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INSTITUTO VENEZOLANO DE INVESTIGACIONES CIENTIFICAS NATURAL RADIOCARBON MEASUREMENTS I

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The I.V.I.C. laboratory started operation in December, 1963 using liquid scintillation techniques and the benzene method. The syntheses are carried out in a Packard benzene synthesizer and the solutions counted by a Packard automatic tri-carb spectrometer. For routine dating, a 4 cc counting vial is used with 2 cc benzene coming from the sample being dated and 2 cc commercial toluene added with the PPO and POPOP scintillators.

The dates reported here are calculated using a C^{14} half-life of 5568 yr. Our modern reference is taken as 95% of the NBS oxalic acid C^{14} standard, converted to carbon dioxide by a solution of potassium permanganate and sulfuric acid. The standard errors are given with the dates in this list. A study has been carried out showing that variations in the measurements, other than those due to the random nature of the disintegration process, amount to less than ½% and are negligible for purposes of natural C^{14} measurements (Tamers and Pearson, 1964).

The reliability of the C^{14} dates produced has been verified in several ways. In this list are the correct values for the known-age samples of the Tinajas series (IVIC-145 and 146) and eight of the measurements that were each done twice (IVIC-15, 74, 88, 106, 108, 109, 112, and 145). In addition, the following table summarizes the results of dates that were checked by other laboratories. The agreement is very good.

	Sample	Age	Reference
IVIC-5		1400 ± 170	IVIC I
Tx-54	Mordan Charcoal	1140 ± 130	Texas II
Y-1422		1560 ± 80	(written commun., Stuiver, 1964)
IVIC-18		790 ± 100	IVIC I
Tx-188	El Cerro Charcoal C	800 ± 90	Texas III
IVIC-62		690 ± 110	IVIC I
Tx-189	El Chao Charcoal B	610 ± 95	Texas III
Y-1421		540 ± 80	(written commun., Stuiver, 1964)
IVIC-74		1340 ± 95	IVIC I
Tx-190	La Betania Charcoal J	1100 ± 110	Texas III

Radon has never been observed to contaminate the counting solutions. It would be removed during the chemical manipulations and effectively discrimi-

nated against by the counter. Quenching, which is caused by impurities reducing the scintillation efficiency of the liquids, is verified as absent in every measurement; it is seen only rarely. Isotope effects, occurring in the chemical syntheses, are sufficiently reproducible or small that they do not add noticeable errors.

ACKNOWLEDGMENTS

Drs. M. Layrisse and M. Roche of the I.V.I.C. Department of Physiopathology generously loaned us their liquid scintillation counter half-time and, in this way, permitted the C^{14} dating laboratory to operate this year even though it is not yet fully equipped. Dr. G. Chuchani, chairman of the Department of Chemistry of I.V.I.C., supported and encouraged the work. J. Navarro joined the laboratory in March, 1964 as the chemical technician and now carries out the benzene syntheses for each dating.

We are particularly indebted to Dr. Minze Stuiver of the Yale laboratory and Mr. F. J. Pearson, Jr. of the Texas laboratory who dated some of our samples as interlaboratory checks.

The snail shells of this list were identified by Mr. René J. Martínez. Universidad Central de Venezuela.

SAMPLE DESCRIPTIONS

I. ARCHAEOLOGIC SAMPLES

A. Venezuela

Tinajas series

Specimens from ruins of mission-town of Nuestra Señora de la Ciudad de las Tinajas, located in country settlement of La Trilla or Tinajas, municipality of Albarico, San Felipe district, state of Yaracuy, in north-central portion of Venezuela (10° 22′ N Lat, 68° 33′ W Long). Mission operated from 1714 to 1761 A.D. These known-age samples were used as part of the verification of the proper functioning of the lab. Coll. 1964 and subm. by Nelly Arvelo, I.V.I.C.

IVIC-145. Tinajas A — **185 ± 85**
A.D. 1765

Charcoal from Sq. VIII, 0.50 to 0.75 m below surface. Associated with pottery, cloth and bricks. Sample was split and the two portions prepared and counted separately, and the results averaged. Individual ages were <180 and 330 ± 110.

IVIC-146. Tinajas B — **320 ± 110**
A.D. 1630

Charcoal from Sq. IX, Pit O_1, 1.00 to 1.25 m below surface. Pottery was also found at this level. *Comment*: dates obtained are in agreement with known age of site.

Mirinday series

Samples from Travesía de Mirinday (9° 37′ N Lat, 70° 14′ W Long). Excavations made on lower slopes of the hill Mupí on E side of Carache Valley, ca. 150 m from town of Carache. Strategically located near edge of Andes.

Carache area may have been a zone of contact between Andes and N coast of South America in prehistoric times. Study of archaeological material in relation to geographic, ecological and chronological positions is expected to lead to interpretation of cultural history of area. Material obtained is in Mirinday style, which belongs to Period IV (Cruxent and Rouse, 1961). I.V.I.C. dates are in agreement with a Yale Univ. date for Period IV pottery at the Mirinday site: Y-454, 580 ± 50 B.P. (Yale IV). Samples coll. 1963-1964 and subm. by Erika Wagner, Yale Univ.

IVIC-1. Juana Batista, Charcoal A — **635 ± 130 A.D. 1315**

From Sec. A-III, 0.80 m below surface. Associated with plain and painted pottery, stone manos, land snail shells. *Comment*: see IVIC-4.

IVIC-2. Juana Batista, Charcoal B — **360 ± 110 A.D. 1590**

From Sec. A-III, 1.00 m below surface. Same type of material as in IVIC-1. *Comment*: see IVIC-4.

IVIC-3. Juana Batista, Charcoal C — **340 ± 100 A.D. 1610**

From Sec. A-III, 1.00 to 1.25 m below surface. This level also yielded plain and painted pottery and land snail shells. *Comment*: see IVIC-4.

IVIC-4. Juana Batista, Charcoal D — **310 ± 110 A.D. 1640**

From Sec. A-III, 1.25 to 1.50 m below surface. Associated with plain and painted pottery and a bone flute. *Comment* (E.W.): the recent dates obtained from Juana Batista charcoal fit the ethnohistorical sources which indicate that area was inhabited shortly before arrival of Spaniards.

IVIC-22. Conchita Benítez, Charcoal A — **400 ± 100 A.D. 1550**

From Sec. D-XI, 2.25 to 2.50 m below surface. Plain and painted pottery and land snail shells were present. *Comment*: see IVIC-106.

IVIC-23. Conchita Benítez, Land Snail Shells A — **610 ± 110 A.D. 1340**

Sample, genus *Plekocheilus* and *Strophocheilus*, was collected with the charcoal of IVIC-22. *Comment*: see IVIC-89.

IVIC-24. Conchita Benítez, Charcoal B — **660 ± 110 A.D. 1290**

Sec. D-XI, 2.50 to 2.75 m below surface. Artifacts from this level included plain and painted pottery, a hand axe, and bone objects. *Comment*: see IVIC-106.

IVIC-25. Conchita Benítez, Land Snail Shells B — **330 ± 105 A.D. 1620**

Sample, genus *Plekocheilus* and *Stropocheilus*, was found with the charcoal of IVIC-24. *Comment*: see IVIC-89.

IVIC-26. Conchita Benítez Charcoal C **730 ± 120**
A.D. 1220

Sec. D-XI, 2.75 to 3.00 m below surface. Associated with the same material as IVIC-24, but also including fragments of Spanish pottery. *Comment*: see IVIC-106.

IVIC-27. Conchita Benítez, Snail Shells C **515 ± 120**
A.D. 1435

Shells, genus *Plekocheilus* and *Strophocheilus*, were found with the charcoal of IVIC-26. *Comment*: see IVIC-89.

IVIC-32. Conchita Benítez Charcoal D **370 ± 110**
A.D. 1580

Sec. D-XI, 4.00 to 4.25 m below surface. Painted and plain pottery, including some Spanish, human bones, stones, and land snail shells were also taken with the charcoal sample. *Comment*: see IVIC-106.

IVIC-33. Conchita Benítez, Land Snail Shells D **680 ± 150**
A.D. 1270

Genus *Plekocheilus* and *Strophocheilus*, collected with the charcoal of IVIC-32. *Comment*: see IVIC-89.

IVIC-37. Conchita Benítez, Charcoal E **660 ± 120**
A.D. 1290

Sec. D-XI, 5.00 to 5.25 m below surface. Associated with plain and painted pottery, of Indian and Spanish types. *Comment*: see IVIC-106.

IVIC-39. Conchita Benítez, Charcoal F **690 ± 120**
A.D. 1260

Sec. D-XI, 5.50 to 5.75 m below surface. Associated with painted and plain Indian pottery. *Comment*: see IVIC-106.

IVIC-88. Conchita Benítez, Charcoal G **565 ± 95**
A.D. 1385

Sec. D-XI, 1.25 to 1.50 m below surface. Fragments of pottery, land snail shells, two human skeletons, and a grinding stone were excavated at this level. Sample was split and the two portions prepared and counted separately, and the results averaged. Individual ages were 580 ± 140 and 550 ± 130. *Comment*: see IVIC-106.

IVIC-89. Conchita Benítez, Land Snail Shells E **850 ± 120**
A.D. 1100

Sec. D-XI, 130 to 1.40 m below surface. Genus, *Plekocheilus* and *Strophocheilus*. *Comment*: all Conchita Benítez snail shell dates are statistically indistinguishable from associated charcoal dates.

IVIC-106. Conchita Benítez, Charcoal H **765 ± 85**
A.D. 1185

were 850 ± 120 and 680 ± 120. *Comment* (E.W.): available evidence suggests that Conchita Benítez samples should all be approx. the same age.

El Chao series

Archaeological dwelling site of El Chao is located in Carache Valley in state of Trujillo of Venezuelan Andes (9° 36′ N Lat, 70° 15′ W Long). The existence of abundant surface material led to excavation of site, which yielded large amount of pottery of the Mirinday style. Purpose of excavation was to compare material with nearby site of Mirinday, thereby checking the local chronology. Seven snail shell samples from this site were also run in order to accumulate statistics on errors involved in dates of this type of material. Coll. 1961 and subm. by Erika Wagner.

General Comment (E.W.): C^{14} age determinations for El Chao charcoal agree with dates obtained for Mirinday. Rouse and Cruxent's placement of the Mirinday pottery in Period IV of the Venezuelan chronology (1000 to 1500 A.D.) is, therefore, confirmed. All snail shell dates are in agreement with dates given by charcoal samples.

IVIC-52. El Chao, Land Snail Shells A — **565 ± 110** / **A.D. 1385**

Genus *Strophocheilus*, from Sec. B-10, 0.75 to 1.00 m below surface. Materials recovered included ceramic fragments, pieces of bone, charcoal, and charred maize cobs.

IVIC-53. El Chao, Charcoal A — **680 ± 110** / **A.D. 1270**

From same section and level as IVIC-52.

IVIC-54. El Chao, Land Snail Shells B — **785 ± 70** / **A.D. 1165**

Genus *Strophocheilus*, from Sec. B-10, 1.00 to 1.25 m below surface. Level also contained charcoal, pieces of pottery, fragments of a human skull, and maize cobs.

IVIC-55. El Chao, Bones A — **<130**

Human skull found associated with IVIC-54; presumably, should be same age. After washing, sample was completely dissolved in hot dilute hydrochloric acid. Liquid was then heated to dryness and the residue burned. The bones contained 5% non-carbonate carbon. *Comment*: date is too recent.

IVIC-57. El Chao, Land Snail Shells C — **470 ± 120** / **A.D. 1480**

Genus *Strophocheilus*, from Sec. B-10, 1.25 to 1.50 m below surface

IVIC-62. El Chao, Charcoal B **690 ± 110**
A.D. 1260

From Sec. B-10, 1.75 to 2.00 m below surface. Objects similar to those found with IVIC-57 were present. Portions of the charcoal of this sample were sent to Univ. of Texas and Yale Univ. as interlaboratory checks. Ages obtained, 610 ± 95, Tx-189 (Texas III) and 540 ± 80, Y-1421 (written commun., Stuiver, 1964) are in agreement with IVIC measurement.

IVIC-63. El Chao, Land Snail Shells E **760 ± 100**
A.D. 1190

Genus *Strophocheilus*, from Sec. B-10, 1.75 to 2.00 m below surface. Associated with charcoal sample IVIC-62.

IVIC-65. El Chao, Land Snail Shells F **565 ± 100**
A.D. 1385

Genus *Strophocheilus*, from Sec. B-10, 2.00 to 2.25 m below surface. Same type of asociated artifacts as IVIC-57.

IVIC-67. El Chao, Charcoal C **760 ± 110**
A.D. 1190

From Sec. B-10, 2.50 to 2.75 m below surface. Other objects found at this level include pottery pieces, land snail shells, bones, a charred maize cob, and a perforated lithic ornament.

IVIC-68. El Chao, Land Snail Shells G **615 ± 110**
A.D. 1335

Genus *Strophocheilus*, found with charcoal sample IVIC-67.

IVIC-70. El Chao, Bones B **850 ± 220**
A.D. 1100

Animal bones, some charred, found in Sec. B-10, 1.75 to 2.00 m below surface. After washing, bones were completely dissolved in boiling dilute hydrochloric acid and the solution then taken to dryness. Residue was burned in standard manner. Bones contained 5% non-carbonate carbon. *Comment*: date is in agreement with those given by charcoal samples.

La Betania series

La Betania site (8° 12′ N Lat, 70° 05′ W Long) is in state of Barinas in W Venezuela. Excavations were located in what is now a field used for cultivation of yuca and bananas. The land is hand-plowed every year and burned regularly at the end of the season. Two kinds of pottery exist in this site. One of them, more elaborate and generally painted, occupied the lower strata. This pottery belongs to the Caño del Oso style (Cruxent and Rouse, 1961), which tentatively had been placed in Period IV of Venezuelan relative chronology. A much simpler, cruder, and as yet unnamed style was found in the superior levels. Coll. 1964 and subm. by Alberta Zucchi, I.V.I.C.

IVIC-42. La Betania Charcoal A **4270 ± 160**
2320 B.C.

From Pit 2, 0.75 to 1.00 m below surface. Sample was associated with the crude pottery and multilegged vessels. *Comment* (A.Z.): date seems too old, in view of fact that sample overlies a series with younger dates (IVIC-43 to IVIC-45).

IVIC-40. La Betania Charcoal B **<350**

Very small sample from Pit 2, 0.25 to 0.75 m below surface, associated with cruder type of pottery. Although specimen probably contaminated with modern carbon, it was hoped that it would check the age obtained for IVIC-42. *Comment* (A.Z.): sample is certainly contaminated.

IVIC-43. La Betania Charcoal C **1800 ± 120**
A.D. 150

From Pit 2, 1.00 to 1.25 m below surface. Sample was associated with the finer type of pottery, frequently painted, figurines, bird and fish bones. *Comment*: see IVIC-45.

IVIC-44. La Betania Charcoal D **1630 ± 130**
A.D.320

From Pit 2, 1.25 to 1.50 m below surface. Same type of material as found with IVIC-43 was present. *Comment*: see IVIC-45.

IVIC-45. La Betania Charcoal E **1820 ± 130**
A.D. 130

From Pit 2, 1.50 to 1.75 m below surface. These three dates are associated with same type of artifacts and are all statistically indistinguishable from the mean (1750 B.P.). Therefore, this must be the proper age for this kind of pottery. *Comment* (A.Z.): Caño del Oso style probably should be placed in Periods II and III.

IVIC-71. La Betania Charcoal F **1610 ± 115**
A.D. 340

From Pit 3, 0.00 to 0.75 m below surface. Same type of material was present as with sample IVIC-42. Pit was excavated in order to find charcoal associated with crude type of pottery and multilegged vessels which could check the antiquity of IVIC-42. However, very little charcoal was found and it was necessary to combine samples from the surface down to the strata where the finer type of pottery was located in order to have enough for a measurement. *Comment* (A.Z.): sample does not confirm antiquity of IVIC-42, but may have been contaminated by modern charcoal from surface layeres (see IVIC-114).

IVIC-112. La Betania Charcoal G **1365 ± 95**
A.D. 585

From Pit 6, 0.00 to 0.25 m below surface. Same type of material as present with IVIC-42 was found with this charcoal. Sample was split and the two portions were prepared and counted separately, and the results averaged. Individual ages were 1380 ± 140 and 1350 ± 130. *Comment*s see IVIC-114.

IVIC-113. La Betania Charcoal H **750 ± 150**
A.D. 1200

Small sample from Pit 6, 0.25 to 0.50 m below surface. This level yielded material similar to that of IVIC-42. *Comment*: see IVIC-114.

IVIC-114. La Betania Charcoal I **1460 ± 130**
A.D. 490

From Pit 6, 0.50 to 0.75 m below surface. Associated with same type of artifacts as IVIC-42. *Comment* (A.Z.): Pit 6 was dug in order to obtain new

samples that might check the unexpected age of IVIC-42. Dates of IVIC-112 to IVIC-114 are stratigraphically inconsistent, showing disturbance of upper levels with probability of intrusion of recent charcoal due to annual cultivation of area.

IVIC-74. La Betania Charcoal J **1340 ± 95**
A.D. 610

From Pit 3, 0.75 to 1.00 m below surface. Fragments of the finer type pottery were found here. Sample was split and the two portions prepared and counted separately, and the results averaged. Individual ages were 1100 ± 120 and 1580 ± 150. Also, a portion of the charcoal of this sample was sent to Univ. of Texas as an interlaboratory check. Age obtained, 1100 ± 110, Tx-190 (Texas III), is in agreement with I.V.I.C. measurements.

IVIC-120. La Betania Charcoal K **2180 ± 110**
230 B.C.

From Pit 11, 1.50 to 1.75 m below surface. Associated with the finer type of pottery. Sample was measured as a control on the following two bone dates.

IVIC-119. La Betania Bones A **250 ± 240**
A.D. 1700

From Pit 11, 1.50 to 1.75 m below surface, collected with charcoal of IVIC-120 and figurines and pottery fragments. This was the complete skeleton of a mature human. Archaeologic and stratographic evidence suggests that the bones should have same age as IVIC-120 charcoal and that it was not an intrusive burial. Sample was washed, acid dissolved, and taken to dryness before combustion. There was only 0.4% non-carbonate carbon, the lowest value we have seen for bones not previously burned. There is no apparent explanation for this minimum amount. *Comment*: date is clearly not valid.

IVIC-121. La Betania Bones B **1160 ± 150**
A.D. 790

From Pit 11, 1.75 to 2.00 m below surface. In association with charcoal of IVIC-120, figurines and pottery. Specimen was complete skeleton of a young child. No evidence that it was an intrusive burial. Same chemical treatment as described for IVIC-119 was used. Bones contained 2% non-carbonate carbon. *Comment*: date is recent in comparison with charcoal of IVIC-120.

La Luz series

Samples were excavated near town of Pueblo Nuevo on Península of Paraguaná, state of Falcón, in W Venezuela (12° 01′ N Lat, 69° 57′ W Long). Pottery collected belongs to Period IV and the Dabajuroid Series of Venezuelan chronology (Cruxent and Rouse, 1961). Coll. 1963 and subm. by Alberta Zucchi.

IVIC-10. La Luz Charcoal A **580 ± 120**
A.D. 1370

From Sec. 2, 0.00 to 0.25 m from surface. Associated with land snail shells, ceramic fragments, human bones, and bone objects. *Comment* (A.Z.): the recent date was expected.

IVIC-11. La Luz Land Snail Shells **245 ± 115**
A.D. 1705

Collected with charcoal sample IVIC-10. Genus *Oxystyla* or *Orthalicus*. *Comment*: date is too recent, but this is typical of this type of snail shell.

IVIC-12. La Luz Charcoal B **830 ± 150**
A.D. 1120

From Sec. 2, 0.25 to 0.50 m from surface. Also present were pottery fragments, bones, and bone objects. *Comment* (A.Z.) : date is reasonable.

El Cerro series

Site is located on lower slopes of hill Santa Ana in Península of Paraguaná, state of Falcón, on coast of W Venezuela (11° 47′ N Lat, 69° 57′ W Long). Samples were done in order to complete chronology of Falcón and, because of the number of charcoal-snail shell pairs, to accumulate statistics on errors involved in this species of land snail shells. Pottery style and period of this site is same as that of La Luz. Coll. 1963 and subm. by Alberta Zucchi.
General Comment (A.Z.) : charcoal dates are reasonable, but the snail shell dates are too recent.

IVIC-14. El Cerro Charcoal A **520 ± 120**
A.D. 1430

From Sec. 2, 0.00 to 0.25 m below surface. Associated with land snail shells, ceramic fragments, grinding stones, polished axes, and bone ornaments.

IVIC-15. El Cerro Land Snail Shells A **80 ± 70**
A.D. 1870

Genus *Oxystyla* or *Orthalicus*, collected with IVIC-14. Sample was split and two portions prepared and counted separately, and results averaged. Individual ages were 170 ± 100 and <100.

IVIC-16. El Cerro Charcoal B **730 ± 110**
A.D. 1220

From Sec. 2, 0.25 to 0.50 m below surface. Level also yielded pieces of pottery, grinding stones, polished axes, and bone ornaments.

IVIC-17. El Cerro Land Snail Shells B **265 ± 105**
A.D. 1685

Genus *Oxystyla* or *Orthalicus*, associated with charcoal sample IVIC-16.

IVIC-18. El Cerro Charcoal C **790 ± 100**
A.D. 1160

From Sec. 2, 0.50 to 0.75 m below surface. Same type of artifacts as previous samples of this series were present. A portion of charcoal of sample was sent to Univ. of Texas as interlaboratory check. Age obtained, 800 ± 90, Tx-188 (Texas III) is in agreement with I.V.I.C. measurement.

IVIC-19. El Cerro Land Snail Shells C **105 ± 100**
A.D. 1845

Genus *Oxystyla* or *Orthalicus*, collected with charcoal sample IVIC-18.

IVIC-19A. El Cerro Land Snail Shells D **430 ± 110**
A.D. 1520

Genus *Oxystyla* or *Orthalicus*, associated with charcoal sample IVIC-18. Although of same genus as IVIC-19, rays on these shells were lighter in color than those of IVIC-19. *Comment*: IVIC-19 and IVIC-19A dates are statistically indistinguishable.

IVIC-21. El Cerro Bones **500 ± 150**
A.D. 1450

Charred animal bones found with charcoal sample IVIC-18. Bones were washed and then completely dissolved in boiling dilute hydrochloric acid. After taking solution to dryness, residue was burned. Bones contained 2% non-carbonate carbon. *Comment*: bone date is in agreement with charcoal date.

B. Dominican Republic

IVIC-5. Mordan **4400 ± 170**
2450 B.C.

Charcoal found in non-ceramic zone 0.75 to 1.00 m below surface in Mordan (or Mardan) site in province of Azua, Dominican Republic (18° 22′ N Lat, 71° 06′ W Long). A portion of sample sent to Yale Univ. as inter-laboratory check. Date obtained was 4560 ± 80, Y-1422, (written commun., Stuiver, 1964). Another part of sample previously dated as Tx-54, 4140 ± 130 (Texas II); however, measurement was questioned because next earliest date for Dominican Republic is only 450 B.C. (Rouse, 1964). Coll. 1963 and subm. by J. M. Cruxent, L. Chanlate, and E. Ortega, I.V.I.C. *Comment*: I.V.I.C. date is in agreement with other measurements.

C. Chile

Quebrada de Guatacondo series

Samples from ruins of prehistoric town in desert of Atacama (area of Norte Grande) in N of Chile (20° 59′ S Lat, 69° 10′ W Long). In archaeologic area Pampa del Tamarugal, region quebrada de Guatacondo, site is 35 km from present-day town of Guatacondo, which is nearest source of water at this time. Prehistoric settlement was discovered from the air in 1961 by J. Kieghley and first visited by the archaeologist E. de Bruyne in 1963. He found the town essentially intact with no evidence of pillaging or European artifacts (De Bruyne, 1963). Later the same year, the site was visited by archaeologists from Mus. Nac. de Historia Nat. de Santiago de Chile, who confirmed previous findings and started excavations under the direction of Dra. G. Mostny. The town has been declared a national monument and is being guarded against intruders. Because of its undisturbed condition, site will certainly become basic in the knowledge of prehistoric Chile. Samples coll. 1964 and subm. by Greta Mostny, Mus. Nac. de Historia Nat., Santiago.

IVIC-166. Quebrada de Guatacondo Wood **1890 ± 100**
A.D. 60

Sample G/I-12/1 from oval structure 12, 5.25 x 4.5 m diam, one of the 110 to 120 mud-walled constructions of Site I (Mostny and Niemeyer, 1963).

Wood is from thin upright pole that might have been used to support roof of building. Floor was ca. 0.6 m below exterior ground level and was covered by a 0.2 to 0.3 m layer of branches, which probably formed roof. Structure 12 contained 7 storage holes, dug into floor near walls; these were empty except for fragments of cord and ceramic and some beans and corn cobs. There was also a mound of earth, 0.5 m high and above the layer of branches, on which was located a fireplace. *Comment*: see IVIC-167.

IVIC-167. Quebrada de Guatacondo Corn Cobs **1175 ± 90**
A.D. 775

Sample G/I-12/2 from same structure as IVIC-166. Material found at bottom of storage hole F, which has diam of ca. 30 cm and depth of 48 cm. *Comment* (G.M.): an interval of 715 yr between construction of the house (dated by IVIC-166) and deposition of the maize (IVIC-167) is too long. However, we do not have any way of determining which of the two dates is more probable.

IVIC-168. Quebrada de Guatacondo Charcoal **775 ± 160**
A.D. 1175

Sample G/I-12/3 from structure described for IVIC-166. Charcoal collected from elevated fireplace. It was suspected that this might represent a later occupation, after the roof had fallen in, since no trace of the charcoal of this fire was found on original floor of structure.

D. Jordan

IVIC-108. Roujoum Meckhayyat A **2575 ± 100**
625 B.C.

Wood, worm-eaten and partially charred, from wall of Moabita fortress or watch tower, 5 km to NW of Madaba on mountain Roujoum Meckhayyat (Pisga) (31° 44′ 30″ N Lat, 35° 44′ 50″ E Long). Structure could be a reference point used to locate tomb of Moses. Coll. 1962 and subm. by J. Ripamonti, Universidad Central de Venezuela, who estimated age of sample as 3200 yr. Two portions were prepared and counted separately, and results averaged. Individual ages were 2730 ± 140 and 2420 ± 140. *Comment*: see IVIC-109.

IVIC-109. Roujoum Meckhayyat B **2530 ± 100**
580 B.C.

Wooden log, well preserved, from filling of structure described above. Associated with large stones, rubbish, and ceramic fragments and located 1 m below surface. Coll. 1962 and subm. by J. Ripamonti. Sample was split and the two portions prepared and counted separately, and results averaged. Individual ages were 2400 ± 130 and 2660 ± 150. *Comment*: these dates support original estimate of Prof. Ripamonti since they probably should be adjusted in two ways: a half-life of C^{14} of 5730 yr is a more exact value than the 5568 yr used (Godwin, 1962) and, as is seen in general for known-age samples about 3000-yr old, an addition of 250 ± 250 yr to the C^{14} dates is indicated (data summarized by Libby, 1963). Corrections would give IVIC-109 age of 2855 ± 360 and IVIC-108, 2900 ± 360.

II. MISCELLANEOUS SAMPLES

IVIC-111. Turba de Naiguatá **3080 ± 150**
1130 B.C.

Peat, 0.80 m below surface, on mountain Pico de Naiguatá, 2450 m above sealevel and a few km from Caracas (10° 37′ N Lat, 66° 44′ W Long). Thorough paleobotanical investigation (analysis of pollen contents) has been made on this site and published in detail (Vareschi, 1955). This is first date on a sample concerned with edaphic metabolism initiated by *Sphagnum* in the tropics. Coll. 1964 and subm. by Volkmar Vareschi, Instituto Botánico, Caracas, Venezuela. *Comment* (V.V.): date is younger than expected, but entirely possible.

IVIC-147. Hojas de Guama **162 ± 1.2 % modern**

Growing leaves from Guama tree (*Inga Fastuosa*) in Altos de Pipe (10° 37′ N Lat, 66° 44′ W Long), 1290 m above sealevel and 14 km from Caracas. Tree is perennial and sample was used to ascertain degree of nuclear weapon contamination of area. Coll. May 26, 1964. *Comment*: with extrapolations of data on contamination in Norway (Nydal, 1963) and France (Léger, Delibrias, and Labeyrie, 1963), it appears that problem is less serious in tropics than in more northern countries.

REFERENCES

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