable suggestions as to the relation between field-workers and Park Service personnel. He also advocated the placing of permanent markers on or near all sites excavated, to which surveys of work done should be tied, in order that excavated areas can in the future readily be located.

Advantage was taken of the presence of Dr. Byron Cummings, who is, under recent state legislation, responsible for the issuance of permits for work in Arizona, to discuss the question of archeological investigations in that state. This led to a general consideration of state laws, of the rights and duties of states and of outside institutions, and of unauthorized digging on public and private lands.

Dr. A. E. Douglass reported his researches on the climate of the southwest and gave the results of his study of tree-rings in their relation to the dating of pueblo and cliff-house ruins. He appealed for the help of all field-workers in the gathering of further materials for this all-important investigation.

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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

FINANCIAL GRANTS TO ADVANCE RESEARCH[1]

FROM the income from the permanent endowment of the American Association a number of grants are made each year to further scientific research. On September 30, 1926, the endowment amounted to $140,876.66 (Treasurer's report of September 30, 1926), a large part of which ($42,350) was the accumulation of sustaining-membership and life-membership fees. By constitutional provision, these fees are always invested and only the income therefrom may be expended.

As more of the members realize the opportunities provided by life membership, the number of life members increases. The fee is now $100. By special action of the executive committee any person who has been a member but who has resigned or has allowed his membership to lapse may at the same time be reinstated and become a life member by paying his total arrearage in annual dues plus an amount sufficient to make a total payment of $100. The sustaining-membership fee is $1,000. Well-to-do persons who are interested in insuring the continuous advance of science should be sustaining members.

Besides the sustaining-membership and life-membership fees, the permanent endowment includes the general endowment fund and the Jane M. Smith Fund. The former amounts to $93,526.66, including the W. Hudson Stephens bequest, the Richard T. Colburn bequest and the Friends' Fund, an accumulation of smaller gifts. The Jane M. Smith fund amounts to $5,000. By provision of the donor's will the income therefrom must be used each year for creating emeritus life memberships. There are now thirty-seven emeritus members and $2,850 of the life-membership fund has been received from the Jane M. Smith fund. Aside from the last-named fund, which yields interest at 6 per cent., the association has recently received about 4.64 per cent. on the invested funds. For the fiscal year 1925–26 (from October 1, 1925, to September 30, 1926) the incomes from the general endowment and from the sustaining-

[1] See also SCIENCE for October 7, 1927.