Reports

Radiocarbon Dates from La Venta, Tabasco

We have recently received a series of nine radiocarbon dates of wood charcoal samples, obtained during the 1955 National Geographic Society–Smithsonian Institution–University of California excavations at the site of La Venta, Tabasco, Mexico (*1*). The radiocarbon determinations were made through the intermediacy of J. B. Griffin at the University Memorial–Phoenix Project Radiocarbon Laboratory, University of Michigan, under the direction of H. R. Crane; costs were defrayed by the National Geographic Society.

La Venta is located about 373 air-line miles southeast of Mexico City in the coastal lowlands near the western border of the state of Tabasco, approximately 12 miles inland from the Gulf of Mexico. This site is the best known major ceremonial center of the classic or florescent phase of the Olmec culture, the exact temporal position of which has long been a subject of controversy. La Venta, with its highly developed stone monumental art and elaborate jade figurines and ornaments, has usually been regarded, especially by archeologists in the United States, as corresponding in time to the earlier part of the classic period of Lowland Maya cultural development. By "the classic period" is usually meant the time-span A.D. 300–900. The present series of carbon-14 dates is in agreement with a growing opinion that the La Venta phase of Olmec culture was in existence for a long time prior to the classic Maya period.

The 1955 excavations at the La Venta site were carried out north of the great pyramid, principally in the column-enclosed ceremonial court, which Drucker (*2*, page 9), termed "complex A" in his report on the earlier work at this site. The recent excavations revealed that complex A has a four-phase history—that is, that it underwent three major successive alterations following its initial construction. We have designated these construction phases, from the earliest to latest, by the Roman numerals I, II, III, and IV. We wish to emphasize that these are site construction phases only, *not* cultural stages; we found no clear evidence of culture change during the time that complex A was in use.

Five samples (Table 1, Nos. M-535, M-529, M-534, M-532, and M-531) were collected from levels which belong stratigraphically to construction phase I. One sample (M-530) came from the phase-II level. Two samples (M-528, M-533) were taken from the lower margin of the 4-foot-thick accumulation of wind-blown sands, which lies directly upon the phase-IV constructions and which, mixed with humus, forms the present surface of the site. These latter samples are referable to post-complex A (post-Olmec?) occupations of the island of La Venta; other evidence for this was encountered during the season. No samples that can be assigned with certainty to the phase-III or phase-IV constructions proper were collected. The maximum time-span covered by the nine samples, within one sigma, is 1580 years (1454 B.C. to A.D. 126). The five phase-I dates span a maximum range of 1150 years, from 1454 B.C. to 304 B.C., again within one sigma. The probability that the five radiocarbon runs from the same stratigraphic phase would show this or a greater maximum date range is 56 out of 100, which is well within the significant range. We feel reasonably sure, therefore, that the average of the five dates (2700 B.P. ± 134, 814 B.C. ± 134) is a close approximation of the actual age of the phase-I constructions at La Venta.

The phase-II sample M-530 gives a date (2760 B.P. ± 300, 804 B.C. ± 300) which is in line with the average for phase I; little more than this can be said about it. Sample M-536 was taken from the lower levels of the base of the great pyramid, from an excavation of approximately 15 feet into the interior of the pyramid on its northern side. The date almost certainly refers to one of the later stages of construction of the pyramid. The two samples (M-528, M-533) from the lowest level of the drift sand which mantles the site are interpreted as providing an early post-phase-IV date. The arithmetic average of the two dates obtained is 2265 B.P. (309 B.C.); the weighted average, arrived at by the method employed by Wauchope (*3*), is 2289 B.P. ± 195 (333 B.C. ± 195). We are unable to determine with accuracy the end of the Olmec phase-IV occupation of complex A, but the average of the two post-phase-IV dates, judged with reference to their stratigraphic position relative to the inferior deposits, enables us to estimate that about a century intervened between the end of the phase-IV occupation and deposition of the charcoal in the basal level of the drift sands. We would place the end of the La Venta phase IV within the period 450–325 B.C., probably near the early part of that period. Complex A thus appears, from the radiocarbon determinations, to have been constructed and used during approximately the four centuries 800 to 400 B.C.

As of this moment, the following observations on the La Venta period of Olmec culture seem justified. Drucker's conclusion (*4*) that Olmec growth was not dependent on a Maya fountainhead is strongly supported. The carbon-14 dates from La Venta appear to affirm Wauchope's early temporal placement of the La Venta horizon (*5*). The exact assignment of this period of Olmec culture to a particular stage in current developmental interpretations, such as late formative or early classic, is of course not fully resolved by these dates, but the element of doubt concerning the temporal position of the period is lessened. If the Olmec traits found at the middle preclassic site of Tlatilco in the Valley of Mexico (*6*) can be definitely associated with the La Venta period, as has been suggested by Drucker (*2*, page 229), the relatively great time-span of

Table 1. La Venta radiocarbon dates.

Sample No.	Age (yr)	Date, B.C.
M-535	3110 ± 300	1154 ± 300
M-529	2860 ± 300	904 ± 300
M-530	2760 ± 300	804 ± 300
M-534	2670 ± 300	714 ± 300
M-532	2650 ± 300	694 ± 300
M-531	2560 ± 300	604 ± 300
M-536	2530 ± 300	574 ± 300
M-528	2400 ± 250	444 ± 250
M-533	2130 ± 300	174 ± 300

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this period and its nonconformity to currently proposed views of Mesoamerican culture development (*3, 7*) will be clear. The difficulty of accepting certain sculptured pieces from the Olmec area which bear initial series inscriptions—such as the Tuxtla statuette and stela C from Tres Zapotes—on the grounds of the improbably early dates indicated (*8*) would appear to be greatly diminished. The final report on the 1955 excavations at La Venta is nearing completion and will be published by the Bureau of American Ethnology.

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References

1. P. Drucker and R. F. Heizer, *Natl. Geographic Mag.* 110, 366 (1956).
2. P. Drucker, *Bur. Amer. Ethnol. Bull.* 153 (1952).
3. R. Wauchope, *Middle Amer. Research Records* 2, 17 (1954).
4. P. Drucker, *Smithsonian Misc. Collections* 107, No. 8 (1947).
5. R. Wauchope, *Middle Amer. Research Records* 2, 34, note 40 (1954).
6. M. N. Porter, *Viking Fund Publs. in Anthropol.* 19, 30 (1953); R. P. Chan, *Las Culturas Preclásicas de la Cuenca de México* (1955), pp. 104–107.
7. A. Caso, *Anthropology Today* (1953), pp. 226–237; J. E. S. Thompson, *The Rise and Fall of Maya Civilization* (1954); G. R. Willey and P. Phillips, *Amer. Anthropol.* 57, 723 (1955).
8. M. W. Stirling, *Natl. Geographic Soc., Mexican Archaeol.* ser. 1, No. 1 (1940).

15 April 1957

Probable Cause of Necrotic Spider Bite in the Midwest

Current medical references used by practising physicians list the black widow, *Latrodectus mactans,* and other species of *Latrodectus* as the only spiders occurring in the United States that may inflict bites serious enough to require medical treatment. Physicians practising in rural areas in the Midwest have realized for some time that other species occasionally bite and cause conditions, which, though less generally severe than those occasioned by the bite of *L. mactans,* are serious enough to require attention. In some cases the animal inflicting the bite has not been observed by the patient, and the attending physician has attributed the condition to "insect bite."

With the exception of certain species of Reduviidae, there are no midwestern Hexapoda known to inflict severe injury by bite to human beings. According to Herms (*1*) reduviid bites are characterized by intense local pain, swelling, intense itching, and, in a few cases, profuse urticaria over the body and a local cellulitis followed by necrosis in the immediate vicinity of the bite. In a few days the symptoms resulting from reduviid bite are usually gone.

Several clinical cases of spider bite in Missouri by a "brown spider" are available. Usually, the spider became entangled in the patient's clothing and bit when it was crushed or removed. First symptoms varied, presumably with the relative amount of venom injected, but a thick wheal usually forms with necrosis of tissues at the immediate site of the punctures made by the chelicerae. The necrotic area soon turns violaceous, then black and dry. This area sloughs in a few days or a week, leaving a deep, sharply-defined granular area surrounded by the raised edges of healthy tissue. The sloughed area, frequently quite large, may persist for several weeks, and healing takes place very slowly. In a few patients, systemic disturbance of a general nature has been indicated by a rash resembling that of scarlet fever.

In these cases, spiders inflicting such necrotizing venom have not been available for identification. In a single case a specimen of *Loxosceles reclusus* Gertsch and Mulaik has been circumstantially incriminated.

A striking similarity between these necrotic, spider-inflicted wounds in Missouri and the "gangrenous spot" or cutaneous arachnoidism of Chile, Uruguay, and other South American countries is evident. Macchiavello (*2*) first indicated *Loxosceles laeta* (Nicolet) as the causative agent of such gangrenous spot on human beings in Chile as early as 1937. Subsequent experimentation with the glandular poison of *L. laeta* by Macchiavello (*3*) and by MacKinnon and Witkind (*4*) has established firmly the role of *L. laeta* in cutaneous arachnoidism in South America. Symptoms in patients bitten by *L. laeta* are similar to those in patients observed in Missouri.

Since *Loxosceles reclusus* was circumstantially incriminated in human necrosis before the South American literature was reviewed, and since it belongs in the same genus, it is not unduly presumptive tentatively to assign to *L. reclusus* the same relationship with cutaneous arachnoidism in Missouri that *L. laeta* bears to that condition in South America. Experiments are currently underway involving *Loxosceles reclusus* and laboratory animals. Preliminary results indicate that the venom of *L. reclusus* is a powerful necrotizing agent capable of causing cutaneous necrosis in mammals.

Gertsch (*5*), in discussing spider venoms, states that the venom of a few spiders is fortified with toxins that cause severe local or general reactions. He reports that some venoms contain hematoxins that destroy cells in the vicinity of the wound and result in extensive sloughing and exposure of underlying tissues. *Loxosceles laeta* is the proved agent causing such conditions in South America. *Loxosceles reclusus* is probably responsible for the same conditions in the southern and southwestern United States as well as in the Midwest (*6*).

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References and Notes

1. W. B. Herms, *Medical Entomology* (Macmillan, New York, ed. 4, 1950).
2. A. Macchiavello, *Rev. chilena Hist. Natural* 41, 11 (1937).
3. ———, *Puerto Rico J. Public Health Trop. Med.* 22, 425 (1947); 23, 266 (1947).
4. J. E. MacKinnon and J. Witkind, *Anales fac. med. Montevideo* 38, 75 (1953).
5. W. J. Gertsch, *American Spiders* (Van Nostrand, New York, 1949).
6. A description of the results of experiments with *Loxosceles reclusus* venom and laboratory animals, together with complete documentation of human medical cases, is in preparation.

* Deceased December 1956.

27 March 1957

Influence of Prenatal Maternal Anxiety on Emotionality in Young Rats

W. R. Thompson [*Science* **125**, 698 (1957)] has reported results which are compatible with the hypothesis that "prenatal maternal anxiety does actually increase the emotionality of offspring." Five female rats were trained "first to expect strong shock at the sound of a buzzer, and then to avoid the shock by opening a door between the compartments and running through to the safe side." These rats, as well as a group of five control rats, were then mated.

During gestation, the experimental mothers were "exposed to the buzzer three times every day in the shock side of the shuttlebox, but with the shock turned off and the door to the safe side locked." The offspring of the experimental and control mothers were tested for differences in "emotionality," and the observed differences were traced to the stress situations which were imposed on the experimental mothers during gestation.

It is possible, however, that differences in prenatal environment may have resulted from maternal hormonal differences caused by systemic changes which were produced in response to the stress