

SURFACE SURVEY OF THE VIRÚ VALLEY, PERU

JAMES ALFRED FORD AND
GORDON R. WILLEY

VOLUME 43 : PART 1
ANTHROPOLOGICAL PAPERS OF
THE AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK : 1949

SURFACE SURVEY OF THE VIRÚ VALLEY, PERU

SURFACE SURVEY OF THE VIRÚ VALLEY, PERU



1. VIRÚ VALLEY: BACKGROUND AND PROBLEMS

JAMES ALFRED FORD AND GORDON R. WILLEY

2. CULTURAL DATING OF PREHISTORIC SITES IN VIRÚ VALLEY, PERU

JAMES ALFRED FORD

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY, IN THE FACULTIES OF POLIT-
ICAL SCIENCE, PHILOSOPHY, AND PURE SCIENCE OF
COLUMBIA UNIVERSITY

VOLUME 43 : PART 1
ANTHROPOLOGICAL PAPERS OF
THE AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK : 1949

PREFACE

THE VIRÚ VALLEY PROJECT was an attempt to coordinate various phases of anthropological research around a central problem, the study of human cultural adaptation within the confines of a small area over a long period of time. Plans for such a cooperative program were first proposed in the summer of 1945 by Drs. Wendell C. Bennett of Yale University, William Duncan Strong of Columbia University, Julian H. Steward of the Institute of Social Anthropology of the Smithsonian Institution, and Gordon R. Willey of the Bureau of American Ethnology of the Smithsonian Institution. As the project plans matured, it was decided to form a committee of the individuals named to organize a research program. As these individuals were also members of the Institute of Andean Research, the program was undertaken as an Institute activity. Subsequently, other scientists interested in South American archaeology, geography, and ethnology were invited to participate. These included Mr. Junius Bird of the American Museum of Natural History; Mr. Donald Collier of the Chicago Natural History Museum; Mr. James A. Ford and Mr. Clifford Evans, Jr., graduate students in anthropology at Columbia University; Dr. F. Webster McBryde, geographer, with the Institute of Social Anthropology; Dr. Jorge C. Muelle of the Instituto de Etnología of Peru; and, some months later, Dr. Allan Holmberg, ethnologist, with the Institute of Social Anthropology.

At the outset, it was arranged that each participant be financed by the particular institution that he represented, and that he prepare and publish the results of his individual work as his own responsibility. In addition to this separate financing, it was recognized that a superior over-all achievement could be attained if certain service features were made available to all participants in the project during the period of field-work. As these features exceeded the capacities of the funds provided by the respective institutions, a substantial grant was made to the Institute of Andean Research for the pursuance of the Virú Project by the Viking Fund of New York City. The Viking Fund grant pro-

vided for the purchase of three "jeeps" for use in the field; permitted the rental of an adequate laboratory in Trujillo, Peru, the base of operations; and made it possible to buy air photographs of the Virú region from the Peruvian Army Air Force.

Dr. and Mrs. Strong, Mr. Evans, Mrs. Ford, and the present writers were the first contingent to arrive in Lima, early in March of 1946. Dr. McBryde, who was already stationed in Peru as a representative of the Institute of Social Anthropology, had made a brief reconnaissance trip to the Virú Valley some weeks preceding our arrival, to make preparatory arrangements which were of aid to the expedition. After official negotiations were completed in Lima, early in April, the party drove north to Trujillo and established headquarters in the Jacobs Hotel in that city. By the end of the first week in April a laboratory had been set up in the Jacobs Hotel, and the initial surveys of the Virú Valley, 46 kilometers to the south of Trujillo, were started.

Other members of the expedition arrived later in the season. In May, Dr. and Mrs. Bennett, accompanied by their daughter Martha, joined the group, followed in June by Mr. Collier and Mr. and Mrs. Bird and their family. Still later Mrs. Collier arrived; Dr. McBryde and his family spent several weeks in the field; and in September, Dr. Holmberg, accompanied by his family, began a study of the modern community in Virú Valley. Shortly after his arrival, Holmberg was joined by Dr. Jorge C. Muelle and a group of Peruvian students who worked in conjunction on the social anthropological problems in the valley.

The archaeological work was concluded chiefly within the year 1946. Late in August, Strong, Bennett, Willey, and Evans left Trujillo; Collier continued excavations in Virú for another three months; Ford and Bird made additional studies in other North Coast areas not directly connected with the Virú problem. Ethnological field-work continued into the spring of 1947.

The two sections of this paper, 1 and 2, represent a phase of this cooperative archaeo-

logical research program conducted in the Virú Valley. While all phases of the program were interrelated and to an extent mutually dependent, the work of the two present authors was especially integrated. Willey undertook the task of tracing the development of land utilization, irrigation, community plan, architecture, etc. Ford's assignment was to provide relative dating for a substantial number of the occupation sites in the valley which would make Willey's analyses possible. Together almost 300 sites were studied.

In order to present a well-rounded report of the Virú Valley survey, we had planned to publish our respective papers in the same volume and use the same introductory paper, valley map, and list of sites. Unfortunately, this has not been possible. The first section, "1, Virú Valley: background and problems," stands substantially as it was written, according to the original plan, and may be utilized as an introduction to Ford's section, "2, Cultural dating of prehistoric sites in Virú Valley, Peru," which follows, and to Dr. Willey's report, "Prehistoric settlement patterns in the Virú Valley of northern Peru," which will be published by the Smithsonian Institution.

Jointly, we wish to express our indebtedness to many associates and friends, both in the United States and in Peru. In a cooperative project, success or failure depends to a great extent upon teamwork. The exact nature of the Virú cooperation and interdependence in scientific problems will be detailed later in the discussion; but over and above this, we wish to emphasize that the complete freedom of interchange of data and a spirit of mutual aid surpassed the requirements of the planned program both in the field and subsequently. In this light we must, first of all, extend our gratitude to our immediate colleagues: Dr. William Duncan Strong, Dr. Wendell C. Bennett, Mr. Donald Collier, Mr. Clifford Evans, Jr., Mr. Junius Bird, Dr. Allan Holmberg, Dr. Jorge C. Muelle, and Dr. F. Webster McBryde. We are very grateful to the wives who willingly shouldered many of the necessary but less interesting tasks of a large expedition.

In the United States, we wish also to thank the Viking Fund and the Institute of Andean Research, both of New York City, for the part they played in making the Virú project possible.

Permission to carry on scientific research in Peru was granted by the Honorable Luis Bustamante Rivera, President of the Republic, the Honorable Luis E. Valcárcel, Minister of Public Instruction, and the members of the Patronato de Arqueología Nacional. In another capacity, that of Director of the newly founded Peruvian Instituto de Etnología, we are again indebted to Dr. Valcárcel for his efforts on our behalf. Through his good offices, Dr. Jorge C. Muelle, also of the Instituto de Etnología, was able to join our program. To the United States Embassy staff we present our thanks for numerous kindnesses received.

During our stay in Trujillo many of its citizens and those of the adjacent area offered and rendered assistance and kindnesses to the whole party and to the writers throughout the course of the work. Upon our arrival we were welcomed and graciously entertained by the rector and faculty of the University of La Libertad. Señor Maximo Diaz, Director of the Museum of the University, was particularly helpful. During the several months of our stay, we were befriended and aided in ways too numerous to mention by Sr. Enrique Jacobs, Trujillo business man and archaeological enthusiast. As mentioned, laboratory and living quarters were established in his hotel in the city, and his facilities and technical personnel were utilized for the care of the motor vehicles of the expedition. Señor Jacobs accompanied us on numerous trips into the field, offering us the benefit of his thorough knowledge of the Virú Valley and its archaeological locations. The hospitality of his home and the friendship of his family made the stay in Trujillo very pleasant.

The aid and kindnesses constantly shown us by our good friends, the Larcos of Hacienda Chiclín, Chicama Valley, merit special mention. Señor Rafael Larco Hoyle, Director of the Museum at Chiclín, gave freely of his time to discuss with us the archaeological problems of the North Coast of Peru and Virú Valley. At all times he extended to us and to other members of the group the complete freedom of his excellent museum for comparative studies. Late in the season, Sr. Larco, his father, Sr. Rafael Larco Herrera, and his two brothers, Srs. Constante and Javier, were hosts to our group at an archaeological conference held at Chiclín on

August 7 and 8. In the course of stimulating discussions, a brief tentative outline of the work and results of each participant in the Virú program were presented, and general problems of Peruvian archaeology were considered.

Individually, Ford is indebted to the John Simon Guggenheim Memorial Foundation for the fellowship that made possible his participation in the program. He wishes also to thank Dr. William Duncan Strong, at whose instigation he joined the project. For permission to delay his entrance on duty as Assistant Curator in the Department of Anthropology at the American Museum of Natural History, in order

to undertake the Peruvian work, he is grateful to his superior at that institution, Dr. Harry L. Shapiro. We are particularly indebted to Miss Bella Weitzner for her careful editing of these papers.

GORDON R. WILLEY
Bureau of American Ethnology
Smithsonian Institution
JAMES A. FORD
The American Museum of
Natural History

February, 1949

CONTENTS

PREFACE	5
1. VIRÚ VALLEY: BACKGROUND AND PROBLEMS. JAMES ALFRED FORD AND GORDON R. WILLEY	11
ARCHAEOLOGICAL BACKGROUND OF THE PERUVIAN NORTH COAST	13
PLAN OF APPROACH	18
Reasons for Study	18
Division of Problems	18
Field and Laboratory Procedures	18
THE NATURAL VALLEY	21
The General Setting	21
Description of the Valley	24
Human Settlement	27
2. CULTURAL DATING OF PREHISTORIC SITES IN VIRÚ VALLEY, PERU. JAMES ALFRED FORD	29
THE PROBLEMS OF SITE DATING AND CHRONOLOGY	31
Discussion	31
Time Scale	31
Old Sites in Virú	32
Method of Sampling	34
Reliability of Surface Collections	35
CLASSIFICATION	38
Theory	38
What Is a Pottery Type?	40
The Popularity Characteristics of Types through Time	40
Setting Up the Virú Valley Classification	41
The Mechanics of Classification	42
Rim Sherd Classification	43
ANALYSIS	44
Fitting of Strata Cut Data	44
Stratigraphic Excavations Used in Analysis	45
Time Gap Filled by Seriation of Surface Collections	47
Critique of the Summary Graph, Time Range of Types	47
Relative Time Represented by Vertical Spacing in Master Graph	48
Smoothing the Chronology	49
Dating Scale	49
Correlation of the Virú Chronology with the Burial Pottery Chronology	49
Surface Collection Graphs	50
Mixed Collections	50
Fitting the Collection Strip Graphs	51
Significance of Surface Collection Graph Fit	51
Comments on Seriation	52
Analysis of Rim and Vessel Shapes of the Most Popular Types	52
The Chronological Position of Other Vessel Features and Shapes	53
Small, Vertical Loop Handles	54
Small, Horizontally Pierced Nodes	54
Large Strap Handles Attached Vertically	54
Large Loop Handles Attached Vertically	55
Strap Handles Attached Horizontally	55
Discussion of Handles	55
Tripod Bowls	55
"Corn-Poppers" or "Dipper-shaped" Vessels	55

Bowls with Ring Bases	56
Pottery Trumpets	56
Graters	56
Solid Bridges of Gloria Polished Plain Type	57
Hollow Arcs of Gloria Polished Plain	57
Hollow Arcs of Queneto Polished Plain	57
Sherds with Appliquéd Snake Figures	57
COMPARISON OF THE VIRÚ CHRONOLOGY WITH NEIGHBORING AREAS	58
SUMMARY OF THE CERAMIC HISTORY OF VIRÚ VALLEY AND SOME NOTES ON RELATIONSHIPS	61
Guañape Period	61
Puerto Moorin Period	63
Gallinazo Period	63
Huancaco Period	65
Remarks on Mochica	66
Tomaval Period	66
Relation of the Tomaval Occupation to the Huancaco in Virú	68
La Plata Period	69
Estero Period	70
APPENDIX I. DESCRIPTION OF POTTERY TYPES	71
APPENDIX II. LIST OF SITES	79
LITERATURE CITED	88

ILLUSTRATIONS

PLATES

(AT END)

1. Sherds from Virú Valley
2. Sherds from Virú Valley
3. Sherds from Virú Valley
4. Sherds from Virú Valley
5. Sherds from Virú Valley
6. Sherds from Virú Valley
7. Features of Virú Valley ceramics which are treated chronologically in Fig. 7

TEXT FIGURES

1. Map of a part of the north coast of Peru 14
2. Map of Virú Valley *facing page 22*
3. Graph comparing surface collections made at different times from the same sites 36
4. Summary graph of Virú Valley ceramic chronology *facing page 48*
5. Graph illustrating the fitting of 68 surface collections and components of collections *facing page 50*
6. Time distribution of rim and body shapes of the five most popular pottery types in Virú *facing page 52*
7. Graph showing the occurrence of some miscellaneous ceramic shapes and features *facing page 54*
8. Diagrammatic comparison of Virú, Cerro de Trinidad in Chancay Valley, and Pachacamac *facing page 58*
9. Diagrammatic summary of the ceramic history of Virú Valley *facing page 64*

1. VIRÚ VALLEY: BACKGROUND AND PROBLEMS

JAMES ALFRED FORD AND GORDON R. WILLEY

ARCHAEOLOGICAL BACKGROUND OF THE PERUVIAN NORTH COAST

THE ARCHAEOLOGICAL AREA of the Peruvian North Coast is generally conceded to include the valleys from Casma north to Lambayeque (Fig. 1). The far north, Piura and Tumbes, is virtually unknown. South of Casma the valleys fall into another major grouping, the Central Coast. In recent years it has become apparent that while the entire Casma-Lambayeque region was subject to many of the same influences in prehistoric times, several subareas or valley groupings within the total area can be usefully distinguished. The best known of these subdivisions is the Moche¹-Chicama sector comprised of these two valleys. Pacasmayo and Lambayeque seem to form another unit, at least at the present state of knowledge, and south of Moche the valleys of Virú, Chao, and perhaps Santa constitute a third grouping with a more or less common prehistory. Similarly, when more is known of the Nepeña and Casma valleys, it is likely that they will compose a fourth subarea of the North Coast.

The physical aspect of all of these North Coast valleys is similar in that they are narrow triangles of watered and cultivated soil, bounded on either side by the absolute desert of the Andean Pacific coast, and they all owe their existence to the rains and snows of the high Andes to the east. Each valley shows evidence of intensive human exploitation in the prehistoric past. The arid conditions favoring preservation of perishable materials are similar to those of Egypt. Architectural remains of adobe and stone dot the landscape. Artifacts of wood, textiles, as well as pottery, are often found as funerary objects. The abundance of all types of archaeological remains has made the area a collector's paradise, and the illegal looting of prehistoric cemeteries for salable items is still a common and lucrative practice.

Since the sixteenth century various travelers have remarked upon the richness of these antiquities of the Peruvian North Coast valleys. Great collections were amassed in the late nineteenth and early twentieth centuries. Many of

these eventually reached museums in Europe, the United States, and Peru; others still remain as private collections, chiefly in Peru. Some of these collections have served as the background material for works on prehistoric Peruvian art. Seler's "*Peruanische Alterthümer*,"² Fuhrmann's "*Reich der Inka*" and "*Peru II*,"³ Lehmann and Doering's "*The art of old Peru*,"⁴ Max Schmidt's "*Kunst und Kulture von Peru*,"⁵ and Wassermann-San Blas' "*Cerámicas del antiguo Perú*"⁶ are examples of such "art histories." Some are chiefly descriptive catalogues; others arrange and interpret materials according to various schemes, intuitively rather than empirically derived.

Accounts of North Coast archaeological field studies began in the nineteenth century; of these Squier's "*Peru. Incidents of travel and exploration in the land of the Incas*"⁷ is outstanding. Similar investigations continued up to the turn of the century.⁸ These works have value as descriptive studies of the ancient monuments of the northern valleys, but they are casual rather than systematic and treat of the data phenomenologically rather than in terms of historical problems.

Organized archaeology, scientific in the sense that it operated systematically with solvable problems of chronology and distribution as referents, began in Peru with Max Uhle. His "*Die Ruinen von Moche*" sets the first culturally calibrated sequence stake in the archaeology of the North Coast. This work distinguished stylistically a Proto-, or Early, Chimú from a Late Chimú; established the precedence of Proto-Chimú with reference to Coast Tiahuanaco; and underscored the validity of the Coast Tiahuanaco style as a pan-Peruvian horizon marker dividing the "Early" from the "Late" periods. These excavations and analyses at Moche assumed greater significance as a part of a total Peruvian archaeology when they were viewed in relation to Uhle's other researches

² Seler, 1893.

³ Fuhrmann, 1922a, 1922b.

⁴ Lehmann and Doering, 1924.

⁵ Schmidt, 1929.

⁶ Wassermann-San Blas, 1938.

⁷ Squier, 1877.

⁸ Middendorf, 1893-1895.

¹ In North American literature this valley is consistently referred to as "Moche." That is the name of the river that flows through the valley. Locally the valley is most commonly called "Santa Catalina."

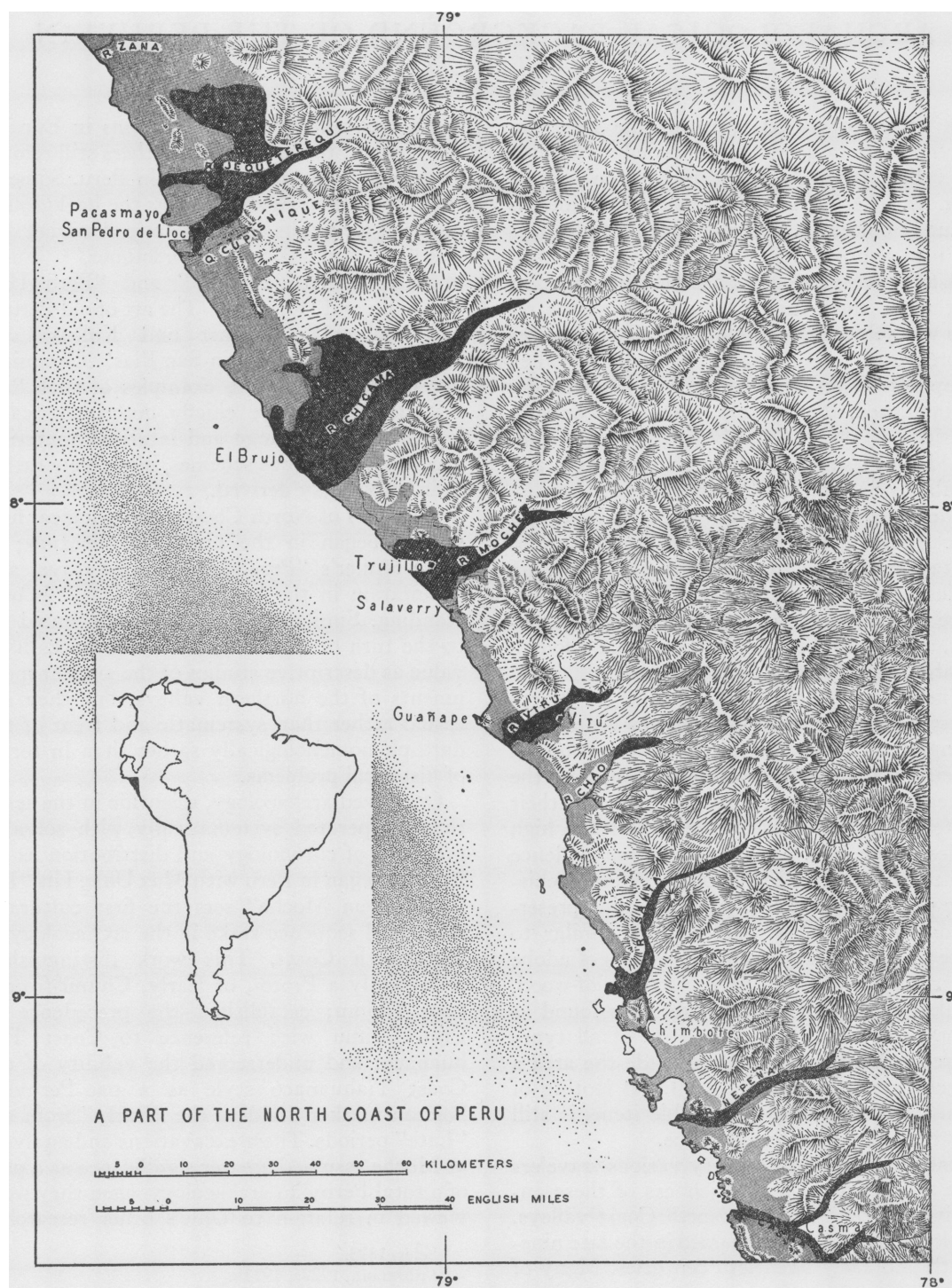


FIG. 1. Map of a part of the north coast of Peru, showing the location of Virú and adjacent valleys.

on the Central Coast,¹ the South Coast,² and in the Highlands.³

The effectiveness of Uhle's work has been greatly augmented by A. L. Kroeber and his associates. In contrast to Uhle's tendency to emphasize results at the expense of evidence presented, Kroeber's factual analyses, both on the ground and in the laboratory, demonstrated and clarified many of Uhle's hypotheses and concepts and placed Peruvian archaeology on a firm if limited footing. Pertinent in this regard are: "The Uhle pottery collections from Moche"⁴; "Archeological explorations in Peru. Pt. I: Ancient pottery from Trujillo"⁵; "Archeological exploration in Peru. Pt. II: The Northern Coast"⁶; and "Coast and highlands in prehistoric Peru."⁷ The last is one of the most important papers in Central Andean archaeology in that it was the first synthesis of Peruvian investigations based on strict identification of styles, association, and stratigraphy. In 28 pages Kroeber reviews Uhle's scheme, offers his interpretations of it, and summarizes the temporal framework of Andes and Coast under four principal eras: 1, the Early or pre-Tiahuanaco; 2, the Tiahuanaco or Tiahuanaco-influenced; 3, the post-Tiahuanaco or Late local cultures; and 4, Late local and Inca influence. In addition he discusses Tello's concept of the Highlands as the prime source of cultural vitality, which, to a greater or lesser degree, and at all periods, gave form and content to the cultures of the coast. As it is at about this time that the concept of Chavín and Chavín influence appears in the literature, Kroeber outlines its significance with particular respect to the prehistory of the North Coast.

The Virú Valley assumed prime archaeological importance with a survey by Bennett⁸ in 1936. Previously Kroeber,⁹ in a one-day visit to Virú, had described and tentatively dated seven sites. Bennett lists 37 sites and describes in detail several of these at which he excavated. His outstanding discovery was a new culture type which he designated as "Gallinazo." In

general, Bennett's conclusions, based for the most part upon stylistic analysis, grave excavation, and the association of tomb contents, follow the main outlines of the Uhle-Kroeber reconstructions for the North Coast. Early Chimú was found to be well represented in Virú, and Bennett placed this style at the bottom of the time scale of the valley. The newly defined Gallinazo negative-painted style was placed immediately subsequent to Early Chimú, followed by Tiahuanaco-Epigon, Late Chimú, and Inca, in that order. Although Bennett found little evidence of Chavín influence in Virú, he discussed the Coastal Chavín or Cupisnique ceramics from the North Coast area and was inclined to consider these as a late subdivision of Early Chimú.

At about the same time Rafael Larco Hoyle was conducting studies in the Chicama and Virú valleys which led him to believe that the Coast Chavín influence, or Cupisnique as he named it, represented the earliest period in the area. In an important monograph, "Los Cupisniques,"¹⁰ Larco presented ample descriptive data on Cupisnique pottery and artifacts taken from numerous tomb excavations. As a colophon to this report, he also described an intermediate style, characterized by white-on-red painting, which he named Salinar.¹¹ Grave superposition was offered as evidence to arrange sequentially Cupisnique, Salinar, and Early Chimú (or Mochica),¹² in that order. In a short synthesis published in 1945, Larco treats the Gallinazo culture of the Virú Valley, referring to it under the name of "La Cultura Virú."¹³ Avoiding the controversial question of its exact chronological position with relation to Early Chimú, he presented the Virú or Gallinazo culture as a local Virú Valley development.

Several summations of Peruvian culture sequences appeared in the five years just prior to the Virú program of the Institute of Andean Research. In one of these, Bennett¹⁴ called attention to the existence of Chavín as a horizon style similar to the Tiahuanaco and Incaic

¹ Uhle, 1903, 1908, and 1912.

² Uhle, 1913.

³ Stübel and Uhle, 1892.

⁴ Kroeber, 1925a.

⁵ Kroeber, 1926.

⁶ Kroeber, 1930.

⁷ Kroeber, 1927.

⁸ Bennett, 1939.

⁹ Kroeber, 1930.

¹⁰ Larco Hoyle, 1941.

¹¹ See also Larco Hoyle, 1945a, 1946.

¹² Larco's description of the culture which Uhle first called "Early Chimú" under the title "Los Mochicas (1938, 1939)" has introduced this latter term and as it is less ambiguous than "Early Chimú" it will be used in this paper.

¹³ Larco Hoyle, 1945b.

¹⁴ Bennett, 1944.

horizons. Correlating the opinions of Tello, Strong's analysis of the Early Ancon collection,¹ Larco's evidence for the early position of Cupisnique on the North Coast, and his own work in the North Highlands, Bennett² presented a convincing case for a Chavín-like horizon as the earliest in Peru. Both Strong in his "Cross-sections of New World prehistory"³ and Kroeber in his "Peruvian archeology in 1942"⁴ published sequence summaries which embodied the results of recent work; Bennett followed with an over-all summary in the "Handbook of South American Indians. Vol. 2."⁵ A detailed discussion of the chronology of Chicama Valley by Larco Hoyle appears in the same volume. The latter work was released in July of 1946, a few months after the Virú expedition took the field. Except for minor details, the relative chronologies presented in these syntheses are the same for the North Coast, and can be integrated as follows:

Peruvian North Coast sequence (1943-1946)

Inca-Chimu
Chimu
Black-White-Red
Tiahuanaco (Coastal or Epigonal)
Gallinazo (Virú culture, Negative culture)
Mochica (Early Chimu, Proto-Chimu)
Salinar
Cupisnique

In brief, the stratigraphic work of the Virú Valley 1946 program confirmed this North Coast sequence with one major exception, the position of the Gallinazo or Virú Negative culture. Through excavations made by Strong and Evans at Site V-162 (Huaca de la Cruz), Gallinazo was demonstrated to be antecedent to Early Chimu or Mochica in the Virú Valley. Later in the season, Collier corroborated this in several other smaller sites in the valley.⁶

Another important addition to the North Coast sequence, but one that does not rearrange previous conclusions, was the discovery of a preceramic period in both the Virú and the Chicama valleys by Strong and Bird.

As previously mentioned, the area of the North Coast breaks down into several cultural subdivisions. The sequences outlined during the past 40 years have referred principally to the Moche and Chicama valleys, although Bennett's and Larco's work in the Virú Valley has widened the scope of these chronological abstractions. As research progressed on the Virú program it became increasingly apparent that Virú, while paralleling Moche and Chicama, was in many ways a unit apart. For example, although Mochica or Early Chimu was shown to follow Gallinazo chronologically in the Virú Valley, considerable evidence indicated that in the Virú Valley Mochica appeared rather late in the developmental history of the Mochica style and that the earlier stages of Mochica in the Moche-Chicama sector were probably coeval with Gallinazo as it developed in Virú. Or, in the case of the Salinar period in Moche-Chicama, it was seen that a comparable but slightly different interval existed in Virú. In view of all this, the members of the Virú party decided to denote the various culture periods of the valley by local names. With this system the degree of similarity and probable relationship between any Virú culture period and one with which it is being equated outside the valley can be indicated without prejudice. Following this system the Virú sequence is presented below in approximate synchronic relationship to the old North Coast, or Moche-Chicama sequence.

Prior to the Virú program of 1946, the definition of the archaeological periods on the North Coast, as well as most other parts of Peru, was accomplished by comparative study of the large quantities of pottery and other prehistoric manufactures, most of which came in an uncontrolled fashion from the thousands of graves that have been opened in the area. The basic methodology of the early work of Uhle and Kroeber was the segregation of carefully gathered ceramic grave lots and their arrangement into stylistic periods by comparing one lot with another. Seriation of the grave lots, backward in time from the Inca period, helped to order the sequence of cultures as represented by the different styles. In some instances, superposition of graves, or the placement of graves within a structure with relation to other graves in the same building, as at Moche, gave

¹ Strong, 1925.

² Bennett, 1944.

³ Strong, 1943.

⁴ Kroeber, 1944a.

⁵ Bennett, 1946a.

⁶ Strong, 1948.

SYNCHRONIZATION OF VIRÚ PERIODS AND THE NORTH COAST CULTURE SEQUENCES

MOCHE-CHICAMA VALLEYS

Inca-Chimu
 Chimu
 Black-White-Red, Coastal Tiahuanaco, or Epigonal

 Mochica, Early Chimu, or Proto-Chimu

 Salinar
 Cupisnique (Coastal Chavín)
 Preceramic

VIRÚ VALLEY

Estero
 La Plata
 Tomaval
 Huancaco (Late Mochica)

 Gallinazo (Negative Period)
 Puerto Moorin
 Guañape
 Cerro Prieto¹

hints of time direction. On the Central Coast, at Pachacamac and Ancon, Uhle derived sequence from tomb position in the ground as well as from stylistic overlap between grave lots. In the North, more recently, the grave superposition in the Chicama Valley, as de-

scribed by Larco,² has contributed to the establishment of a relative chronology.

¹ The evidence for this occupation was developed more completely by the work of Junius Bird in Chicama Valley at the Huaca Prieta Site.

² Larco, 1939, Fig. 321.

PLAN OF APPROACH

REASONS FOR STUDY

THE VIRÚ VALLEY PROJECT was planned in order to integrate several phases of anthropological research in the study of a long continuum of culture growth within a small natural area. From the foregoing it is obvious that archaeological field-work in North Coastal Peru up to 1946 had been confined to survey and sampling. The large geographic area to be covered and the vast amount of data in the field and already in museum collections made such an approach, as reported by Bennett,¹ the most productive procedure for that stage of the investigations. These surveys have in effect provided archaeologists with the skeletal structure of a time-space framework. With this as a background the Virú group were convinced that the knowledge of the North Coast had reached a point at which an intensive study of all aspects of man's culture in a single valley might be profitably undertaken. It was decided that such a coordinated approach should utilize the skills not only of the archaeologist but of the ethnologist and cultural geographer to help interpret prehistoric land use, environmental adaptations, and various cultural features.

The selection of the Virú Valley for an intensive anthropological and geographic study was determined by a number of factors both scientific and practical. In the first place it is situated in the center of the North Coast and is immediately adjacent to the well-known Moche-Chicama sector; hence it might be expected to reflect trends shared by this region which was once the most populous in prehistoric Peru. Archaeological study had been advanced in Virú by Bennett and Larco to a point where general sequence outlines were known. Furthermore, in the museum at Chiclín, in the not too distant Chicama Valley, abundant specimens and notes concerning Virú and the neighboring valleys had been kindly put at our disposal by Sr. Rafael Larco Hoyle. Ethnographically and sociologically Virú was considered a good choice because the modern culture of the valley is rural and it would serve as a point of comparative reference for a social study made recently

at Moche in the Moche Valley by Dr. Gillin² of the Institute of Social Anthropology. Virú is a small valley, and its thorough exploration in a coordinated program in a limited length of time was considered possible. Near-by, in the Moche Valley, the departmental capital of Trujillo was close enough and of sufficient size to serve as a base of operations.

DIVISION OF PROBLEMS

In the course of preliminary planning, prior to starting the Virú Valley Project, the over-all program of research was divided as follows:

1. Geography of the modern valley; F. Webster McBryde, Institute of Social Anthropology, Smithsonian Institution
2. Ethnology and sociology of the modern valley; Allan Holmberg, Institute of Social Anthropology, Smithsonian Institution, and Jorge C. Muelle, Instituto de Etnología, Lima
3. Stratigraphy of the late prehistoric periods; Donald Collier, Chicago Natural History Museum
4. Stratigraphy of the early prehistoric periods; William Duncan Strong and Clifford Evans, Jr., Columbia University
5. The preceramic periods of the North Coast; Junius B. Bird, the American Museum of Natural History
6. Intensive study of the Gallinazo period; Wendell C. Bennett, Yale University
7. Cultural dating of sites by surface survey; James A. Ford, Columbia University and Guggenheim Fellow
8. Study of prehistoric settlement patterns; Gordon R. Willey, Bureau of American Ethnology, Smithsonian Institution

FIELD AND LABORATORY PROCEDURES

The mechanisms for effecting cooperation in field-work were worked out in advance and operated so efficiently that it seems worth while to describe them. One of the principal features was a common field catalogue. This was prepared in the United States before departure. A light-weight 5 by 8-inch index card bearing a mimeographed data form for each "find" was stapled to a blank card of the same size and to a smaller linen tag. Several thousand of these

¹ Bennett, 1939.

² Gillin, 1947.

sets of two cards and a tag were prepared. Each card and tag of each set was stamped with a number beginning with the numeral 1 and running in sequence. The three items of each set bore the same number.

While engaged in excavation or surface collecting, each field party carried these numbered forms. When a collection was made from a level in a stratigraphic cut, from a tomb, or from the surface of a village site, the two forms were filled out in duplicate with carbon paper and the tag accompanying the cards was attached to the specimen bag.

In the Hotel Jacobs laboratory in Trujillo, the specimens from the field were cleaned, and the number on the accompanying linen tag was written on or attached to each object. The original card filled out in the field was retained by each archaeologist and was filed by him according to site and provenience within each site. This formed an "Analysis File" to which photographs, cards bearing the classification for each collection, and other pertinent data could be added. The carbon copy card, also filled out in the field as a duplicate, went into a common catalogue file for the laboratory where the cards were arranged in sequence of catalogue numbers.

Before actual procedures in the field are described, a word should be said about the mapping techniques that proved to be of distinct value in the settlement pattern survey. Three series of aerial photographs of Virú Valley were purchased from the Servicio Aerofotográfico Nacional of the Peruvian Air Force at the Las Palmas laboratories near Lima. Two of these series were duplicates. These were large coordinated quadrangle mosaics, each of which encompassed two minutes of latitude and three minutes of longitude at a scale of 1:10,000. Twenty-two such quadrangles, each measuring approximately 23 by 16 inches, were needed to give adequate coverage of the cultivated valley and the immediate desert environs. During the survey work, one copy was carried into the field and the other was assembled on the laboratory wall in Trujillo and served as the key site location map. The third set of aerial photographs consisted of prints made from the original negatives of the mapping flights. These were the pictures from which the mosaic quadrangles had been assembled. Individual prints were 9 by 9 inches, and, as the scale is

approximately 1:12,000, about 100 such prints were needed to give comparable coverage with the mosaic quadrangles.

Probable sites and other archaeological features were noted from the mosaic quadrangles and marked before the field survey was begun. Preliminary maps of individual sites were made in the laboratory from the mosaics by projecting, with an epidiascopic projector, the section of the mosaic photograph on which a site was observed onto a screen under dark-room conditions. These served as a basis for Willey's task of site mapping.

Work in the field was undertaken jointly by the authors of this paper. During the months of April and May the survey of sites was conducted from the Trujillo base; in June and July, in order to speed the work, field camps were set up in different parts of the Virú Valley. Two Peruvian workmen were engaged, and in one of the three "jeeps" with which the expedition was provided, a systematic coverage of the valley was begun. As previously mentioned, the guides for this work were the air mosaic quadrangles. A few weeks' experience, alternating laboratory study and field examination, were sufficient to enable us to become adept at interpreting features as they appeared on the air photographs. As sites were visited, they were numbered in a simple series, V-1, V-2, V-3, etc. This series of site numbers was controlled by us, and, as a site was located and entered upon the survey records, it was numbered on the air quadrangles in red pencil. At convenient intervals the recently numbered sites were transferred from the field quadrangles to the copy of quadrangle maps assembled in the laboratory. In this way the general progress of the survey could be checked by other members of the Virú group, and the numbers of their excavated sites entered into the survey numbering system. Thus the work of Strong and Evans, Bennett, Collier, and Bird, which bears upon this 1946 season, will utilize the same site numbering designations as used here.

In the field the air quadrangles were assembled in groups of four on a large plywood table. This table was designed to fit down upon the flat hood of the "jeep" after the windshield was lowered. Constant study of the assembled quadrangles, while riding in the "jeep," not only helped to discover new sites but also showed the routes by which the car might be

driven from one site to another. Passing to the right or left of an algarrobo tree frequently determined whether or not a site could be reached. Occasionally, when the position on the map was lost, it was a simple matter to go to a point where a good view of the terrain was obtainable. Then the car was swung until the longitude lines on the quadrangles were orientated north-south by compass (with allowance for magnetic deviation). Next, pins were placed in the map on two prominent landmarks which could easily be seen in the landscape. Strings stretched across the map from each pin and lined up exactly with the appropriate landmarks indicated by the point of their crossing the position of the "jeep." Position was kept so accurately that one of the workmen declared that he could see the "jeep" on the map as it moved along.

We can only estimate the thoroughness or completeness of our survey. The 315 sites recorded are, judging from the air photographs and our knowledge of the valley, about one-fourth of the prehistoric sites that can be observed on the surface. There are, then, somewhere in the neighborhood of 1200 stations

comparable to what we have called "sites." The site designation was applied rather arbitrarily to every manifestation, from a small midden heap to a great palacio or castillo covering several acres. Some of the following inequalities in the nature of our sample should be mentioned: 1, Proportionately, we surveyed more large than small sites, as these were more readily brought to our attention. 2, Proportionately, we surveyed more sites in the upper sections of the valley than the lower, as these were usually constructed of rock and presented better preserved remains of houses. 3, Midden sites on the beach and mound or refuse sites in the cultivated lower sections of the valley were somewhat slighted, as these gave little or no evidence of arrangement or house plans. Nevertheless, the survey covered all sections of the valley and attempted to include sites representative of all major cultural functions, i.e., burial places, dwellings, temples, fortifications. It is clear in retrospect that the job was a bigger one than had been anticipated, but the coverage achieved should give a representative picture of the cultural past of Virú Valley.

THE NATURAL VALLEY

THE GENERAL SETTING

THE VIRÚ VALLEY is located in the northern quarter of the Pacific coastal desert that extends from the Gulf of Guayas to central Chile (Fig. 1). The coast lands of this part of South America are a relatively narrow shelf lying at the foot of the western Andes. This coastal strip varies in width, but compared to the Andean massif to the east it is never more than the merest ledge. In the far north, between Tumbes and Chiclayo, it is as much as 80 or 90 kilometers wide; from Chiclayo to the Santa River, the coastal zone decreases in width as the Andes are closer to the shore.¹ Virú is in this latter segment, at a point where the mountains are about 20 to 25 kilometers from the sea.

The littoral zone is typically composed of a series of old marine terraces, or *tablazos*, which have been transversely incised at intervals of about 50 kilometers by rivers descending from the Andean slope. The western ranges of the Andes are pre-Tertiary. A gradual subsidence occurred during the Tertiary when great thicknesses of shallow-water deposits were accumulated at their base in the sea. Since the end of the Tertiary, mountain uplift has caused a strip of land to emerge from the sea and form the littoral. Bosworth,² in a detailed study of the coastal region to the north, near Talara, interprets the coastal terraces as the result of alternate rise and subsidence of the level of the land during the Quaternary. It appears more likely to the writers, however, that further examination of Quaternary history of this North Coast region will show that throughout this time there has been a slow and fairly steady uplift in process. The terraces which may be noted at many places were probably formed by the more rapid oscillations of sea level during the Pleistocene. If this is true, these terraces will correlate with the similarly formed Pleistocene terraces that are found in all parts of the world, particularly in the valleys of the larger rivers.³

During each rise in sea level, the rivers and their lower tributaries formed large outwash fans, and as the sea was lowered they cut valleys

in both the adjacent terrace and the fan which had been placed upon it. Bosworth⁴ describes this process in detail, although, as we have pointed out, he gives a somewhat different interpretation of the causes of the phenomena.

The details of this history do not show clearly in Virú, although they can be seen in valleys to both the north and south. Virú is a relatively narrow valley, and it seems probable that outwash fans which may have been placed in the valley itself were excised during periods of lowering of the sea level. Flanking terraces which probably lie in the sloping desert on either side of the river mouth have been almost completely masked by the tremendous slopes of sand that have blown up against the coastal range of mountains.

The history of man in Virú is apparently included within the past 4000 years. Very slight uplift of the coast may have occurred within that period, but in Virú the evidence for it is not very clear. In Chicama Valley, Junius Bird has found evidence at Huaca Prieta, the large preceramic site that he investigated, that the beach line has risen about 3 meters since the site was first settled.

At present, and probably from the end of the Pleistocene, Virú and neighboring valleys have been in an aggradational stage. This is indicated by the width and levelness of their flat floors, the principal slope of which is from the mountains towards the sea. The short tributaries that open into the valleys from the lower foothills also show that they were formerly much deeper and that their lower parts are now filling with sediment. The principal rivers are not deeply incised after they debouch from the sierra, and they meander through the gently sloping flood plain on the way to the sea. Several recently abandoned courses of the Virú River show plainly on the aerial photographs of the lower part of the valley.

Direct evidence of the valley filling process was found by Donald Collier in his excavations at Site V-171 (square C4 on map, Fig. 2). At this site the refuse of the Guañape period, the first pottery-using culture of Virú, was about 2 meters below the present flood plain surface. This site is within 1 kilometer of the active river

¹ James, 1942, 170.

² Bosworth, 1922.

³ Fiske, 1944.

⁴ Bosworth, 1922, 253 ff.

channel and 8 kilometers from the beach. Junius Bird has observed even more striking evidence in the cut bank made by the Virú River at a slight fall line just above the point where it is crossed by the Pan-American Highway. Here river-laid deposits were interbedded with cultural material to a depth of about 5 meters below the present flood plain. The oldest of these deposits was of the late Guañape period. (See Site 311 in square D2 on map, Fig. 2.)

Material dumped into the sea by the Virú River in the recent past, and possibly also a very slight rise in the land, have contributed to an advancing coast line all across the mouth of the valley. Three old beaches, the oldest of which is one-half kilometer from the present beach, are clearly visible on the aerial photographs to the south of the river mouth. When these beaches were examined on the ground, no evidence of differences in elevation could be detected. This point unfortunately was not checked by an instrument. Considerable fill has been added to a recent beach line to the north of the mouth of the river. The widest extent of this fill lies between the low old beach bluff on which Site V-71 is located and the rocky promontory of Cerro Prieto de Guañape. This area shows the progressive stages by which it was filled in; at present it is a "salinas" or salt plain, where until recently salt was manufactured by evaporating sea water.

It appears probable that a large part, if not all, of this fill has occurred since Site V-71 was established in preceramic (Cerro Prieto) times. At this and other sites of the period the economy was dependent on the sea to a major degree, and the large accumulations of refuse as at this site have always been found on present or former beaches. The old beach on which this site was located is marked by a low bluff. At that time Cerro Prieto de Guañape seems to have been an island.

This recent filling in of irregularities in the coast line can be observed at a number of places along the North Coast of Peru. The process is apparently not dependent upon the relatively slow uplift phenomenon. Rather it seems to result from the strong southwesterly winds and the northward current rehandling material brought down and dumped into the ocean by the rivers. The coastal indentations that appeared when the sea returned to its

present level after the last retreat of the Pleistocene ice caps are being straightened out. The coastal currents have also prevented the rivers from extending any deltaic deposits out beyond the coast line. Probably material has always been rehandled by the sea as fast as it was dumped by the rivers.

The fill in the coastal valleys is composed of both sand blown in from the surrounding desert and a much larger proportion of material brought down from the hills by water. It is obviously being sorted and laid down by the disastrous rainy seasons that at present are irregularly spaced seven to 20 years apart. These rainy seasons result from a shift from the normal southwesterly winds to north winds, which bring in warm moisture-laden air from the tropics, and torrential rains last some months. There is no vegetation on the hills to delay the run-off, and the flat valleys are flooded several feet deep. Considerable erosion occurs in the foothills, and large rocks are rolled down water courses in the upper parts of the valleys. Human constructions in this region are all based on the premise that it will not rain, and rainfall such as we are describing is a major disaster. The last great flood occurred in 1925.

The water that passes through the coastal valleys in normal years all derives from the rains that fall during the coastal "summer season," from November to May. Rains at present do not normally occur below 3000 meters, so that the amount and dependability of the water so necessary for agriculture in each valley are directly related to the extent of watershed which each valley has in the high rain zone. Santa is the only valley on the North Coast that normally has a greater flow of water than present agriculture needs.

The climate of the coastal desert of Peru is generally considered by geologists to have remained about as it is at present throughout the Quaternary.¹ However, some archaeological evidence suggests that the rainfall zone was lower on the mountains in the period of the Cupisnique culture (Guañape period in Virú) and possibly until later times.

Remains of this period were found in a large wash that is situated 8 kilometers to the north of the edge of Virú Valley. This wash has a

¹ Bosworth, 1922, 258-268.

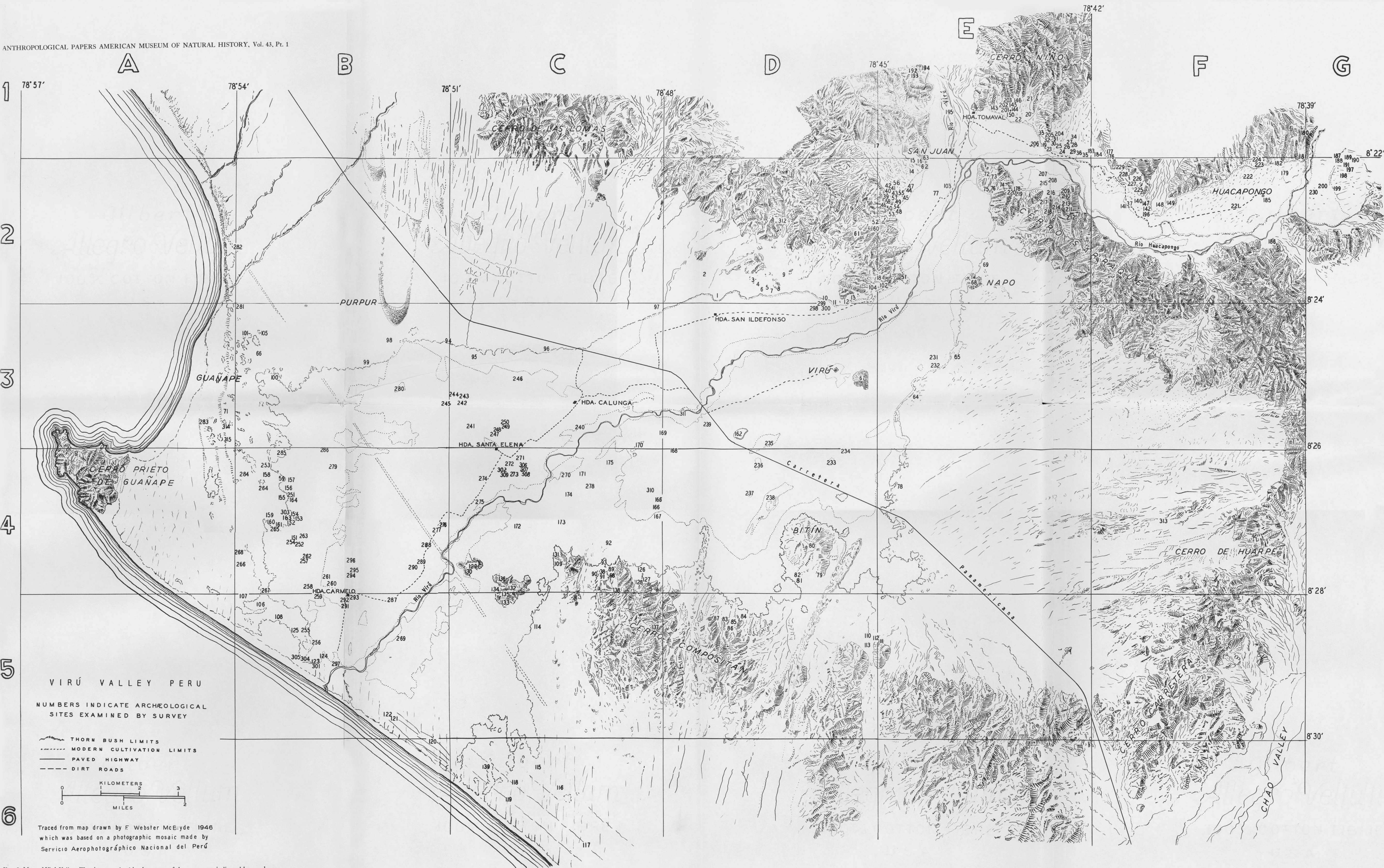


FIG. 2. Map of Virú Valley. The sites examined in the course of the survey are indicated by numbers.

rather small catch basin in the Cerros de Las Lomas which do not rise over 1500 meters. At present the entire area is dry, has virtually no vegetation, and human habitation is out of the question. Water flows here only during the rare coastal rains described above.

A second occupation of this period, consisting of a number of small houses, was found alongside a large wash that is located 12 kilometers south of the Chao River. These houses are near the point where the wash is crossed by a dirt road that connects the Hacienda Tanguchi on Rio Santa with the Pan-American Highway. This unnamed gully has a fairly extensive catch basin in the Cerros de Las Cabras which rise 1100 meters above sea level. Other occupation in this little valley lasted until at least Tiahuanaco times and suggests that conditions of occasionally greater water supply lasted that late. This region is typical desert today, and the nearest plant life is on the Chao River.

The most striking evidence of this nature is found at "La Pampa de los Fósiles" in Quebrada Cupisnique, a name that Rafael Larco Hoyle has applied to the earliest ceramic period of the North Coast.¹ Cupisnique Quebrada flows seaward out of the mountains, when there is any water, 28 kilometers north of the northern limits of Chicama Valley, just south of the valley of Jequetepeque (Fig. 1). It leaves the mountains and enters the sandy desert some 20 kilometers from the coast at an altitude of about 200 meters above sea level. The quebrada has a rather large catch basin which is bordered roughly by the 2500-meter contour line.

During the Cupisnique period, there was a lake at the point where this small valley leaves the mountains. The entrance to the desert pampa was blocked off by a large train of sand dunes which formed as a result of a gap in a line of low hills that rise out of the pampa to the southwest. This lake, about 2 kilometers in diameter, filled the mouth of the valley. The shore line is plainly discernible today; as a matter of fact, the mineralized stems or roots of plants that grew along the lake shore outline the old lake and account for the name of the area, "Pampa de los Fósiles." The outlet for this lake was southeastward, behind a line of low hills named Cerro Yulo that run parallel to the shore. This outlet emptied into the Chicama Valley.

People with the typical culture of the Cupisnique period built their simple C-shaped stone houses around the shores of this lake and along the outlet. Larco reproduces photographs of these structures.² How long this condition prevailed cannot be ascertained. However, the water eventually cut a narrow gorge through the low and narrow range of hills that formed part of the lake dam to seaward. The drainage is now directed towards the sea through a channel which in its upper part parallels the former one. The basin of the old lake is now completely drained.

Cupisnique Quebrada is normally dry today, but a few algarrobo trees and other scrub vegetation grow in the old lake basin. Evidently some moisture from the catch basin finds its way down the valley at depths that can be reached by the roots of these plants.

Some of the areas of occupation in Virú Valley may be explainable in terms of a lower precipitation line. Some of the early houses of the Guañape and Puerto Moorin periods were placed along the valley sides on talus fans at the bottom of small gullies on the slopes of the neighboring hills. Any extensive irrigation system does not seem to have been developed at this period, and in any case these locations are often some meters above the level to which the later peoples were ever able to bring water. Perhaps these early peoples were utilizing a simple flood-water irrigation and the ground water that descended these draws under more moist conditions. Such sites as V-83, V-84, V-87, V-127, and V-128 will serve as examples. These are located in the southwestern part of the valley (Fig. 2) at the foot of a low range of hills, Cerro Compositán. These hills are not over 1500 meters high. Although at a later date, probably in the Huancaco period, a canal was brought along the foot of these hills somewhat lower down, the heads of the draws where the Guañape and Puerto Moorin period sites are located have not been occupied since that time.

The present climate of the Pacific Coastal desert is dry and cool. As a result of the cold Peru or Humboldt Current that sweeps this coast and the upwelling of cold water near the shore, cool southwesterly winds blow rather strongly. Crossing the cold waters of the

¹ Larco, 1941.

² Larco, 1941, Figs. 12-13.

Pacific, the air picks up little moisture. As this cool air is warmed it extracts all possible moisture from the land. Sea fogs are common all along the coast, especially during certain seasons of the year. Temperature is fairly constant the year around, with a cooler, foggy winter season from June to October and a warmer, sunny summer season from November to May. The latter is the period of rains in the mountains. The average annual temperature at Lima is 66.7° F.; for the Virú it is only slightly higher.

In the extreme north there is spotty xerophytic vegetation on the desert pampa between Tumbes and Chiclayo, but south of the latter the desert is almost completely barren. Natural cover in the valleys consists principally of algarrobo trees, low shrubs, and marsh grass. Animal life is not abundant. Rabbits, rodents, numerous birds, and an occasional larger animal are native to the valleys. In prehistoric times deer lived in the valleys, but are absent or rare today. During the "jeep" survey of a thick section of algarrobo in the Lower-South section of Virú, we saw a wild bobcat; it is likely that in prehistoric times the larger cats occasionally came down out of the hills. On the other hand marine life is most plentiful. The deep, cold waters of the Pacific are rich in microscopic organisms and, in turn, in fish which these organisms sustain. Shellfish are also found, although apparently these were more plentiful in the prehistoric past than at present. Crustaceans, too, are common on the beaches. In addition to the marine life, the guano birds swarm the coast by the millions, and their excrement was used by the Indians, as it is today, for crop fertilizer.

DESCRIPTION OF THE VALLEY

Virú Valley is bracketed by latitudes 8° 20' S. to 8° 32' S. and by longitudes 78° 36' W. to 78° 57' W. (see map, Fig. 2). The direction of river flow is chiefly to the southwest. The main channel is fed by two tributaries: Upper Virú, which comes in from the north-northwest, and Huacapongo, which flows from the east and converges with Upper Virú to form the Rio Virú proper. From the mouth of the river to the convergence of the Upper Virú with the Huacapongo is a distance of 22.5 kilometers. Today there is no cultivation and little water in the Upper Virú. In our survey we explored

this arm for a distance of only 3 kilometers, but there are abundant remains in this part of the valley. The main stream flow comes from the Huacapongo, in which continuous cultivation extends for some 10 kilometers above the juncture with the Upper Virú. Our work halted at this point, where the stream gradient steepens markedly, but evidences of prehistoric occupation continued on beyond, for an undetermined distance. Maximum width of cultivation is near the center of the main valley. At the point where the Pan-American Highway cuts across, the cultivated fields are about 7 kilometers wide. Downstream the valley widens, but there is considerable shrinkage in the area now under cultivation due to a lack of water, so that just above the delta crops are grown in a strip only 3 kilometers across. The cultivated land narrows markedly as one goes upstream; in the Huacapongo it is no more than a kilometer wide in many places.

For convenience in describing the valley topography, a series of names for sectional subdivisions of the valley has been selected. These conform in part to actual ecological zones and in part to arbitrary demarcation. Briefly, they may be defined as follows:

Lower Virú-South is that section of the valley lying southeast of the river and southwest of the Pan-American Highway.

Lower Virú-North is that section of the valley lying northwest of the river and southwest of the Pan-American Highway.

Middle Virú-South is that section of the valley lying southeast of the river and northeast of the Pan-American Highway. It is bounded on the north by the Cerro Sarraque and the point of convergence of the two tributaries.

Middle Virú-North is that section of the valley lying northwest of the river and northeast of the Pan-American Highway. It is bounded on the north by the Cerro de Las Lomas and the point of convergence of the two tributaries.

Upper Virú is the drainage above the convergence of the Upper Virú tributary with the Huacapongo. Huacapongo-South is the south side of the river in the Huacapongo tributary drainage.

Huacapongo-North is the north side of the river in the Huacapongo tributary drainage.

The outer limits of the Virú topography are the Andean foothills which form the valley border. On the southeastern side these are, going inland from the sea, the Cerro Compositán, a kilometer and a half from the beach,

the Cerro Carretera, and the Cerro de Huarpe. The latter separate the Virú from the Chao Valley drainage to the south. On the northern side of the valley the hills are set somewhat farther back from the coast. This hill mass, known as the Cerro de Las Lomas, extends southeastward almost to the river. The upper end of the valley is bounded, first, by the Cerro Sarraque, which lies between the Cerro de Huarpe and the river, and by the still higher hills farther to the northeast, of which Cerro Niño is the most immediate. The Huacapongo tributary flows between the Cerro Sarraque and the Cerro Niño. At the juncture of the Upper Virú and the Huacapongo, the valley passage between the Cerro Sarraque and the Cerro de Las Lomas is no more than one-half a kilometer in width. These bordering hills range from 200 to 500 meters above sea level. The hills at the head of the valley are considerably higher than those near the coast, but a part of their greater elevation is masked by the general upslope of the valley floor, which steepens markedly towards the head of the valley. The hills are exposed and weathered rock, utterly without vegetation, and their seaward slopes are piled high with drift sand carried from the beaches by the steady south-westerly winds.

Within the basin formed by the hills, a high sandy pampa slopes down to the present valley floor. This pampa is best seen in Middle Virú-South, within the embrasure of Cerros Sarraque, Huarpe, and Carretera, and on the north side of the valley around the Purpur dune. It is covered with deep drift sand, and the surface is marked with shifting, lunate sand dunes. Under the sands are probably remnants of the ancient terraces cut by the river during Quaternary time. At many points, particularly in the Middle Virú, a sharp declivity separates the sandy pampa from the now cultivated valley floor. This seems to mark the borders of the canyon cut during the last lowering of sea level in the Pleistocene. In Lower Virú, this drop has often been graded off by drift sand. At the upper end of the valley and in Huacapongo the formation of the land is somewhat different. Here, where the valley is narrower, a number of steep, flat-bottomed quebradas open out onto the valley bottom from the bordering hills. Queneto Quebrada in the Cerro de Las Lomas is a good example. On the north side of Huaca-

pongo there are several such quebradas, including the small one behind Tomaval Hacienda and Niño Quebrada. Also, the Upper Virú tributary is little more than a dry quebrada of the same type. All the quebradas are choked with rock and boulders—alluvial fill carried down from the surrounding hills during the infrequent downpours of rain. In this part of the valley the present river bottom is usually several meters below the debris-filled quebradas. These slight drops, as well as the fall line which has been noted just above the Pan-American Highway bridge, may be due to the continued uplift of the coast since the period of maximum valley-filling activity. On the other hand, it is possible that they should be attributed to nothing more than the river lowering the gradient in the upper part of the valley floor since the filling process has slackened, due to change in rainfall conditions higher up in the mountains.

Besides the hills bordering the valley, a number of isolated hills rise out of the valley floor or the adjacent pampa. Because of their setting, these hill islands are some of the most imposing landmarks in the valley; in the past they were important as dwelling, temple, or fortification sites. The largest within the valley proper is Cerro Bitín, lying off the northeast flank of the Cerro Compositán. Extending off the western end of the Cerro Compositán are a series of hills, the Cerros de Las Piñas, of which Cerro Azul is one. These hills extend almost to the river, growing progressively smaller and lower towards the middle of the valley. Some still show rock outcrops; others appear to be only earth and sand. The most isolated hill in the valley is Cerro Virú, or Santa Clara, in the center of the valley near the modern Virú Pueblo. Two others in Middle Virú-South are the cerros of Napo and Virú Viejo. Lastly, there is Cerro Prieto de Guañape, the large rocky crag extending out into the sea.

The above described hills are true hills in the sense that they are detached rock outcrops in various stages of weathering, but there are still other hill formations in the valley that stand several meters above the bottom lands. Some of these are old stabilized sand dunes. In Lower Virú-South there are several of these within the valley in process of formation. On the southeast side of Cerro Bitín, a large streamer is advancing down the slope from a

gap in the Cerro Compositán across the sandy pampa into the edge of the valley bottom. Another, in a similar stage of formation, extends down from the Cerro Compositán just west of Bitín. In the center of the valley, north of Bitín, are several low sand hills. The largest of these, Huaca Larga, is unquestionably an old stabilized dune, similar to the advancing dune streamers, but representing a later stage of development. Quite possibly several other hills immediately to the north of Huaca Larga are also dunes. The doubt here is occasioned by the fact that most of these old dunes on the valley floor were occupied in prehistoric times and the Indian inhabitants have built up deep layers of refuse and adobe structures on the natural sand. Thus it is sometimes difficult to decide whether a hill is natural or artificial, especially if it is small.

In addition to the rises just described, there are in the lower portion of the Virú Valley, below the Pan-American Highway, hundreds of small hillocks. These are usually round or oval in shape, 30 to 40 meters in diameter, and rise sharply 1 to 2 meters above the valley floor. Several of these mounds, excavated by Bennett, Collier, and Willey near the Gallinazo site, were found to be entirely artificial and to contain burials of the Gallinazo period. Many of these mounds were examined in the course of the survey, and nearly all yielded cultural refuse ranging in date from Gallinazo to Inca-Chimu times. The concentration of saltpeter in these hillocks was noted to be unusual. Large blocks of soil cemented by mineral salts were encountered in excavating the mounds and made digging them particularly difficult.

Señor Rafael Larco Hoyle suggested that these hillocks were formed by prehistoric agriculturalists. He has noted that today when water is let into the fields for irrigation, the mineral salts, which are highly concentrated in these soils, are brought to the surface, and in the course of time a hard and sterile crust is formed. At present this formation is prevented by plowing with either animals or tractors. However, under conditions of hand-labor agriculture, the soil was not stirred deeply enough to prevent the crust from forming. Evidently the ancient people removed this crust by hand and made piles of the material at convenient points in the fields. Today these stand out as small barren hillocks in the green

fields. The valleys of Chicama and Moche have similar hillocks in their lower parts.

In a strip about 1 kilometer wide inland from the beach, extending 3 to 4 kilometers on either side of the river, there are a great number of low, flat, grass-covered basins. These are roughly rectangular, 20 to 50 meters square, and their floors are sunken a meter or so below the surrounding surface. Typically narrow walls of soil 3 to 4 meters high border each rectangle. At intervals there are narrow gaps in the earth banks as though it was intended to provide gateways from one to another.

These are artificial cultivation plots of the type called *pukios*. The Indian agriculturists have lowered the ground surface by excavation so that the ground water is available to plants growing in the plots. The success of this method is obvious as the grass is very rank in the bottoms of the plots today. In 1946 some of the plots in Virú were so marshy that our "jeep" bogged down in them. The cultivators of the *pukios* seemed to have been plagued by the same phenomenon of crust formation as that described slightly higher up the valley. In most cases the crust material was probably placed on the walls that had been made in excavating the area. However, in some regions where the cultivation plots were rather large, a small mound of soil of high salt content is placed neatly in the center of each *pukio*.

Pukios are also found in the neighboring valleys of Moche and Chicama. As in Virú they are located near the beach. The largest and deepest cultivation pits of any found on the North Coast were seen in the Moche Valley near the large Chimú site of Chanchan. This successful but laborious method for providing water to crops is no longer in use in the area.

This discussion so far has omitted the beach country at the mouth of the valley. The present, active, wave-washed beach is narrow, fairly steep, and composed of fine sand. All along the valley shore the waves break close to the land, indicating the bottom drop-off to be fairly rapid, as it is in most places along the Peruvian coast. A ridge of sand dunes, partially covered with grasses, lies just behind the high-tide mark. This ridge, which may be anywhere from 2 to 4 meters high, forms a natural wall all along the ocean front. In some places behind the ridge there are flat grasslands which are quite suitable for modern cattle grazing. In other places

the dunes continue at close intervals for as much as 2 or 3 kilometers. At intervals of from 1 to $\frac{1}{2}$ kilometer behind the present beach there are clear evidences of old beach lines. Three of these are easily distinguishable on the air map or the ground, and along the southeastern section of the beach there are suggestions of even more. These old beach lines are marked by dunes, similar to those behind the present beach, and by piles of shell. There are a great many prehistoric sites in this part of the valley, and almost all periods of the archaeological chronology seem to be represented. Many of these sites are located on these old beach lines, but the association appears to be fortuitous. Where pottery and other evidences of human occupation are found, the shells are more abundant and most often are whole. Without definite remains of human occupation, the shell deposits on the old beach lines have a different appearance; the shell is broken and crushed and has a much more water-worn and ancient quality.

In Lower Virú-North, there are a number of lagoons about 1 kilometer or more inland from the beach. In years when there is abundant run-off from valley irrigation, these are filled with brackish water; 1946 was such a year, and many of the basins were full of water. In contrast to the *pukios* just described, these lagoons are natural formations. However, they are a result of the same phenomenon that makes *pukio* agriculture practical. Water that is absorbed into the ground near the head of the flat valley approaches the surface near the beach. Natural depressions as well as artificial ones tap this underground water.

HUMAN SETTLEMENT

With an agricultural economy, the key factor in the establishment of human settlements in the Virú Valley is an ample water supply. This was as true for the past as for the present. Water was never so plentiful in Virú as in the larger northern valleys, yet human life is sustained on a modest scale today, and there is reason to believe that the pre-Columbian populations were considerably greater. Kroeber¹ and Bennett,² quoting Garcia and Adams, place Virú as a "second class" valley. This by defini-

tion is one that does not head into the continental watershed, but draws its water from the upland zone of regular annual rains. As of 1921, Virú had a basin of 900 square kilometers with 5000 hectares under irrigation, and of the latter only 2500 were in actual cultivation. By 1936, the year of Bennett's survey, the acreage under cultivation had decreased rather than increased. The relative size and richness of Virú can be appreciated by contrasting it with the Chicama, which has a basin of 4200 square kilometers and 30,000 irrigated hectares.

Today Virú is not of great economic importance, when compared with Moche or Chicama. There is only a small town named Virú in the valley; its old port, Puerto Moorin, has ceased to function; Trujillo and Salaverry, 46 kilometers to the north, serve as the chief points of commercial contact and shipping. The productivity of Virú, except for livestock, is virtually all agricultural. There are today about 7000 persons in the valley. These are chiefly of mestizo stock. The language spoken is Spanish; the culture might be termed a rural type of Costeño of Peru, a blend of Colonial Spanish, Indian, and a few North American industrial elements. The population may be conveniently separated into three geographic localities. In the upper valley the Hacienda Tomaval is located at the juncture of the Upper Virú with the Huacapongo. Tomaval controls the upper valley lands, and the inhabitants of that section are economically integrated under its close direction. With sufficient water, the principal commercial crop is sugar cane, although corn and various vegetables are grown for local consumption. The second nucleus of population is the little pueblo of Virú near the center of the valley. Here the land is divided into a number of small independent farms on which truck products and citrus fruit, rather than staples, are raised. The largest but driest part of the valley, from the Pan-American Highway to the sea, is under the control of the Hacienda Carmelo. Several subsidiary haciendas are a part of this system. Cotton is the principal commercial crop, although foodstuffs are grown for individual needs. Under Carmelo many of the farmers operate independently, but rent their land from the hacienda corporation. It is in Lower Virú that most of the land once cultivated is now fallow, being covered with monte or algarrobo trees. In some places the monte is used for

¹ Kroeber, 1930, 74-76.

² Bennett, 1939, 19-21.

grazing as the algarrobo bean pods are quite nutritious; in other sections the trees are cut down and burned for charcoal. The monte growth occurs, of course, in all parts of the valley, but in the middle and upper sections it is no more than a narrow fringe bordering the agricultural land, whereas in the lower valley it covers several square kilometers.

A comparison of modern and prehistoric settlements provides an interesting contrast and

shows a recession of land under cultivation in modern times. Some of this recession probably took place with the change from native to European exploitation. In many places there are evidences of old irrigation and cultivation systems in rocky quebradas, barren desert, and thick monte, all far removed from modern watered fields. Similarly, there are many prehistoric communities, cemeteries, and shrines in terrain no longer occupied.

**2. CULTURAL DATING OF PREHISTORIC SITES
IN VIRÚ VALLEY, PERU**

JAMES ALFRED FORD

THE PROBLEMS OF SITE DATING AND CHRONOLOGY

DISCUSSION

THE OVER-ALL PURPOSE of the 1946 program of the Institute of Andean Research in the Virú Valley was to reconstruct the cultural prehistory of a North Coast valley as completely as possible through the application of archaeological techniques, and to examine the present culture of the valley and relate it to the past. The students involved and a summary of their interlocking roles in the accomplishment of these objectives have been given in the preceding section.

The portion of the problem with which I am immediately concerned is to date, within as narrow limits as possible, a substantial number of the old occupation sites that are scattered over the valley: house ruins, religious buildings, pyramids, hilltop fortifications, cemeteries, and isolated refuse deposits. Such a dating may be expected to indicate the areas of occupation at different times and to make it possible to infer the probable period of construction of canal systems, roads, and land clearance projects. This relative dating of a representative sample of sites is necessary to provide a basis for the portion of the Virú program undertaken by Dr. Willey: the study of the development of architecture, occupation and community pattern, and as much as may be inferred of prehistoric religious, social, and political structure.

Secondarily, and with some temerity, I would like to offer this study as an exposition of some techniques for measuring culture history and time change which are slightly different from, and in some details possibly are an improvement on, the current modes of handling chronological problems. This possible slight improvement in technique lies in giving more emphasis to the quantitative aspect of cultural change, a phase of archaeological research that has been by no means entirely neglected by American students but that certainly has not yet been fully exploited.

TIME SCALE

There seems to be little immediate prospect that a chronological framework, in terms of years, will be worked out for the prehistory of coastal Peru through the techniques of dendrochronology. True, no extensive studies have

been undertaken, but the nature of the vegetation and its dependence on local water supplies which have been controlled by man for centuries are conditions that do not appear promising. Until new methods of calendrical dating are developed and applied, the principal basis for reconstructing Peruvian prehistory must remain a relative scale in which time is measured by cultural change. This means, principally, ceramics.

In the first section of this paper, what has been published about the chronology of the North Coast before 1946 has been reviewed. The work of Uhle, Kroeber, Larco Hoyle, and Bennett has provided a sequence in which periods were blocked out, and some evidence, derived primarily from grave superposition and ceramic typology, made it possible to place these periods in chronological order. The most debatable point of the sequence was the relative time positions of the Mochica (Early Chimú) period and the Negative or Gallinazo period in Virú.¹

This outline chronology was based almost entirely on materials secured from burials. Indeed, with a few exceptions of fairly recent date, it can be said that virtually all published knowledge of the archaeology of the Peruvian-Bolivian area has dealt with tomb furnishings. This emphasis on a group of highly selected materials has an effect on current interpretations of Peruvian prehistory which will be considered in subsequent sections, and of which the casual student is sometimes left unaware.

Strong and Evans from Columbia University and Collier of the Chicago Natural History Museum assumed the task of making stratigraphic excavations in refuse deposits to develop the detailed data for assembling a time scale based on changes in ceramics. The present study, as well as the other papers that result from the Virú program, utilizes the information they have gathered, either directly or indirectly.

The reasons that led to this concern with refuse heap materials by all the archaeologists working in Virú are identical to those motivating such studies in other regions. Briefly, refuse materials are not consciously selected as are

¹ Kroeber, 1944a, 65.

grave goods and can be expected to allow cultural change to be measured both qualitatively and quantitatively. Also, accumulations of any appreciable depth can be excavated by levels, to give a reliable basis for determining cultural change.

Even had it been possible to refine the known chronology based on tomb contents to the degree that is usually expected of refuse dump cultural sequences, this would have provided little assistance to the problem of dating occupation sites. At most sites there is no way in which the cemeteries can be correlated with near-by buildings. The buildings may or may not have been occupied when burials were being placed in the cemeteries. Burials do occur within filled-in rooms of buildings but are rare and hard to find. At best they indicate a terminal cultural date.

Neither can the ceramic refuse from dwelling and ceremonial structures be correlated with the material from the tombs to any great degree. The ancient people of Peru shared the trait, widespread in the higher cultures of the Americas, of manufacturing objects especially for burial with the dead. On the North Coast, at least, this trait was developed to a singularly high degree.¹

The proportions of interrelation between culinary and mortuary ceramics in the Virú Valley vary slightly in the different periods, and some of the common culinary types were buried with the dead in all periods. The quantity cannot be determined for all periods, as extensive grave excavations were not undertaken as part of the project.² An entirely misleading idea is obtained from viewing most collections from this region because the professional tomb hunters, the *huaqueros*, who made nearly all of the collections, did not save the less spectacular pottery. They had no market for it. Large fragments that have been abandoned beside opened tombs in Virú, as well as surface collections from cemeteries, demonstrate that a small amount of culinary ware was buried in all periods.

The percentages of fragments of the specialized burial ware found in occupation refuse are treated in a later section of this paper. Now it is

sufficient to note that in no period does it go much over 5 per cent. The average is about 1 per cent. The chances that a few sherds of the types on which the North Coast chronology was based will be present in a collection of 100 sherds from an occupation deposit are not very large.

The plan for dating occupation sites in Virú, then, was considered to involve two steps. First, it was necessary to assemble a time scale showing both the qualitative and quantitative aspects of refuse dump ceramic styles. As far as the work of Strong, Evans, and Collier made it possible, this time scale would be based on the evidence provided by vertical stratigraphy. Where this kind of evidence was not available, the method of seriation of surface collections was used. Fortunately, the stratigraphic evidence provided by these investigators was so nearly complete that seriation was used for a brief time span only.

The second step was to gather and classify collections from all the sites which were to be examined by Willey. The results of these classifications were then to be compared with the time scale to determine the ages of the occupation areas. Willey and I started our survey at the same time that Strong and Evans began the first of their series of strata cuts.

OLD SITES IN VIRÚ

As do all the other North Coast Peruvian valleys, Virú abounds in evidences of prehistoric occupation. Many of the structures show plainly on the excellent aerial photographs which we obtained from the Servicio Aerofotográfico Nacional, and it was not difficult to recognize prehistoric constructions on the ground. These were so numerous that the survey consisted more of making a judicious sampling in order to examine all parts of the valley in the time at our disposal than of a search for such evidences. For brief descriptive purposes the evidences of prehistoric occupation may be classified as follows:

DWELLING UNITS

Small single-room houses with stone-wall foundations

These were usually found on talus slopes at the base of the mountains along the sides of the valley and dated in the Puerto Moorin period.

Multiple-room houses

On the rocky slopes these had rubble-filled stone walls. In the valley floor the walls were of cane-

¹ Larco, 1941, 11; Bennett, 1946, 27.

² Bennett, in his forthcoming report on the Gallinazo period, will be able to give the proportion for this period. The carefully gathered collections of Larco and Uhle show these proportions.

marked adobes. These structures dated from Gallinazo to Tomaval times. While the earlier house units have four to six rooms, some of the later are quite large and must have 40 or more.

Large, walled quadrangles

In the upper part of the valley these quadrangles were massively constructed with walls of large stones. In the flat lower part of Virú, where the majority of such sites were found, the walls were made of smooth, rectangular adobes. Rooms were arranged around open courts in most of these quadrangles, and in some, small pyramids, or *huacas*, were incorporated in the structure. These quadrangles dated from La Plata to Estero.

MIDDENS

As a matter of fact, a few potsherds can be gathered at almost any point in Virú where one wishes to stop and look around, but concentrations of refuse are usually found near the ruins of some sort of structure. However, near the coast, and at one or two points on the margin of the valley farther inland, there are simple refuse heaps where stone or adobe structures do not show on the surface of the ground. The coastal sites are thin, and the dwellings of the people who lived at these places were probably made of reeds and matting like the houses of present-day fishermen. Collections from these coastal middens date from Gallinazo to La Plata.

SMALL, STONE-FACED PYRAMIDS

These vary from 2 to 3 meters in height and are usually square with flat tops. Foundations of buildings are found on the flattened tops of these structures, but there is rarely any evidence of a stairway leading up to these buildings. The small pyramids are located not only on the valley floor in the upper parts of Virú but also on commanding mountain tops both to the north and south of the valley. In the latter positions they were placed within stone-wall fortifications. The dates of these pyramids range from Puerto Moorin through Gallinazo.

LARGE ADOBE PYRAMIDS

Most of the large adobe pyramids are in the central part of the valley. They are found both in the valley floor, where they stand alone, and atop each of the rocky spurs that extend out into the valley and provide a commanding position. The small hills that rise out of the valley, such as Cerro Virú and Cerro Napo, are also crowned with pyramids. Pyramids in com-

manding positions are locally called "castillos" and as they are frequently associated with obvious defensive works, such as walls, it is a fair assumption that they served military as well as religious purposes. The castillos are built with cane-marked adobes and date from the latter part of the Gallinazo period.

HILLTOP FORTIFICATIONS

Stone walls rising to 1 to 2 meters encircle the crests of several of the low mountains that border Virú on the north and south. Cerro San Juan and the isolated mountain called Bitín are both crowned with such enclosures. Small pyramids are found in both enclosures, but there are few remains of permanent dwellings. It seems likely that these are hilltop refuges where people gathered when threatened by enemy action and so differed somewhat in function from the later castillos which seem to have been designed to control and guard the valley itself. These forts date from Puerto Moorin to Gallinazo.

PUBLIC BUILDINGS

A class of structures found at a few points in the valley seem to be public buildings for either religious or governmental functions or, more probably, for both. These buildings are large, with massive adobe walls, and are divided into several rooms that are much bigger than any found in dwelling units. At Castillo de Tomaval and on Sarraque ridge these structures are associated with the adobe pyramids described above and date from the latter part of the Gallinazo period. At Huancaco on the south side of the valley a pyramid is incorporated into one corner of a large building of this class. This building gives the name Huancaco to the Virú Valley phase of the Mochica culture, as it proved to be of that date.

ROADS

The prehistoric local roads and trails which ran lengthwise in Virú Valley are probably mostly still in use today. In some places these are bordered by stones and roughly paved after the fashion of "Inca" highways, but there is no way to determine whether or not the work dates from pre-Conquest times. However, a clearly marked prehistoric road crosses the mouth of the valley from northwest to southeast. This leaves the beach above Puerto Moorin and runs

in a straight line across the valley to the pampa on the seaward side of the mountains bordering the valley on the south. In the valley this road is about 10 meters wide and is bounded on either side by the remains of adobe walls. The structures along this road date after Huancaco times, so it probably was not built until the Tomaval period.

"STAR ROADS"

In Queneto Quebrada several roads, 4 to 5 meters wide, are cleared of large rocks. Starting at various points these roads run in straight lines across the flat floor of this small side valley and up over the hills. They end as abruptly as they begin and as they cross over steep slopes at thoroughly impractical angles, it is obvious that they were not intended as trails. Similar features are found on the south coast of Peru, particularly in Nazca Valley where recently Kosak has postulated that they may have served as devices for measuring the position of stars or the sun.¹ There seems to be no way to date these constructions.

CANALS AND CULTIVATED AREAS

There is little doubt but that many of the irrigation canals in present-day use that pass through the center of Virú Valley were first laid out before the coming of the Spaniards. However, both the canals and fields at present under cultivation in the area have been so thoroughly worked over that there seems to be no practical means by which the time of first use can be dated. Traces of canals and ancient fields that have not been re-used are found around the borders of the land now cultivated, at some places rather far up the slopes of the pampa. These reveal the agricultural practices of different periods. Small rectangular fields carefully cleared of stones in Queneto and Niño quebradas seem to date in the Tomaval period, to judge from the refuse of near-by houses. Intricate gridwork irrigation patterns in the flat land near the coast are La Plata in age.

Pukios OR SUNKEN GARDEN BEDS

The roughly rectangular excavated areas found in the valley floor near the coast have been described in the first section of this paper. These agricultural plots, designed to utilize

ground water, probably date in the latter part of the Virú chronology.

SALTPETER MOUNDS

The hundreds of small mounds scattered through the lower part of Virú, which are supposed to have resulted from the collecting of the salt-hardened crust that formed on the irrigated land, have already been described. Collections were made from many of these, and they were also used by the ancients as burial places. They range in age from Puerto Moorin to Inca times.

CEMETERIES

Literally thousands of graves have been opened in Virú by *huaqueros*, and the well-looted cemeteries, which resemble battlefields after heavy bombardment, are found in the valley at almost every point that could not be cultivated. Cemeteries form an almost continuous border to the ancient irrigated area situated along the edge of the dry pampa and on the talus slopes of the mountains. The stabilized sand dunes that are found in the southwestern part of the valley were also utilized, as were the slopes of the isolated hills such as Cerro Virú.

METHOD OF SAMPLING

Refuse is very abundant in and around most of the prehistoric structures in Virú. It consists almost entirely of pottery fragments. Worked stone is virtually absent, and relatively little cloth, basketry, or wooden artifacts are found, except in areas where graves have been disturbed. The collection of pottery was a principal objective of the survey, but other materials were not ignored; for the most part these did not appear on the surface.

Sample collections might have been secured from each site by means of small excavations. For several reasons this was not done. By far the majority of the deposits were so thin that it would have been necessary to dig over large areas to secure an adequate sample, and most of the pottery was already on the surface. Much time would have been consumed at each site, and only a small part of the valley could have been covered in the months available. Finally, it is doubtful whether an excavated collection in a thin site is in any way superior to a surface collection for dating that site.

The two workmen who accompanied Willey

¹ Kosak, 1947.

and me gathered most of the collections. These usually were made from a small section of each site, not more than 100 meters in diameter. The workmen were instructed not to select sherds when collecting and were watched to see that they did not. Their goal at each place was to fill the required number of bags so that they might rest until Willey had finished writing notes. The men were also repeatedly cautioned and watched to see that they did not gather all the material from one spot, for at some sites they might have made a collection of the required size without moving, and had this been permitted all the sherds might have come from one or two large vessels.

Each locality was carefully examined in an effort to determine whether there were any variations in the types and proportions of material exposed on the surface in the different parts of the site. Where there was any reason to suspect such differences, two or more collections were made.

RELIABILITY OF SURFACE COLLECTIONS

Several questions must be considered in regard to the reliability of surface collections when used for the cultural dating of buildings. The first and perhaps the most serious of these is whether the material exposed on the surface represents the cultural refuse of the people who built the structure. Their refuse might be deeply buried beneath later cultural material and the sand which is constantly in motion along the desert coast. This may have happened in the dating of a few of the structures in Virú, but if so, their number is very small. This possibility was guarded against by two methods of procedure. At all sites showing any promise of depth of refuse, test holes were dug, for one purpose of the survey was to discover places with an appreciable midden depth, so that the investigators making stratigraphic excavations might put down cuts. The second check was to examine the surface of all parts of the site. Generally it would not be expected that an older stratum would be covered for its full extent; at some point it would probably show on the surface, in ravines or beyond the edge of the later deposit.

A corollary of this problem is the procedure in the determination of the dating of structures when material from separated time periods is mixed on the surrounding surface. A num-

ber of examples of this situation were found in Virú, particularly in occupations of the Puerto Moorin and Tomaval periods. In none of these was the deposit thick enough to make vertical distinction possible. Fortunately here the later population did not occupy the houses erected in the Puerto Moorin period, but tore them down to their foundation stones and built structures of their own design, using the stones collected in the earlier period. At six of these reoccupied sites, collections made from the rubble fill of the stone walls of the later houses were almost entirely of Puerto Moorin pottery types, while in and around the same house the two periods were about equally represented. In a few instances we have not been able to establish the association between structures and one of several ceramic complexes. These are listed in the tabulation of sites.¹

A third problem is the desirable size of a collection necessary to obtain a fair sample of the material available on the surface of the site. This is a matter discussed by Spier² in his study of Zuni surface collections, and briefly by the writer in regard to collections from the Lower Mississippi Valley.³ It seems well to offer a little additional data from the Virú Valley.

Figure 3 presents, in graphic form, a comparison between repeated collections made at different times at five sites. Type percentages of the two collections compared from each site are represented by the contrasting clear and black bars, and each pair has been marked with a small bracket. For this purpose the types involved are not significant, so their names have been omitted.

The examples compared here are inadequate to permit any definite conclusions as to the desirable minimum size of a collection. The collections from Site V-17 show the greatest variation, as is to be expected, because of the inclusion of a collection of only 51 sherds. Another thing that seems to be indicated is that when a type appears in a strength of over 5 per cent the chances are excellent that it will be represented in a collection of over 100 sherds. Out of 17 occurrences in which type percentages exceed five, the same type was found in the companion collection except in two cases.

¹ See Sites V-24, V-26, V-28, V-29, V-33 for examples.

² Spier, 1917, 254.

³ Ford, 1936, 13-14.

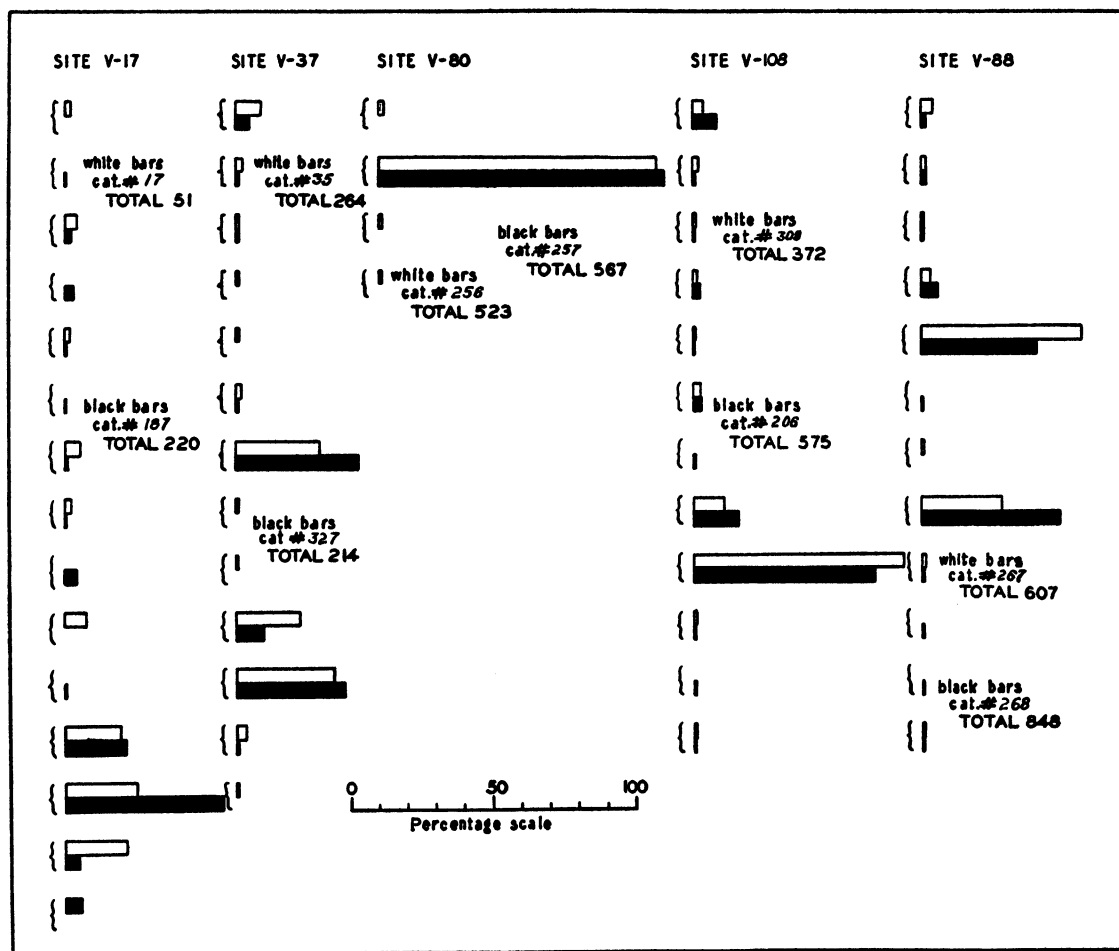


FIG. 3. Graph comparing surface collections made at different times from the same sites.

Both these are in the small collection of 51 sherds from Site V-17.

This graph also appears to indicate that fairly substantial variation from the theoretical actual percentage conditions on the site is to be expected in types that approach 50 per cent popularity, even in collections of 300 to 500 sherds. Variation between the substantial (over 10 per cent) type pairs shown in this graph ranges from 3 to 20 per cent. In one type pair from Site V-17 the difference is 31 per cent, doubtless due to the inclusion of the small collection of 51 sherds.

This range between type pairs from substantial collections is really only half as bad as it appears. The probabilities are that the percentages of the type in each collection vary on either

side of the actual proportion of that type on the site. Thus we may say that the range of variation from the actual percentage of a type on a site to be expected in a collection of over about 200 sherds is probably not more than 10 per cent.

As a result of experience in analyzing classification results, rather than from any basis demonstrated here, I have come to regard a random collection of over 100 sherds as fairly dependable, and anything over 50 sherds as usable for rough dating.

There is still another qualification which must always be made when dealing with fragmentary pottery from refuse deposits. The quantities of different kinds of pottery fragments recovered are never an accurate reflec-

tion of the number of vessels of these varieties that had been in use. Difference in size of vessels is an obvious factor. Big pots make more sherds than little ones. Thin vessels can be expected to break into smaller pieces than thick ones. This, however, need cause no concern over the use of quantitative studies for chronological purposes. Vessel size and thickness changed with time, as did other cultural features, and were subject to as strict stylistic control. A percentage increase of a type due to the vessels' becoming larger or thinner is as good a measure of time change as it is when it reflects greater popularity of that

type. The primary aim of a chronological analysis of ceramics is to provide a time and space scale by means of which other and more important cultural elements may be ordered, thus making possible a reconstruction of culture history. To provide a "true" qualitative and quantitative history of ceramics is of lesser importance, if not impossible of accomplishment with the type of data that can be obtained from refuse deposits, and the fact that such uncontrolled variables as those just described are hidden in the pottery counts is not of much concern.

CLASSIFICATION

THEORY

MANY STUDENTS of ancient cultures seem to regard the classification of cultural remains as a somewhat esoteric business in which the classifier, aided by some inherent insight, examines an assembled mass of prehistoric handiwork and separates the type groupings which the ancient artisans have put there. He decides which features are important and which may safely be ignored. If the classifier is competent, the groupings are believed to approximate the true ones; if not, the classification is incorrect and useless.

This attitude is highly questionable. It derives directly from the notion that there is a basic order in these phenomena, and the scientist's duty is to search for and discover this order. This was the viewpoint of the "natural sciences" in the nineteenth century. It fails to recognize that the apparent order has been imposed on the material either by chance circumstances or, more commonly, by the classifier himself. In actuality the same group of archaeological material may be classified in an almost unlimited number of ways, each equally valid from an empirical point of view. A single inevitable and natural order apart from a posed problem is not there to be found, and each classificatory arrangement of material must be tested by the question of how well it serves the end purpose that the classifier has in view.

The primary purpose of classifications of archaeological material until about 1920 was description of the material. In the second decade of this century, the pioneer work of Kroeber,¹ Spier,² and Kidder³ has introduced the concept of the classification system as an instrument for measuring culture history in time and space. This is the major goal of classification in most present-day archaeological studies.⁴

The reasons for this change in point of view, and the resultant procedures, are not obscure. They have resulted from a gradual, perhaps not

always conscious, acceptance by archaeologists of the concept that culture is most usefully viewed in what Kroeber⁵ has defined as a "superorganic" realm of phenomena. According to this concept, culture may be briefly defined as a stream of ideas,⁶ that passes from individual to individual by means of symbolic action, verbal instruction, or imitation. The present-day archaeologist is primarily concerned with the histories of what can be recovered or reconstructed of these streams of ideas. Stone tools, pottery, and other artifacts are not collected and examined for their esthetic qualities, or to discover and concentrate upon their uniqueness. They are useful as recorders of cultural influence. It follows then that archaeological materials are classified primarily to measure culture and trace its change through time and over area.

There is nothing difficult about the application of a classification system after it has been set up. Illiterate workmen can often be trained to be excellent classifiers. All that is necessary is to learn the bounds of the variation that has been allowed the type groups and to maintain a strict consistency in handling the materials. The setting up of a system and the constant adjustment that is necessary as the result of increasing knowledge of a cultural history are more involved. These demand a grasp of the theories of cultural change and a clear conception of the end results expected from the use of the classification.

This is the point to introduce a discussion of the theoretical assumptions that apply specifically to the problem of setting up a time scale in the small area of Virú Valley. These are the probabilities in accord with which work was carried forward until analysis of the material should demonstrate otherwise:

A. At any one time in the past the features of the culture in this restricted area were essentially the same all over the valley. Some locali-

⁵ Kroeber, 1917.

⁶ Webster's definition of "idea" does not quite serve here, yet the writer does not wish to use an obscure word or coin a new one. For the purposes of this paper, it is understood that individuals do not "create" ideas. The concept of "free will" seems to have no place in science. Individuals receive ideas from other humans, sometimes combine them, less frequently discover them in the natural world about them, and almost always pass them along to others.

¹ Kroeber, 1916.

² Spier, 1917.

³ Kidder, 1931.

⁴ Brew, 1946, 44 ff. Rouse, 1939, uses his classifications in this manner without making an explicit statement to this effect.

ties may have lagged slightly in the process of cultural change, and at different times people with a foreign culture may have held portions of the valley. Or, less likely, extraneous cultural influences may have found acceptance in some parts of the valley but not in others. If true, these conditions must be demonstrated. The probabilities are against areal cultural differentiation having occurred often or having lasted for any length of time in such a small valley. Probably then the areal dimensions of the problem can be factored out.

B. It may be assumed that with the passage of time marked changes of style occurred in all elements of culture. The ideas of the ancient people as to the proper ways in which things should be done and made were quite different when they are observed at 500- or 1000-year intervals. The difference may appear relatively small if the culture is protected from outside influence either by its simplicity and consequent inability to absorb new ideas or by geographic isolation. Or it may be observably great, as in the recent history of our present culture. In any span of cultural history some change will have occurred, but sometimes the problem is to find tools delicate enough to measure it.

C. Normally cultural change will have taken place gradually, so gradually that the people making the artifacts and following the customs were probably under the impression that they were doing everything exactly as their fathers and grandfathers did. Any rapid change in these relatively simple cultures will have been forced by external pressure.

In the less complex cultures, where handmade articles are produced, each object made is different. No two women can make identical pieces of pottery, and no craftsman can duplicate his own handiwork exactly. While at any given period the cultural styles stayed in more or less narrow limits, the accumulation of variations resulted in slow shifting of the norms. Emulation of the variations affected by outstanding individuals and the acceptance of new ideas from adjacent cultures may have speeded up this process at times. It is to be expected that the foreign ideas which are readily accepted will not be entirely new and strange. They are more likely to be variations originally derived from the same source as the custom which they are replacing. Entirely new ideas will

almost certainly be strongly modified in the course of merging with the local culture.

D. In a strictly literal sense, there is never anything new in a cultural history. Each cultural entity has one or, more often, numerous parents, to which it will show a rather strong family resemblance in most characteristics. Change in culture occurs by only two processes: first, combination of ideas already available in the cultural environment; and, second, discovery and adaptation to cultural purposes of new phases of the natural environment. Cultural change is always a gradual process in which the new is founded on the old. It is this fact that gives cultural history its strongest resemblance to biological history. However, the relationship ties in a cultural history weave back and forth between the different cultural categories in a bewildering fashion entirely foreign to the history of living organisms, and only the strongest and most easily detected can be traced with any assurance. These evidences of relationships are to be expected, but in dealing with the materials that will be used to form a hitherto unknown cultural chronology, they must be set aside and carefully ignored. Assumptions as to relationship are impossible until the chronological factor is completely under control.

E. The foregoing discussion is not intended to convey the impression that there was homogeneity in the cultural material of any category at any one time. All the pottery vessels did not vary about a single stylistic norm. On the contrary, it is to be expected that several norms will have existed side by side which were kept somewhat separated by the manufacturer's ideas as to either the function or the derivation of the classes. Chicha jars, cooking vessels, and water containers each may have characteristic features. Introduced ideas may be used but kept separate from the local ideas in a conscious fashion. This is directly comparable with modern dress styles. At one moment there now exist, side by side: types of house dress, sport dress, street dress, and evening dress. This is a functional separation. Introduced ideas accepted as a complex are such things as modified Chinese costume used for a house dress. All these varieties, separated in the minds of the present-day users by function or origin, undergo time change.

We cannot always guess at the ideas carried

in the minds of the prehistoric culture bearers that caused this separation. Indeed, it is not necessary that such an attempt be made. For present purposes it serves to be aware of the phenomenon and to take it into account in the work of classification, for these divisions will be more or less reflected in the classification system.

F. It is of fundamental importance that distinctions be drawn between the histories of a culture, a people, and a region. Regions, such as Virú Valley, are fixed in space, but both populations and cultural ideas were free to move. Evidently they did. The remarks above as to the characteristics of cultural development apply to *culture*. Neither people nor area is involved. This study will not be a history of people, nor entirely a history of culture. It is a study of the cultural history of a restricted geographical area. If attention were to be focused on cultural history, it is evident that we would have to examine many parts of South and Central America to complete all details of the story. History of *people* is something we are not prepared to touch upon. To be strictly literal in the present viewpoint, it lies completely in the field of physical anthropology.

WHAT IS A POTTERY TYPE?

Different parts of the foregoing discussion have been previously considered a number of times by various writers. The point of view is summarized here because it must be kept in mind if the nature of the ceramic analysis presented is to be clearly understood. The ceramic chronology of Virú is the story of the change of pottery styles with the passage of time. Most of the change was slow and gradual. This change can be visualized as fluid in nature; sharp breaks, due to the factors cited above, were rare in the continuity. No two pottery vessels made during that long history were exactly alike, and every sherd has some feature that makes it unique. Yet all this material that represents any one time level is clearly imprinted with the prevalent cultural ideas or styles. Just as today, there seemed to the individuals involved to be proper, and apparently inevitable, ways of attaining their objectives. Ancient potters conformed to prevailing ideas exactly as we do in everyday experience. The several different styles of pottery that may have been in use at any one time are due to the difference in func-

tion of the vessels or origin of stylistic ideas.

The pottery that the classifier groups into a type is nothing more than material that exhibits a high degree of similarity in the features that reflect the influence of the ideas prevailing in the ancient cultures. Each type established will be found to grade insensibly into other materials that were made coevally or particularly those that preceded or followed. This will lead to "drifting" of the type concept in the mind of the classifier unless it is guarded against by strict definition of the type limits. It must be clearly understood that the type does not exist in the material. "Type" is an artificial concept created by the classifier, and it is here created for one purpose: to serve as a measure of time and space. However, we have here assumed the spatial factor to be negligible, owing to the restricted area to which this study has been applied. Types must be described to be defined, and that the description of all the types of a chronology adds up to a complete description of the material is merely a welcome by-product.

As a type is primarily a time-space measuring tool, it is clear that its validity depends solely on how well it serves for its end purpose. Recombining of types that have proved useless with others that are highly similar and thus are inferred to be culturally related and the splitting of one type into two are both quite valid if this procedure can be justified by the results obtained.

The separation of pottery into types is limited by the ability of the classifier to differentiate readily and consistently between the groups. It is desirable to have the groups as restricted as possible in order that they may be more sensitive measures of cultural change. This is a practical matter that must be settled by usage. If the material has a different position areally or chronologically, and classifiers well acquainted with it can consistently separate the groups, then a division is justified.

THE POPULARITY CHARACTERISTICS OF TYPES THROUGH TIME

Pottery types are to be viewed as artificial units set up by the archaeologist in what actually was a continuous stream of ideas, expressed in durable form, that were changing with the passage of time. In consequence, when the relative popularity of a type is measured through

time the resultant graph will resemble a normal distribution curve. The type will appear to have been made at first in very small quantities. As time passes it reaches its period of maximum popularity, more or less great. Then it declines in popularity and finally vanishes. (See Fig. 4 for examples.) This apparent life cycle of a type is misleading, for it is really created by the act of classification. For example, the change of features from the type Guañape Red Plain to typical examples of Huacapongo Polished Plain and on into Castillo Plain and Valle Plain are seen to be quite gradual if the material is laid out on a table in the same sequence that it came out of the ground. The fact that a few sherds of Huacapongo Polished Plain are illustrated as from the lower levels of Site V-272, Cut B (Fig. 4), means that at the time represented by these lower levels that proportion of the pottery had passed from the bounds of the ceramic features set by the classifier for Guañape Red Plain to the group of features called Huacapongo. By the time represented by the upper levels of this excavation, nearly all the pottery had crossed this line set up by the classifier, and only a small percentage is left in the type Guañape Red Plain. Many of the sherds from this site were so near the border between these two types that one classifier might put them in one type and another in the other without being in essential disagreement at all.

To illustrate the nature of this process further, it should be pointed out that in the stream of cultural ideas represented by this series of pottery types, one type concept might have been established on the basis of this border material that now appears to be between Guañape and Huacapongo, and another on the present border material between Huacapongo and Castillo Plain. If that had been done, then the material that is now considered typical Huacapongo would be on the border between the two new types. Such a procedure would be fully as valid as the course followed.

SETTING UP THE VIRÚ VALLEY CLASSIFICATION

Field-work was continued for several weeks and collections were gathered from about 50 sites before any attempt was made to set up a classification. I was considerably surprised to note how little of the beautiful pottery that

fills museum collections from the North Coast of Peru was found on the occupation sites. In the looted cemeteries, of which Virú has its full share, fragments of pottery representing the well-known styles of Gallinazo, Mochica, and Tiahuanaco of the North Coast variety were abundant. These styles were rare in the rubbish collections and, when found, were often explained by the presence of a looted cemetery near-by. Obviously the already known ceramic chronology promised to be of little assistance in the dating of dwelling site refuse.

Most of the pottery collected was undecorated and rather crude, as compared with a collection of rubbish heap material from the southwestern United States. The sophisticated ancient Peruvian potters spent little skill on their domestic ceramics, or, more likely, separate classes of potters made the two wares. For the first few weeks, the prospect of success in developing a time scale any more sensitive than that already provided by the grave pottery seemed very small. The dating of structures appeared hopeless.

However, as more material accumulated and I became better acquainted with the refuse pottery, consistent dissimilarities became apparent. Suggestions of time difference in the plain wares also began to accumulate from the deep strata excavations which Strong and Evans were making at the Castillo of Tomaval. A classification was begun by pouring out on a large table the sherds from half a dozen sites which seemed to show the full range of ceramic differences encountered in the valley up to that time. Then the pottery fragments were divided into a number of groups, each characterized by observable distinctions in paste, composition, surface finish, hardness, thickness, firing, or decoration when present. Consistent differences in any of these categories of features were accepted as a basis for a separate grouping. Thus a group of sandy, oxidized-fired, hard, unpolished ware which ranged from 6 to 12 millimeters thick was segregated from similar ware from 12 to 40 millimeters thick. This division resulted in the types named Castillo Plain and Valle Plain.

Each of these arbitrary groups was given a type name and was defined, both mentally and in notes, with very rigid boundaries which the classifier expected to observe as consistently as possible. The types thus set up were guesses. In each one the classifier was guessing that the

observable differences would be significant temporally or areally, or would be the coeval results of different function or of distinct cultural influences. These types were not final; all were held on probation until analysis should prove whether or not they would be useful in determining cultural history. Analysis by the seriation method was begun as soon as enough collections had been classified, and this tentative work resulted in the re-combination of several types which were highly similar and proved to have identical cultural histories. It also resulted in the splitting of some of the types. If a slight difference was detected in certain sherds that fell in the range set for a type and there was any reason to suspect that this difference indicated any change in time, two types were made. Later, as the classified results of the stratigraphic work of Strong and Evans and Collier became available, their evidence served as a more detailed basis for the evaluation of the type divisions. This balancing of typology against a growing knowledge of the chronology continued right up to the end of the work of classification. Each time a type was split, all the sherds of that type which had already been classified had to be re-checked and the records corrected accordingly.

Brief descriptions of the pottery types set up for Virú are given in Appendix I. Full descriptions will be published by Strong and Evans and Collier, and duplication here appears unnecessary.

THE MECHANICS OF CLASSIFICATION

Catalogue numbers were placed on each sherd by the laboratory staff. The cleaned and numbered sherds accumulated in a corner of the laboratory in the Jacobs Hotel much faster than they could be classified on the week-ends devoted to this work during the first few months of field-work. Disregarding its order, a bag of sherds was taken from the pile and poured onto a large table about 1 by 4 meters in size. Sherds were then sorted into type groups which were always arranged in the same sequence from left to right. Type names lettered on the table assisted in this. Body and rim sherds were separated. Nails were driven in the edge of the table 8 inches apart, the heads left projecting for an inch, and on these cloth bags were hung—a special bag for the rim and body sherds of each type.

While the sherds of a collection were laid out, each type group was counted, rims and bodies separately. This count was recorded on a file card which carried a mimeographed form for the purpose. The catalogue number of the collection which was recorded in the upper right-hand corner of the card was all the classifier knew of the identity of the collection under examination. As each type was counted, the sherds were swept off the table into the appropriate bag. Filled bags of body sherds were poured into large pasteboard boxes, and filled bags of rim sherds were closed and the rims of each type were stacked together.

Classification of the Virú surface collections was spread over a period of five months. For the first few months week-ends were spent on this work at the laboratory. In July the collections were moved out to a camp on the beach in Virú Valley, and six weeks of steady work completed the task. Throughout this work it was found most difficult to be strictly consistent. At the beach camp, body sherds were placed in separate type piles which soon grew to rather respectable size. From time to time these piles were re-checked to detect any variation that the classifier might have allowed to occur, and the variant sherds were placed at one side. Their catalogue numbers and corrected type designations were noted on correction slips which were interpolated into the file of classification forms, later to be transferred to these forms.

All sherds that did not strictly conform to the established types were put into an unclassified bag as each collection crossed the table. Most of the rare painted material went into this bag. When classification was completed some 15 bags of unclassified sherds had been accumulated. These were spread on the table, and in consultation with the others working in Virú, the rarer types were selected and set up. These data were added to the classification file as described above. Inevitably, a residue of three to 10 sherds or more which would not fit into any category was left in almost every collection. For the most part these unclassified sherds were rather featureless, and they will receive little attention.

While I was engaged in this work, Strong and Evans, and later Collier, were classifying the pottery from their respective stratigraphic excavations on tables which, for the first few months,

were set up in the same laboratory. Considerable attention was given to achieving consistency in the classification. From time to time the other workers reviewed my piles of classified sherds, and I reviewed theirs. Setting up new types, merging, or breaking up of old types was done in cooperation after considerable discussion. The stratigraphic excavations which the other workers were analyzing carried much of the weight of the evidence used in these processes. A total of 84,547 sherds was classified for this study. These comprised 308 collections made from 263 sites scattered over the valley. The completed record cards were arranged by catalogue number in a file which will be referred to as the Type Classification File.

RIM SHERD CLASSIFICATION

The rather featureless character of the great mass of plain sherds from Virú has already been mentioned. Therefore, it was to be expected that some of the type concepts set up by the classifiers would include material that covered rather long spans of time. This has proved to be the case, as may be seen from the graphed history of such types as Castillo Plain. However, in the course of handling the material, there seemed to be promise that variations in the rim profiles might indicate time differenti-

ation within the range of the more popular types.

The bags of rim sherds of the seven most common types were emptied on the classification table, one type at a time. Then the rims were separated into the recognizably different shape groups which were designated as "A," "B," "C," etc. Each type was grouped independently; its "A" grouping had no reference to the "A" grouping of any other. The catalogue number on each sherd in each group was recorded, and the data were rearranged so that a Rim Class File resulted. This file was arranged by catalogue number, and each card indicated the number of sherds of each class, A, B, C, which had been found within each type.

Later, in the process of analysis, after the relative dates of the types were known, the rim profiles comprising these various classes were rearranged in an order which suggests the probable sequence of their development (Fig. 6). This development may have occurred in Virú, or the suggestions found there may only reflect stronger trends occurring elsewhere. At the moment, that does not matter. The data in the Rim Class File were translated into percentages and recorded on specially prepared mimeographed transfer cards, which arranged them into the form presented here.

ANALYSIS

FITTING OF STRATA CUT DATA

AS SOON AS 75 surface collections had been classified, tentative seriations were begun. These revealed the gross outlines of the developing chronological picture and served to indicate where several types might be divided in two with profit. However, the excellent results that were appearing from the stratigraphic cuts of Strong and Evans and later from those of Collier soon made it obvious that vertical stratigraphy would be available to carry the weight of the evidence for a site-dating background.

Descriptions of the strata cuts and detailed analysis of the results will be published by the individuals who did the field-work. Strong and Evans' study will appear in the anthropological series under the imprint of the Columbia University Press. Collier's work will be published by the Chicago Natural History Museum. The reader is referred to these monographs for the basic data that will be considered in this section.

I was provided with the data from eight strata cuts by Strong and Evans and 10 cuts by Collier. I made two small cuts myself. Some of these data consisted of the sherd counts of each type from each excavation level; other data were in the form of graphs representing the percentages of each type in each level. All of this was reduced to a common form. A bar graph of type percentages was drawn for each excavation. As this is the basic graph form used in this study, it will be described in some detail.

Graph paper 50 centimeters wide, which is marked with a millimeter-centimeter grid and is available in rolls, was cut into sheets as necessary. The excavation levels, spaced according to the depths of the levels made in the cut under study, were indicated at the sides of each sheet. Sixteen centimeters represented 1 meter of depth, and as most of the strata excavations had been dug in 25-centimeter levels, 4 centimeters separated the levels in these cases. Across the top of the graph, an "axis" was marked for each type, a vertical line from which the graphic bars representing the percentage of the type in each level were to be measured. The positions of type axes were carefully arranged so that the bars representing type percentages interfered with one another as little as possible and, in all graphs made, were placed in the same relative positions. The arrangement

adopted is that shown in Figs. 4 and 5.

The percentage of each type in each level was represented by a horizontal bar which extended an equal distance on either side of the type axis. This style of representation was selected because it permits the graphs of the types with the larger percentages to be accommodated to one another in the figures, and the type percentages can be shown at twice the scale that would have to be used if the bars extended in only one direction from their base lines. This arrangement was made after the quantitative histories of the various types became apparent. Where the horizontal graph bars did interfere with one another, the longer bar has been broken, as is shown by its jagged termination, to allow the bar representing the smaller percentage to be set in. Examples of this treatment will be seen in the graphs published here.

The results of the classification of the pottery from each of the strata cuts made by Strong and Evans and Collier, and the two cuts I made, were put in graphic form, each excavation on a separate sheet of paper. These graphs, then, from bottom to top showed the quantitative characteristics of each pottery type in each level. From this could be seen the popularity trend of the type—whether it had increased or decreased with the passage of time.

The actual time span represented by these graphs is of course unknown. Each excavation was cut down through midden deposit that started at some undetermined time in the prehistory of the valley, continued to build up while the adjacent houses that were the source of the refuse were occupied, and stopped when these houses were abandoned or the inhabitants began to throw their refuse elsewhere. The probabilities were that every deposit represented a more or less continuous occupation. If a time gap did exist in any one of the deposits, it could be checked in two ways: sudden shift in pottery type proportions, and comparisons with other deposits which had been added to continuously through the period which was not represented in the first deposit. As far as can be seen, no such gap exists in any of the excavations.

The graphs each represented a segment of the history of the ceramic styles in Virú. Many of these segments overlapped in the time spans

that they represented; this is to be considered desirable as it reinforces the validity of the completed picture of ceramic history. After several strata excavations had been tentatively analyzed in the field and some work had been done on the seriation of surface collections, the members of the Virú Valley party had a fairly good knowledge of the ceramic history of the valley. This enabled Collier, whose field-work followed that of Strong and Evans, to select sites that did not duplicate the evidence collected by the earlier party, and to fill in the time gaps not covered by their excavations. The almost complete coverage of the Virú Valley ceramic chronology by stratigraphic excavations is due to this procedure.

After the separate graphs representing each excavation were completed, the next step was to fit these fragmentary bits of the ceramic history together to give a composite picture of the entire valley history. The basic assumption that guided this process was that each pottery type selected by the classifiers from the ceramics made in Virú had undergone a popularity cycle through time that resembled a normal distribution curve. The reasons why this was necessarily true have already been discussed. The quantitative history of each type differed from every other, so that when all types were considered a pattern was formed. Each strata excavation, when analyzed, revealed a portion of this pattern. Thus inspection of the graphs, giving consideration to the percentage trends indicated for each type, the actual percentage of each type present in the various levels, and the relative vertical positions of the peaks of popularity of each type provided the basis for a judgment as to the time covered by each excavation as compared with the others.

A sheet of graph paper over 2 meters long was marked down the sides with the 16-centimeter divisions which were to be used as an approximate guide for each meter of midden deposit. Type axes were indicated across the top of the sheet. The excavations covering the longest time span, such as Site V-51, Cuts 1 and 2, were plotted first. Next, the shorter time-span excavations were drawn in with their levels in proper vertical position to give the best fit to one another. A color key, a separate color for each excavation, was used in the graph made for study purposes. In the final copy (Fig. 4), a system of symbols has replaced the colors.

While depth of midden deposit was used as an average guide in assembling the summary chronological graph, this factor could not be allowed to be a determinant in the fitting of the excavation graphs. It is obvious that refuse heaps cannot be expected to accumulate at exactly the same rate. One may have grown 4 meters in depth in the space of 50 years; another may have accumulated only 1 meter of refuse. For this reason, the writer has felt at complete liberty either to expand or compress either parts or the whole of an excavation graph in order to make it fit the others.

STRATIGRAPHIC EXCAVATIONS USED IN ANALYSIS

The data from stratigraphic excavations which have been used to compile the strata graph (Fig. 4) were provided by Strong and Evans and by Collier with the sole exception of Site V-60, Cut A, which I excavated. All these excavations were made primarily to obtain stratigraphic information. The pits were relatively small, as is most desirable for this purpose, ranging in size from 4 by 4 meters to 4 by 6 meters. The total number of sherds recovered from each 25-centimeter level was sometimes as many as 1000, but probably averaged about 300. This graph represents about 70,000 sherds. It is not necessary here to give the data on which the various excavation graphs were based, as full descriptions of each excavation and the material recovered will be published by the men who did the work. The brief discussion that follows will describe how the data provided by Strong and Evans and by Collier are utilized and modified for the present study.

Site V-171, Cut A (excavated by Collier). Data from Levels 1 to 10 were provided in 25-centimeter levels; a total depth of 0 to 2.50 meters. The bottom level which had only 16 sherds was not used.

Site V-171, Cut C (Collier). Levels 1 to 12, representing 25-centimeter levels, were available. Total depth of the cut was 3 meters. From top to bottom this cut covers the entire range of the Virú Valley chronology. It gives an excellent picture, except that the distribution of the types in the ground are telescoped because the midden was so shallow. Substantial percentages of Gualiapa Red Plain were found in the levels which have preponderant percentages of the

Castillo Plain and Valle Plain types that obviously were laid down in Gallinazo times. Gallinazo period middens of more rapid growth contain no Guañape types. Inclusion of these levels in the master graph would give a misleading idea of the relation of these types in the time scale. For this reason only the top five levels have been used. These are relatively unmixed, suggesting that the midden accumulation was more rapid during the latter part of the occupation. The top five levels represent 1.25 meters of deposit, and in the graph it has been necessary to space them more widely apart than average.

Site V-108, Cut A (Collier). This cut reached a depth of 1.25 meters with five levels of 25 centimeters each. As the lowest level had a total of only 39 sherds, only the top four are used here. As will be noted, the levels are arranged in a slightly irregular spacing, owing to the practical difficulties of fitting them into the graph.

Site V-305, Cut A (Collier). Five levels in this cut give a depth of 1.25 meters. All have been used.

Site V-60, Cut A (Ford). Three 20-centimeter levels and one of 15 centimeters carried this cut to a depth of 75 centimeters. All levels were included.

Site V-301, Cut A (Collier). This cut had nine levels and reached a depth of 2.25 meters. As Level 9 had only 27 sherds, it was omitted. The analysis of the top eight levels showed that this 2 meters of refuse represented a very short period of time, as compared with the other cuts that cover this portion of the chronology. Consequently it was necessary to compress the graph of this cut to make it fit, by combining Levels 1 to 4 and 5 to 8. Thus the percentages from the site are presented as from two levels, each 1 meter thick.

Site V-167, Cut A (Collier). The material from this cut came from 14 levels, a total depth of 3.50 meters. The time span covered was so short in comparison with other sites covering the period represented that the levels were merged into three, as follows: 1-4, 5-8, 9-14.

Site V-162, Cut 1¹ (Strong and Evans). This cut had 12 levels and reached a depth of 3.10 meters. All levels were used in this analysis. In order to fit this graph to the others which served

as a guide of vertical spacing, the graph was expanded.

Site V-162, Cut 2 (Strong and Evans). This cut reached a depth of 4.50 meters with 18 levels. All of these levels were included in the analysis. In order to make the graph of the cut fit, it was stretched in the middle, as will be noted by referring to the summary graph (Fig. 4).

Site V-51, Cut 1 (Strong and Evans). Twenty-four levels in this cut reached a depth of 6.00 meters. All levels were used.

Site V-51, Cut 2 (Strong and Evans). Twenty-three levels carried this cut down to 6.15 meters. The last level was 65 centimeters thick. All levels are used here.

Site V-272, Cut B (Collier). This cut has a depth of 2.00 meters; eight 25-centimeter levels. The top two levels contain a strong mixture of the Gallinazo period types. This is excellent evidence that these types are later than the unmixed late Guañape horizon material in the lower six levels, but the mixture of Guañape and Gallinazo period types in the upper two levels is not the true picture of the relation of these types. Either very slow midden accumulation or re-occupation of the site has shortened this part of the evidence from the cut. For that reason only the lower six levels are used in this analysis.

This cut varies in other ways from the classification standards that were followed by the others presented in the graph. At the time he provided me with these data, Collier had not differentiated between the types Guañape Red Plain and Guañape Black Plain. The combined percentage is therefore graphed together and placed on the axis of Guañape Red Plain. Also, Collier has not classified the decorated types of the Guañape period. These are listed in the graph as combined percentages and are shown as figures on the left-hand side. These inconsistencies result from the fact that when Collier excavated this cut and classified the material, Strong and Evans, who had set up the types for the Guañape period on the basis of Site V-71, had already left Peru for the United States. Since he was not fully acquainted with the minutiae of their standards, Collier very wisely did not attempt a detailed identification of his material at that time.

Site V-71, Cut 1 (Strong and Evans). Sixteen levels representing 4 meters of deposit are pro-

¹ It will be noted that Strong's excavations have been given numbers rather than letters as used by Collier.

vided by this cut. All these were used in the graphic analysis.

Site V-71, Temple (Strong and Evans). This is a large, excavated collection from inside a building located on the side of the Site V-71 and apparently constructed for ceremonial purposes. All the material comes from not more than 1 meter deep.

In addition to the excavations listed above that formed the basis for this analysis, seven more strata excavations covering various parts of the chronology were available but are not included here for various reasons. Reports on these cuts will be written by the investigators who excavated them, and the reader is referred to their publications. The following paragraphs explain why analyses of these cuts were omitted.

Site V-171, Cut B (Collier). This cut compressed almost the entire Virú chronology into 3 meters. The levels show type maximums in the same relative position as the cuts used, but the picture is blurred because of the slow accumulation of refuse and the resultant overlap in range of early and late types.

Site V-302, Cut A (Collier). This gives a fairly good story of the time span from "E" to "L," but compresses this time into 2.25 meters. Not used because this resulted in mixing of older and later types in the same levels.

Site V-272, Cut A (Collier). The top four levels of this cut were lost in handling, somewhere between the field and the classification table. The lower meter that is available gives the same story as Site V-272, Cut B. The material is classified in the same way as this latter cut. For these reasons the cut has not been used.

Site V-51, Cut 3 (Strong and Evans). This excavation gives a good representation of the time covered by Cuts 1 and 2 from the same site. Cut 3 was not used owing to lack of space in the graph.

Site V-51, Test Pit 3 (Strong and Evans). This pit had only three levels and duplicates part of the chronology given by Site V-51, Cuts 1 and 2; not used owing to lack of space in the graph.

Site V-59, Cut 1 (Strong and Evans). Repeats results of Site V-51, Cuts 1 and 2. Not used owing to lack of space in the graph.

Site V-61, Cut A (Ford). Gives almost but not quite so good a picture of the same time

presented by Site V-171, Cut A. The cut was not used owing to lack of space in the graph.

TIME GAP FILLED BY SERIATION OF SURFACE COLLECTIONS

After all the useful strata cut graphs had been fitted, there still remained a gap in the chronology. This was in the Puerto Moorin period, a time during which there seems to have been no accumulations of very deep refuse deposits in the valley; at least the survey found none. At this period the people were living in scattered, single-room houses which probably were not occupied for a very long time. Eighteen surface collections from as many sites were arranged from top to bottom, according to an increasing percentage of the type Guañape Red Plain, a dying type of the earlier Guañape period. Then the later of these sites were rearranged according to their increasing percentage of Castillo Plain, the predominating type of the succeeding Gallinazo period. The results are shown in the summary graph, Fig. 4.

CRITIQUE OF THE SUMMARY GRAPH, TIME RANGE OF TYPES

The graph (Fig. 4) that resulted from the fitting of the strata excavation results and seriation is presented as the story of the popularity of the pottery types described in the Virú Valley. In viewing this graph, one should keep two things in mind. First, the ceramics represented here were classified over a period of five months by four different people: Collier, Strong, Evans, and myself. Despite efforts to be consistent, some variation doubtless occurred. Evans, who made most of the plainware classifications for his unit, may have drawn the line between the types Valle Plain and Castillo Plain so as to include more sherds in the former type than did the others. I am certain that my concept of each type at the beginning of the work was not identical with that held towards the end. This factor of human variation is inevitable and must be kept in mind.

A second source of variation may be due to differences between the communities of the prehistoric peoples of Virú. While, for general purposes, we have assumed a high degree of similarity of the culture in all parts of the valley at any one moment in the past, this cannot be carried so far as to insist that there was necessarily an exact degree of uniformity in the

popularity of pottery styles. Some of the common styles may have reached a slightly higher degree of popularity in comparison with the other styles of the moment in one part of the valley than in another. The strata excavations were made in various parts of the valley, and some of the percentage variation shown may be due to this factor. Still another uncontrollable factor is the sampling error.

The variation between type percentages, however, is not great, and the major trends shown by the excavations are in almost perfect agreement. That Valle Plain came in later than Castillo Plain and reached a lower peak of popularity is shown by all the cuts that cover the early part of the Gallinazo period. The fit of the stratigraphic cuts is much better than was hoped for when I began putting them together.

Still another factor seems to have introduced a certain amount of distortion in the summary graph. That is the tendency for older pottery types which were originally deposited in the lower strata of a midden accumulation to occur in decreasing percentages right up into the top levels. This slow fading away of popularity is, of course, the way in which a type is expected to die. However, it seems that the types did actually disappear sooner than is apparent from the evidence supplied by deep strata cuts. The reason for this appears obvious. While the midden was in the process of accumulation and people were living on and around it, the ground was constantly being dug into and overturned to a shallow depth. In the course of this constant stirring of the soil, potsherds that were originally deposited in the lower levels were brought higher and higher in the midden.

That this weighting of a type history towards its later phase does occur is demonstrated by comparing these slightly mixed sites with middens that began their life history after the type actually had disappeared. Site V-51, Cut 1, shows that the type Huacapongo Polished Plain continued in very small percentages almost to the end of the Gallinazo period. Site V-162, Cut 1, which begins its history after the first half of this period had elapsed, contained very little of this type only in the lowest levels. The absence of the type Castillo Plain in the short-lived late Site V-108, Cut A, is in contrast to the other sites which cover the same time but were settled at an earlier date, Site V-171, for

example. The comparison of surface collections from sites which were occupied for very short periods and produce samples free from this kind of mixture also shows that this tendency existed in deep midden deposits.

RELATIVE TIME REPRESENTED BY VERTICAL SPACING IN MASTER GRAPH

The amount of midden accumulation suggests that the earlier Guañape and Gallinazo periods were several times longer than the later Huancaco, Tomaval, and following periods. The brevity of the late periods is indicated by the *average* of several cuts: if such an excavation as Site V-167, Cut A, with its total depth of 3.5 meters had been taken as a guide, the Tomaval period would have been represented as about two-thirds as long as the Gallinazo period. However, deposits like Site V-171, Cut A, and Site V-60, Cut A, suggest that this is not true.

It will be noted that time periods become shorter from the bottom to the top of the graph. The suggested acceleration in cultural change from early to late periods probably did occur, for there was a factor in operation throughout the history of the valley which would tend to mask such evidence for relative speed of change as is used here. That factor is the trend towards urbanization which will be discussed by Gordon Willey in his paper. Populations were much more concentrated in the later periods, and relatively greater depths of refuse should have been accumulated in a given length of time. This is another of the uncontrollable factors that enter into our time estimates.

It has been mentioned above that probably not enough vertical space, representing time, has been allowed for the Puerto Moorin period. This is suggested by the fact that as the chart is now arranged the type Huacapongo Polished Plain appears to change much faster than either the preceding popular type Guañape Red Plain or the succeeding one, Castillo Plain. In fact, the present arrangement gives Huacapongo about the same rate of change as Tomaval Plain, the most recent popular type which existed at a time when considerable cultural acceleration probably had developed.

It is also very likely that too much vertical space has been given to the upper two-thirds of the Estero period (Time B-C on the time scale). Above the horizontal position of the tops of the two compressed strata-pit graphs, Site V-305,

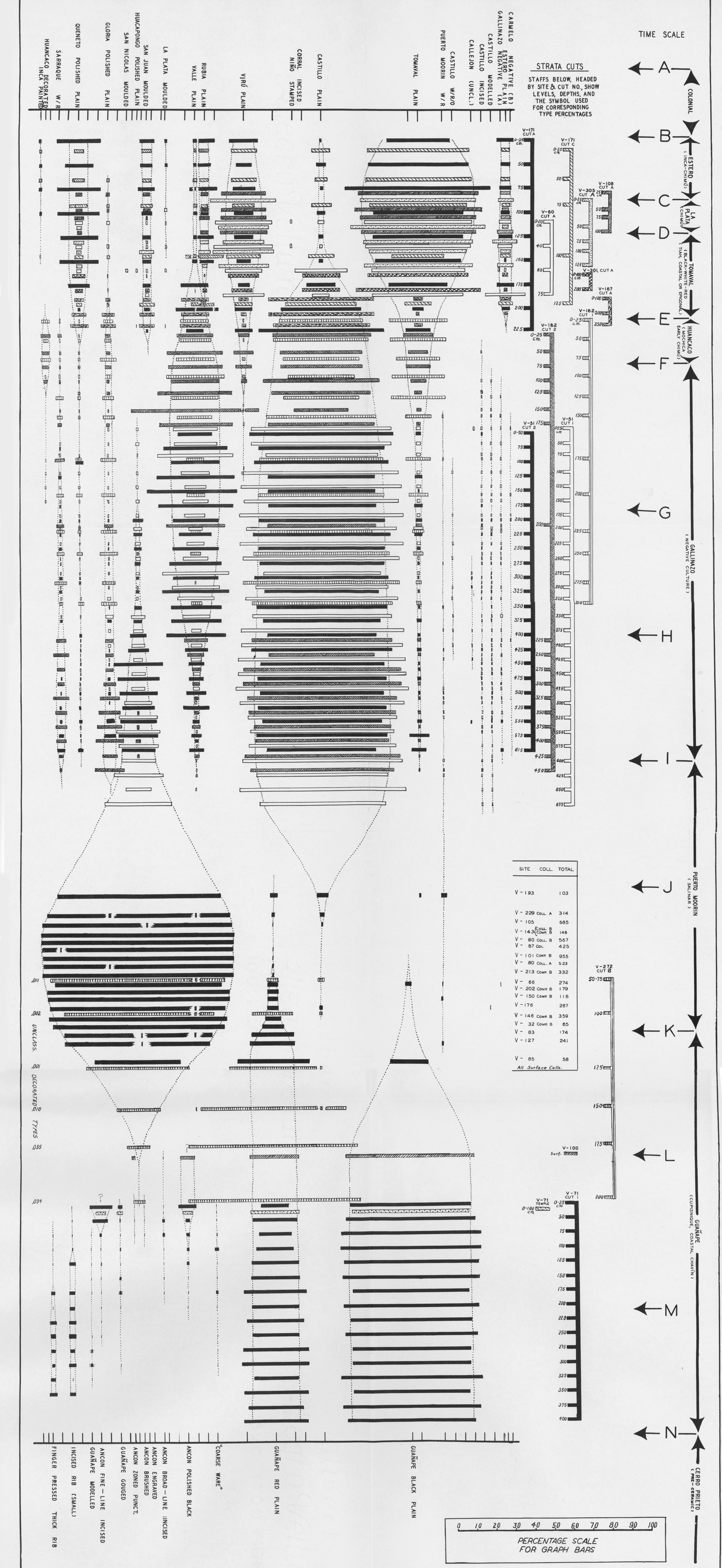


FIG. 4. Summary graph of Virú Valley ceramic chronology based on stratigraphic excavations and seriation of surface collections. Levels of the several strata excavations are indicated by staffs on the right side of the diagram. Frequencies of the types named at the top and bottom of the figure are shown by the lengths of the horizontal bars which can be measured by the scale at the bottom. The type frequencies are smoothed as is shown by the light dotted lines. Both the arbitrary time scale, which is used for dating site collections, and period names are given on the right-hand side.

Cut A, and Site V-108, Cut A, the graphic spacing of the upper levels of Site V-171, Cuts A and C, should have been placed closer together. They should have been drawn to conform to the average spacing illustrated by such excavations as Site V-51, Cut 1, and Site V-71, Cut 1.

SMOOTHING THE CHRONOLOGY

After the graph representing the valley chronology had been completed, the curves indicated for the percentage popularity of each type were drawn. This smoothing was done by eye, and an effort was made to strike an average between the variation shown by the several collections covering the same sections of the chronology. The smoothing lines are dotted and are identical in both the strata chart derived from the strata excavations (Fig. 4) and the graph illustrating the fitting of surface collections (Fig. 5).

DATING SCALE

The smoothed strata graph was inspected to determine the number of divisions that might be made in it to date the surface collections. It was not to be expected that surface collections when graphed would fit perfectly at one and only one point along the smoothed graph. Even if some did, this fitting would still be suspect. Too many variations were involved to make possible such accuracy in dating. Short spans of time to which each collection might be referred would allow for the error factors hidden in the graphs.

The appearance of Inca Painted pottery, the beginning of the decline of Tomaval Plain, and the end of the types Corral Incised and Niño Stamped provided one such point. Accordingly a line was drawn across the graph. Other points were chosen as shown and lines drawn. Space was left at the top for a Colonial period on which very little data were recovered, but this period is known to exist both from historic records and collections in the Chicla Museum. This is the arbitrary scale to which the dating of surface collections will be referred. The divisions are lettered "A" to "N" on the right-hand side of the four graphs (Figs. 4, 5, 6, 7).

CORRELATION OF THE VIRÚ CHRONOLOGY WITH THE BURIAL POTTERY CHRONOLOGY

The ceramic chronology just discussed is primarily the history of kitchen wares made for

service in the households, broken in use, and discarded. No particular attention or religious significance seems to have been attached to them and, as we have seen, these wares underwent slow and gradual changes with time, as do all cultural elements which are not controlled by conscious effort.

Part of the ceramics that were put in the tombs with the dead were a different matter.¹ From earliest times in Peru these seem to have been selected and made especially for burial with the dead. The high degree of similarity in burial ceramics found scattered all through the nine valleys dominated by the Mochica culture (Huancaco period in Virú) leaves little doubt but that a small group of priestly craftsmen made much of this burial furniture. Further, as might be expected, there seems to be a connection between the use of these cult objects and political domination. When Mochica culture, with its typical architecture and temple structures, spread into Virú from the valleys to the north, the Mochica grave cult replaced the cult of the Gallinazo period, which seems to have developed locally. In turn, the Mochica cult was entirely replaced by that known as North Coast Tiahuanaco. There is very rarely any mixing of cult goods of different periods in one grave.

The foregoing discussion does not mean, of course, that each ware of the beautiful ceramics which served as cult paraphernalia did not undergo a course of development similar to that discussed for the utilitarian pottery. They must have and evidently did. However, because grave deposits where these wares are found were consciously selected, this sequence is difficult to trace, and its quantitative aspects seem to be completely obscured. Portions of this history for the North Coast have been described by Larco for Mochica²; the history of the Gallinazo ceremonial ware in Virú will be discussed by Bennett in his forthcoming paper. Cult ceramics and their spread seem to be a most promising key to an interpretation of the religious and political history of ancient Peru, paralleling and amplifying the cultural history of the masses of the people, as outlined by the utilitarian wares.

Correlations of the Virú Valley chronology with the religious-ware periods which have al-

¹ Bennett, 1946b, 101.

² Larco, 1946, 161 ff.

ready been recognized and discussed for the area are not difficult. The small percentages of these wares found in the strata cuts and surface collections were consistent in their associations and so can be relied upon to mark the periods when they were used. The list given below includes the wares from the earliest to the latest periods:

- Guañape Period (Cupisnique, Coastal Chavín)
 - Ancon Broad-line Incised
 - Ancon Polished Black
 - Ancon Engraved
 - Guañape Modelled
 - Ancon Zoned Punctate
- Puerto Moorin Period (Salinar)
 - Puerto Moorin White-on-red
 - Huacapongo Polished Plain (This type is generally in very large vessels and few have been saved by *huaqueros*. Larco has one in his museum at Chiclin, and the excavations of Strong and Evans at Site V-100 show that these vessels were used in burials.)
- Gallinazo Period (Virú culture—Negative period)
 - Gallinazo Negative
 - Carmelo Negative
 - Callejón (unclassified)
- Huancaco Period (Mochica culture—Early Chimú culture)
 - Huancaco Decorated

The late periods, Tomaval, Chimú, and Inca-Chimú, all share the burial pottery classified here as San Juan Moulded and San Nicolás Moulded. They tend to be differentiated by the following types:

- Tomaval Period (North Coast Tiahuanaco)
 - Niño Stamped
 - Corral Incised
 - Tiahuanaco Black, White and Red
- La Plata Period (Chimú period)
 - La Plata Moulded
- Estero Period (Inca-Chimú)
 - Inca Painted

With these types as a key, the time spans of the several burial cult complexes have been drawn as given in the time scales of Figs. 4, 5, and 6.

SURFACE COLLECTION GRAPHS

The system of recording the classification data was described in the foregoing discussion of classification. Frequencies of type occurrences in each collection were calculated and recorded on the cards in the Type Classification File. Next a key was made on a strip of graph

paper which indicated the axis occupied by each type in the composite strata chart. A strip of graph paper 5 centimeters wide was cut for each collection represented by a card in the Type Classification File. These strips were laid against the key one at a time, and the type percentages shown on the collection card were drawn as bars along the upper edge of the strip. The scale was the same as that used for the strata graph, and each bar extended an equal distance on either side of its axis as the bars did in that graph. Catalogue number, collection total, unclassified total, and, later, site number were noted on the margin of each strip of graph paper.

MIXED COLLECTIONS

At this point the mixed collections representing sites that had been occupied at two widely different periods became quite obvious. The nesting of the more popular types of the different time periods has brought these types close together on the summary graph. Virú Plain, Castillo Plain, and Guañape Red Plain were all in an 8-centimeter span on the axis key so that in attempting to draw strip graphs for the mixed collections, the percentage bars overlapped badly. For the majority of collections representing only a single short time span, there was little or no overlapping. If Castillo Plain was the majority type for the collection, Guañape Red Plain did not appear.

All the cards representing mixed collections were removed from the file and the data compared with the chronology of the valley as supplied by the summary graph to see if any bore evidence of long, continuous occupations. A site that had been occupied continuously from Puerto Moorin times to the Tomaval period should contain substantial percentages of the types popular during the intervening Gallinazo and Huancaco periods. As none of the collections included these types, they were all considered as proof of simple re-occupation. A long period of time had intervened between the depositing of the two complexes of pottery types.

As a matter of fact, most of the re-occupied sites were in areas in which small houses of the Puerto Moorin period were scattered along the margins of the valley and had been re-occupied by people of the Tomaval period. The earlier houses had been razed to their foundations to supply stones for the larger houses of the suc-



FIG. 5. Graph illustrating the fitting of 68 surface collections and components of collections. The type names, their positions, smoothed frequency curves, and the time scale are identical with those shown in Fig. 4.

ceeding population. Willey will describe these instances in his analysis of occupation patterns.

Based on the evidence supplied by the master graph, it was assumed to be fair to divide the mixed collections into two components, an early and a late. Separate totals were made, and the types forming each component were calculated as percentages of their respective total. The later component was graphed along the top edge of the strip graph representing the collection, and the earlier component was placed along the lower edge.

FITTING THE COLLECTION STRIP GRAPHS

The strip graphs, each representing a surface collection, were taken singly and matched with the smoothed graph of the valley chronology until the point was found at which the percentages of all the types in the surface collection came nearest to fitting the curves of the master graph. This point was considered to be the mean cultural date of the surface collection, and the arbitrary division of the time scale in which the best fit was found was recorded on the strip graph: "C-D," "H-I," etc. Where fitting was extremely bad, a wider range of the time division was assigned, "C-E" for example.

After the strips had been fitted once, and it had been observed how well the average strip graph might be expected to fit, the process was repeated, then the degree of fitting was rated as "excellent," "average," and "poor." This also was noted on the strip graph and is given in the tabulation of dates in Appendix II.¹

Figure 5 illustrates the fitting of 68 components of the 308 surface collections that are dated in this study. The time scale used in this graph is identical with that of the strata summary (Fig. 4), and the smoothed curves of type percentages, shown by dotted lines, are copied directly from it. The surface collections shown as fitted on this graph were first chosen by taking all collections with catalogue numbers ending in numbers 5 and 0. As many of these as could be fitted without overlapping were drawn in. Then all the remaining space was filled as well as possible with additional collections selected at random. In this way any selection of

the samples used to illustrate the fitting process was avoided.

The blank space in the lower parts of this graph reflects the fact that not many surface collections dated in these early periods. All that are available, which have not already been used for seriation to fill in the gap left by the strata cuts between Times "J" to "L" in the strata graph (Fig. 4), are shown here. Two cases of sites having "A" and "B" components will be noted. To make comparison easier, the components are connected by light lines on the right side of the graph.

It should be emphasized that the classification of the sherds, calculation of the percentages, and the making and fitting of site collection graphs were purely mechanical. Subjective judgment or preconceived notions as to where certain sites should fit into the time scale could have no influence on the result because the data were identified only by catalogue numbers which were too numerous for their site association to have been memorized. Such facts as that two collections were made from the same site at different times were not indicated in the data. Until the time the collection graphs had been dated and then identified as to site, I often felt that I had deserted archaeology for accounting.

Site collection dates, the primary results towards which this study is aimed, are listed in Appendix II. The sites are arranged in numerical sequence, and the position of each is listed on the valley map (Fig. 2), as well as the field catalogue number, relative date, and degree of reliability of the collection.

SIGNIFICANCE OF SURFACE COLLECTION GRAPH FIT

The position in which a surface collection strip graph fits must be considered at best as a *mean* cultural date. The length of the occupation which has been included in the collection, the dating of the period at which the area was settled, and the period at which it was abandoned are not shown. Each of the settlements from which collections were made obviously was occupied for a shorter or longer time span. If material from a long time span is included in a collection, types that became obsolete before and that appeared after the point in time at which the collection seems to fit best will be included in the graph. The longer the time span

¹ This evaluation was entirely subjective and apparently leans towards the generous side, for a later count of the ratings shows that 179 collections were rated excellent; 114, average; and only 73, poor.

represented, the less accurately the strip graph may be expected to fit. This may be the case with such site collections as Site V-72, V-223, V-284, and V-290.

There seem to be no means at hand for making an accurate determination of the time span represented by a surface collection. Fortunately for the purposes of this study, average collections apparently do not represent any greater span of time than is normally found in a 25-centimeter level of a strata cut into a refuse deposit.

It will be noted from the graph illustrating the fitting of surface collections that about 15 per cent of the older sites, older than "F" on the dating scale, have a very small percentage of such late types as San Nicolas Moulded. These types were buried with the dead in late periods, and these graves have been opened by *huaqueros* everywhere in the valley. Usually the notes reveal that open graves on or near the sites will account for these small stray percentages.

COMMENTS ON SERIATION

As an exercise in methodology, I would like to point to the course that would have been followed in the analysis had the stratigraphic work of Strong and Evans and Collier not produced such excellent results. The smoothed outlines of the history of type percentages would have been constructed by seriation—as it was, in crude form, before the results from their work were available. The surface collections would have been graphed on strips, exactly as described above, and these strips would have been shifted around in relation to one another until patterning of type quantities appeared as clearly as possible. An examination of Fig. 5 will demonstrate that the smoothing curves for all periods, except the Guañape for which insufficient information is provided, would have been drawn only slightly differently from those given by the strata excavations. The resemblance is even closer if all the 366 collection component graphs are used instead of the sample of only 68 illustrated here.

A seriation picture of this kind has the disadvantage of being slightly less clear-cut than stratigraphic evidence from such rapid accumulation of refuse as most of that used here. The sites occupied for the longer time spans make types seem to appear earlier and last

longer. Then, too, there is the ever present possibility of accidental mixture. This latter is usually not too serious, as these cases can be factored out by following the evidence of the majority of the collections. Comparable disadvantages of stratigraphic excavations have been cited in the preceding explanations for the omission of some of Collier's excavations in the graph (p. 47).

ANALYSIS OF RIM AND VESSEL SHAPES OF THE MOST POPULAR TYPES

Definitive information on rim and vessel shapes may be expected to come from the studies of these aspects of the ceramics by Strong and Evans and by Collier when they conclude the analyses of their stratigraphic excavations. In the absence of the data from their work, I have undertaken an analysis of the shapes of some of the more common types.

The popular types Guañape Red Plain (Guañape Black Plain was included), Huacapongo Polished Plain, Valle Plain, Castillo Plain, and Tomaval Plain were selected for presentation. In the foregoing section on Classification, I have already described how rim variations were segregated into "A," "B," and "C" groupings within types. The data for each surface collection were transferred to cards which were mimeographed so as to arrange them in the order used here. Then the total number of rims present in each collection was computed, and the percentages of each rim variation of that total were listed.

Data for 92 of the surface collections are presented in the graph (Fig. 6). The vertical time scale on the right of this illustration is identical with that of the other two graphs (Figs. 4 and 5). The numbers 1 to 36 arranged across the top represent the varieties of rim and related body shapes. Above these numbers are the names of the pottery types in which each shape occurs, and vertically below each number extends a thin line, the axis on which the bars representing the percentage of that shape are centered. The sites listed on the left-hand side of the graph are placed in the vertical position that was indicated for the site when it was dated by the process described above. Thus, if a site was dated "E-F" when its type percentages were compared with the strata summary graph, it is placed between "E" and "F" in this graph. Capital letters "A" and "B" following the site

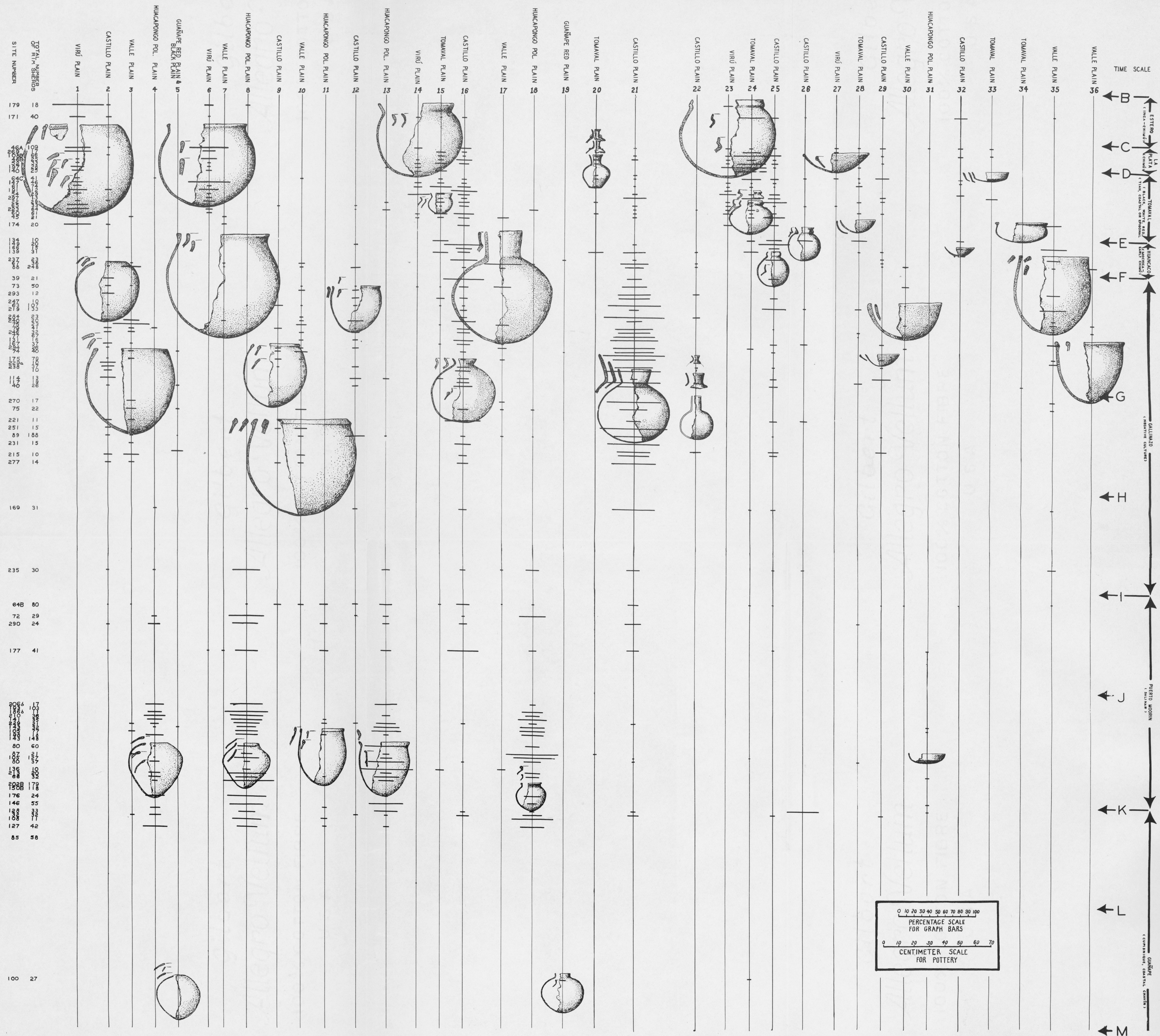


FIG. 6. Time distribution of rim and body shapes of the five most popular pottery types in Virú. The time scale given on the right is the same as in Figs. 4 and 5. The sites listed in the left-hand column are placed temporally according to the dating obtained from matching the entire collection with the smoothed type frequency curves as is illustrated in Fig. 5. The lengths of the horizontal bars centered on the vertical lines or "axes" indicate the frequencies of the several rim and vessel shapes in the different collections. These frequencies can be measured by the scale provided. The drawings of vessel and rim forms are also to scale.

number refer to collections A and B made from different parts of the same site. Small letters "a" and "b" indicate components selected from the same collection.

The size of the rim sherd total was the basis for choosing the collections to present here. Collections with the larger totals were graphed first, and remaining spaces filled in in descending quantitative order. No collections with totals of fewer than 10 rim sherds were included, and this limited the number of collections graphed to 92.

The shape percentages were plotted on the shape axes according to the scale indicated in the graph. It will be noted that there is a definite vertical clustering for each rim shape. Drawings of the rim shapes and the indicated vessel shape are centered on the corresponding axis as near the point of maximum occurrence as could be arranged. These drawings are to the scale given in the graph.

The clear-cut time picture of the rim variations given here is partially effected by the fact that the rim breakdowns were made inside the pottery types. Folded rims on Huacapongo Polished Plain (Rim shape 11) cannot occur outside the chronological range of the type. However, this shape does carry over into a later time on the ware classified as Valle Plain (Rim shape 10). On the other hand, some change appears in rim and vessel shapes within types. Most noticeable is the case of Castillo Plain, which has such a long time range in the Virú chronology. Wide-mouthed pots with high, flaring necks (Shape 21) tend towards the early phase of this type, while pots with vertical, cambered necks (Shape 25) are later.

In this chart some continuity of both rim and vessel shape is suggested. As a matter of fact, the graph has been arranged to stress this. Shapes 5, 4, 3, 2, and 1 suggest that an egg-shaped vessel with direct rim prevailed through the history. In the later periods, the vessels increase in size, and the earlier pointed bottoms tend to become more rounded. Similar vessels with upcurved rim, which appear in the Puerto Moorin period (Shape 8), may be ancestral to the wide-mouthed and larger vessels of the later periods (Shapes 7 and 6).

Pot forms with angular rim thickening appear first in the Puerto Moorin period (Shape 11). This feature lasts only until the end of the Gallinazo as Shapes 10 and 9. Pots with mod-

erately constricted mouths and vertical or slightly outflaring necks are rare in the Gualañape period (Shape 19), more common in Puerto Moorin, where the lip is beaded (Shape 18), and most common of all in Gallinazo (Shape 21). These Gallinazo shapes have much longer necks which usually outflare slightly. Related forms are Shapes 17, 22, and possibly 20. Cambered necks appear first in the Huanaco period and are present to the end of the chronology (Shapes 25, 24, 23). Bowl forms occur as shown. They are most common in the later periods but do occur earlier. Lack of more adequate data for the Gualañape period probably explains the absence of this form for that time span. Larco has found bowls in the Cupisnique of Chicama, and they are common on this same time horizon at the Ancon and Supe sites on the Central Coast to the south. Bowls with low ring bases (Shape 32) are late, as shown. Similar bowls with tripod legs, shown separately in Fig. 7, have the same time range.

It must be repeated that this chart does not fully cover the shape variation found in midden material. Only the shapes found in the six types listed are presented. Other shapes and such features as handles are given in the descriptions of the various pottery types and are treated in Fig. 7. This discussion does not begin to cover the field of the shapes of the pottery made especially for burial with the dead. To obtain an idea of this latter group of material, the reader is referred to Larco's articles on the subject in the "Handbook of South American Indians."¹

THE CHRONOLOGICAL POSITION OF OTHER VESSEL FEATURES AND SHAPES

After the foregoing analyses had been completed some additional information on vessel features was left in the classification data which was handled in a slightly different fashion. These were the five groups into which vessel handles had been divided; the legs broken off tripod bowls; handles from "corn-popper" vessels; fragments of bowls with ring bases; fragments of clay trumpets; pieces of "graters"; pieces of stirrup-spouts in Gloria Polished Plain (oxidized-fired) type of ware; flattened arcs of Queneto Polished Plain (reduced-fired) pottery; stirrup-spout fragments of Queneto type ware; and pottery fragments with small

¹ Larco, 1946, 149-175.

appliquéd ridges simulating snakes. The occurrence of these features is listed chronologically by actual number of specimens, and the frequency is graphed in Fig. 7.

The method followed in developing the frequencies given in this chart was slightly different from that applied in the foregoing graphs and demands some explanation. As these features are not pottery types, nor in every case are they vessel forms, it was decided not to present them in terms of proportions of the collections in which they were found. Instead the collection data cards were classified according to the time period of each collection as has been described. Then the total occurrence of each feature was listed by time period. These totals are given in the chart (Fig. 7). Next the total number of sherds representing each time period was computed. As an example, the collections that date "E-F" contained 17,543 sherds, as against only 1582 in collections of the "B-C" period. If a feature were equally popular in both periods, then we would have several times as many sherds from the former period as from the latter. The total number of sherds representing each period compared with the total number of sherds collected provided a weighting factor which can be used to indicate the expectancy for occurrence owing to the differing quantities of material gathered. These factors are given on the right-hand side of Fig. 7, and the horizontal graph bars merely represent the total occurrence of a feature in each time period multiplied by the appropriate correction factor.

One of the principal difficulties of this system is that for the time periods from which we have a relatively small number of examples the application of the weighting factor is liable to enhance the importance of the stray sherds, probably present in most surface collections. For example, in spite of the length of the graph bars for three handle variations in Period H-I, it will be noted that only one sherd of each was found. It seems quite probable that these are strays and that handles do not appear in the chronology before Period "G."

Even that qualification may be further questioned. As stated in the foregoing, the dates we have attempted to establish for the surface collections are *mean dates*. It is not beyond the bounds of possibility that, although we have correctly assigned dates between "F" and "G" to some of the collections, the handles and other

features included in these collections may have been deposited towards the end of the occupation of the site and actually have been in the "E-F" time period. With these reservations we shall proceed to describe the categories of the features that are analyzed in Fig. 7.

SMALL, VERTICAL LOOP HANDLES

Small loop handles (Pl. 7i-j) in both the reduced-fired Tomaval type of plainware and the later, thinner variety of Castillo Plain are found mainly on small, round-bottomed pots. Usually two loop handles on opposite sides of the vessels are attached to the shoulder and near the rim. More rarely, they are placed on the upper vessel shoulder. This type ranges in time from Period "F-G," probably quite late in that period, until "C-D." The greatest frequencies are from "C" to "F."

SMALL, HORIZONTALLY PIERCED NODES

This class (Pl. 7k-l) consists of small, rounded nodes, usually oval in cross-section and pierced horizontally so that they serve as handles. Most of these are plain, but some have a series of shallow notches as ornamentation. Usually two are found on a vessel. The vessels having these nodes are both reduced and oxidized fired and are of a variety of forms. Some are simple pot shapes, and two of the handles were placed on the upper shoulder. Others, particularly in the blackwares, are moulded melon-shapes on which two of these handles are arranged on the upper shoulder on either side of the vessel neck. These latter vessels are frequently decorated with pressed designs. The small node handles range in time from Periods "G" to "C" with the maximum occurrence between "D" and "F."

LARGE STRAP HANDLES ATTACHED VERTICALLY

Fragments of large strap handles (Pl. 7m) indicate quite a range in vessel thickness and size. A few of these large straps were attached to polished blackware bottles, forming a bridge between the bottle shoulder and a point near the lip of the neck. These are obviously late. Others apparently were broken from large jars and were attached somewhere near the rim. All of these are made of a Tomaval type of paste, and probably none should be dated earlier than "E-F," in spite of the five examples from the preceding period. The maximum number of these handles was dated in Period "D-E."

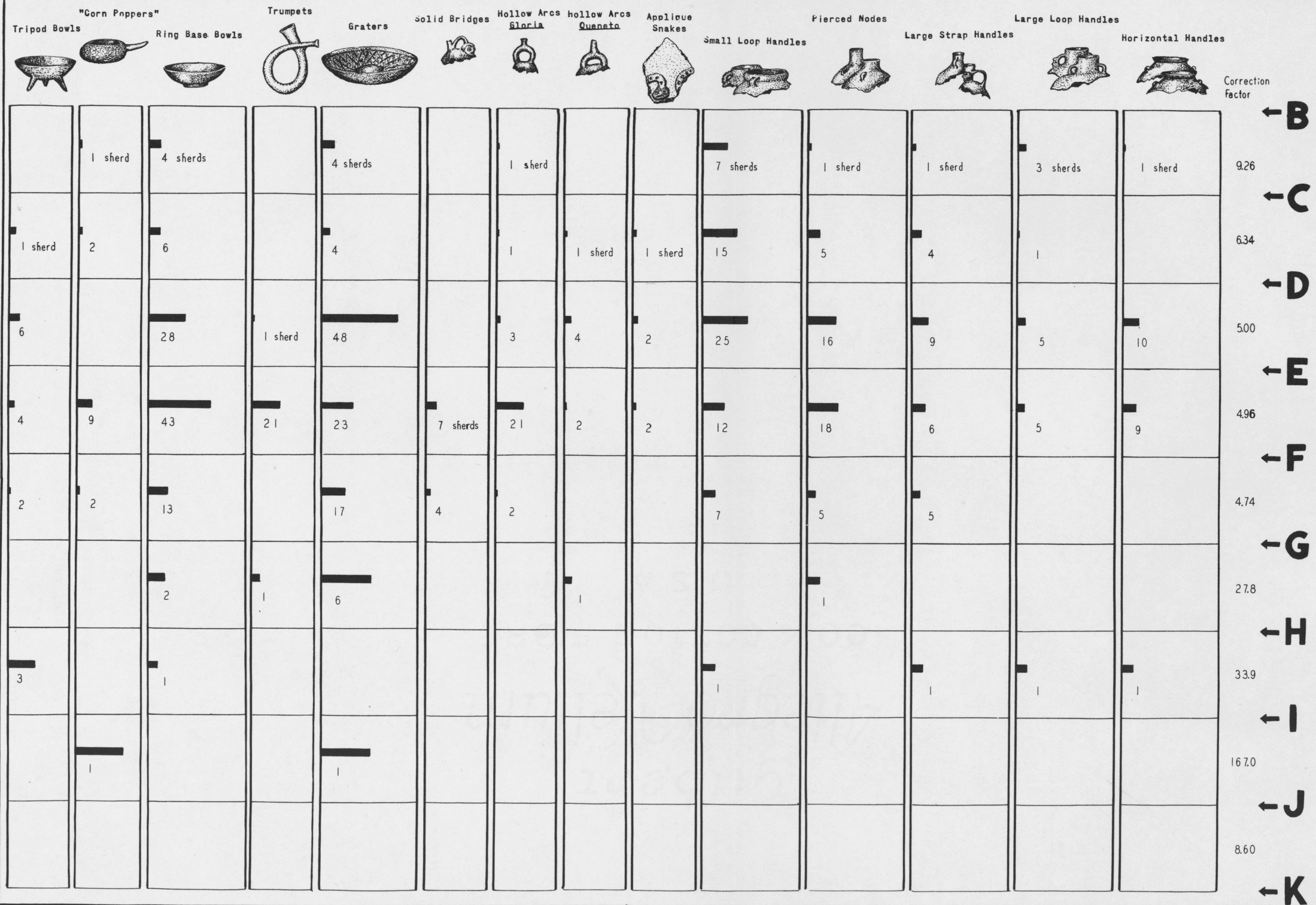


FIG. 7. Graph showing the occurrence of some miscellaneous ceramic shapes and features. The horizontal bars indicating frequency have been weighted according to the total number of sherds gathered from each period and the resultant expectancy for finding these unusual features.

LARGE LOOP HANDLES ATTACHED VERTICALLY

Large, vertically attached loop handles (Pl. 7n) are mainly of reduced-fired pottery, of the types Tomaval Plain and Queneto Polished Plain. They are usually attached at the base of the necks of wide-mouthed bottles, bridging the upper shoulder and the lower part of the neck. Some of these are plain, but most of them are modeled to simulate bird heads or are ornamented with small, applied clay pellets. These decorated handles are probably late in the range of the class. Large vertical loop handles range in time from "F" to "B." The majority of examples were dated between "D" and "F."

STRAP HANDLES ATTACHED HORIZONTALLY

Horizontally placed strap handles (Pl. 7o-p) are found both on the reduced-fired Tomaval Plain type of ware and on the thinner and later version of the oxidized-fired Castillo Plain. Normally they are found on fairly large, wide-mouthed pots which may or may not have necks. These handles are placed on the upper shoulder, and two seem to have been used on opposite sides. Our present evidence places the horizontal handle in Virú, principally between periods "D" and "F."

DISCUSSION OF HANDLES

The above description of the handle classes in Fig. 7 presents the data contained in the surface collections from Virú. This evidence suggests that all of the handle forms (as differentiated from stirrup-spouts and bridges) did not come into common use on the household ceramics before Period "G," towards the end of the Gallinazo period. However, this suggestion must be qualified by calling attention to the fact that while this may be quite true for the common household ceramics, handles were known and used at an earlier date on burial wares. If Larco's dating of his Salinar burial pottery is correct, large flat strap handles on bottle forms, attached to the shoulder and neck, were used at an earlier time.¹ This material is believed to date in our Puerto Moorin period, from Times "I" to "K." However, this latter time interval does seem to be the earliest during which true handles were used in the Chicama-Virú sector of the North Coast.

¹ Larco, 1944.

TRIPOD BOWLS

The occurrence of fragments of tripod bowls and legs (Pl. 7a-b) broken from these vessels is given in the sixth column of Fig. 7. The paste ranges from the sandy oxidized ware of the late form of Castillo Plain to the reduced-fired Tomaval Plain. Some of the later vessels are polished on the interior and were grouped in Queneto Polished Plain. Many, if not all, of the bodies of these bowls were made in moulds and the legs were added afterward. They vary little in form; all are shallow "simple" bowls, and the bottoms and walls have very nearly the same gentle curve. In some, the walls tend to straighten slightly. A thin white slip, like that described for the type Sarraque white-on-red, covers the interiors of some of the oxidized-fired vessels, but incised decorations were not noted. The legs on these bowls were attached by welding, and they range from 4 to 8 centimeters in length. Most of them are solid, but a few of the larger ones are hollow towards the attached end and nearly all taper to a point at the lower end. About half have an incision near the base as though a small stick had been inserted into the leg to assist in welding it firmly to the body of the bowl or perhaps to speed the drying and firing processes.

In the surface collections the tripod bowls range in time from "I" to "C" with a maximum occurrence in Period "D-E." Kroeber has briefly discussed the Mesoamerican resemblances of this form.²

"CORN-POPPERS" OR "DIPPER- SHAPED" VESSELS

The "corn-popper" is a characteristically shaped vessel which is fairly common in refuse deposits. These vessels are all of sand-tempered Castillo and Gloria Polished Plain types of ware. Their bodies are shaped like small seed bowls with rounded bottoms and side walls and a relatively large mouth, and generally they are not over 18 centimeters in diameter. A single rod-like handle, usually slightly curved, is attached on one side of the shoulder and projects horizontally for from 5 to 10 centimeters.³

The surface collections data suggest that the "corn-popper" form had a time range from "J" to "B." However, the majority may be dated between "E" and "G." It is possible that the

² Kroeber, 1925a, 212-213.

³ Bennett, 1939, Fig. 16j.

occurrence preceding and following these dates is accidental.

BOWLS WITH RING BASES

Small simple bowls with ring bases (Pls. 2h, 7d) are fairly common in the surface collections for the latter part of the Virú chronology. They have already been treated in Fig. 6 where collections were selected on the basis of the number of rims present, but this re-study deals with all the fragments of this shape found and gives more complete information. The majority are sand tempered and oxidized fired and have been included in one of the two plainware types, Castillo Plain or Gloria Polished Plain. Virtually all were made in moulds which were used to give form to the exterior of the vessels. About one-third of the oxidized-fired ring base bowls have the pinkish paste color that characterizes the ceramics of the Huancaco (Mochica), period and some of them have interior painted decorations in red-on-white. Small star-like designs in relief imparted to the surface by the moulds are found on the exterior of the bases of some vessels. Some bowls also have faint cast decoration, usually in the form of curvilinear scroll designs, on the exterior of the side walls. These bowls are always of the "simple bowl" profile, fairly shallow, with the curvature of their side walls and bases about the same. The rim diameters average about 16 centimeters, and very few could have exceeded 25 centimeters. In over-all height they vary between 6 to 10 centimeters. The ring base was formed by the mould in the process of casting and is quite low, usually about 1 centimeter in height.

Collections from the later sites include this same form of bowl made of the dark-colored Tomaval Plain variety of paste. In addition to small designs cast onto the exterior base, some of these have exterior cast designs on the side walls, usually the small raised bumps so characteristic of the late North Coast moulded wares.

Ring-base bowls range in age from Periods "I" to "B." The majority of occurrences were in the collections which dated between Periods "D" and "G." This range, shown in Fig. 7, is doubtless more nearly correct than the selected data given in Fig. 6 (Rim 32).

Ring bases appear in the Virú series on bottle and effigy forms, as well as on bowls, but these forms are rarely found in surface collections.

Bennett¹ as well as Larco² has illustrated negative-painted vessels of the Gallinazo period with ring bases. These bases continued to be used for bottle and effigy forms well into the La Plata period. There seems to have been a tendency for the bases to increase in height so that on some blackware vessels they should probably be described as pedestal bases. These latter were made separately and attached rather than moulded in one piece with the body of the bowl.

POTTERY TRUMPETS

Recurved pottery trumpets (Pl. 7e-f) are usually represented in the surface collections by fragments of the mouthpieces or sections of the tubes from near the point where they crossed and were welded together. Most of these fragments came from the surface of looted cemeteries, and there is little doubt but that they were grave goods. The instruments were made of sand-tempered paste, oxidized fired, and have the pinkish color that typifies the Huancaco period in Virú. Many were coated with a thin white slip or had painted white line decorations. These trumpets are tapering clay tubes with a flaring mouthpiece similar to a modern bugle. The tubes are about 60 centimeters long, form a single loop, and are fastened together near the mouthpiece and near the end of the tube. Twenty-one of the trumpet fragments are in collections which date "E-F," the Huancaco period. It seems likely that this instrument is confined to this period and that the two examples dated in other periods are strays that were accidentally mixed in unrelated surface collections.

GRATERS

The fragments classed as graters (Pls. 3c, 1; 7g) are tabulated in the fifth column of Fig. 7, which shows that they occurred with fair frequency from Periods "H" to "B," with the maximum between "G" and "D." During the early part of this time range, before "E," the end of the Huancaco period, the paste of these graters agrees in every way with the description of Valle Plain—oxidized-fired, sand-tempered thick ware. After Time "E" the paste is the same as the accompanying thick type Virú Plain, a reduced-fired thick ware tempered with large particles of gravel.

¹ Bennett, 1939, Figs. 13c, d, j; 14d, e; 16i.

² Larco, 1945b, 4-5.

Throughout the time range the vessels are similar in shape. They are large, shallow, round-bottomed bowls which vary from 30 to 50 centimeters in diameter and from 12 to 24 centimeters in depth. The decoration or, perhaps more correctly, the functional incisions on the interior of these bowls extend from near the rim to a line encircling an unscored area in the bottom. A cross-hatched incised pattern is most common all through the range, and for the later Virú Plain paste vessels it is almost the only pattern. Occasionally the earlier reddish bowls have punctations, or rather slashes, and sometimes the roughening is divided into panels alternating with smooth areas. On all these graters the interior designs were incised when the paste was wet so that they have jagged edges. There can be no doubt but that these were functional graters used in the preparation of food.

SOLID BRIDGES OF GLORIA POLISHED PLAIN TYPE

These are fragments of solid bridges, circular in section, which either may have been broken off the double spout and spout and effigy bottles, or may be bottle handles. Both of these forms in Gloria Polished Plain paste occur in the Gallinazo period burial ware.¹

This material and the hollow arcs from stirrup-spout vessels discussed below are elements of the ceremonial burial ware complex. They have been included in the surface collections only where material has been gathered from areas in which there were looted graves. For this reason the surface collection method is scarcely appropriate for revealing the time span and popularity of these features. They can be better observed in grave collections, such as those made by Bennett, Larco, and Uhle.

HOLLOW ARCS OF GLORIA POLISHED PLAIN

These are fragments of stirrup-spouts from oxidized-fired and polished vessels. The time

range for this feature, shown in Fig. 7, is obviously incomplete, a fact which is undoubtedly due to the paucity of surface collections from early cemetery sites. In addition to the occurrences shown, it is well known from the cemetery collections of Larco and others that stirrup-spouts of this general class, but of course on vessels which differ in other very significant details, are found in graves dating from late Gualañape through Puerto Moorin.

HOLLOW ARCS OF QUENETO POLISHED PLAIN

This group includes fragments of stirrup-spouts from the black, reduced-fired polished ware of the later burial ware. In cross-section these spouts vary from round to square with rounded corners, the latter quite a late form. These arcs occur on a wide variety of vessel forms as is shown by the illustrations given by Kroeber.² As the surface collections did sample quite a number of worked cemeteries of the later period, it is probable that the occurrence of this feature (Fig. 7) reflects its popularity on grave pottery to a very limited degree. Again, the most productive study of these hollow arcs can be made on the ceramics obtained from tombs.

SHERDS WITH APPLIQUÉD SNAKE FIGURES

The surface collections contained five sherds that showed portions of snakes (Pl. 7h). Small ribbons of clay had been attached to the surface of the vessels, usually coiled with the snake heads well modeled at one end of the ribbon. Punctations spaced along the clay ribbon apparently were intended to simulate the markings of the snakes. Vessel shapes could not be determined beyond the fact that they were medium-sized ollas of fairly crude construction and unpolished finish. The ware was sand tempered and oxidized fired. So far as can be judged from the specimens found, the principal occurrence of appliquéd snakes was between Times "D" and "F."

¹ Bennett, 1939, Fig. 13b, e, g, h, j; Larco, 1945b, 4-5, 7, 10.

² Kroeber, 1925b, Pl. d, e, g; 1926, Pls. 7, 8, Figs. 1-2.

COMPARISON OF THE VIRÚ CHRONOLOGY WITH NEIGHBORING AREAS

MOST OF THE PREVIOUS WORK along the Peruvian coast has contributed to the establishment of a ceremonial-ware chronology. The peculiar advantages to be derived from this chronology have already been mentioned and will be discussed in more detail later. However, owing to the difference in the nature of the accumulated data, it is not possible to utilize all these studies to make quantitative and detailed type and time position comparisons with the Virú chronology.

Two published studies do lend themselves for direct comparison—the reports on the excavations at Pachacamac by Strong and Corbett,¹ and at Cerro de Trinidad in the Chancay Valley by Willey.² A third study by these authors at Ancon and Supe will also be comparable, but their basic data have not yet been published. It is now being prepared for publication by Corbett.

It has been necessary to modify somewhat the arrangement of Strong's and Willey's data in order to make possible direct comparison with the Virú study. From the report of the Pachacamac excavation, I have extracted the type percentages from 6-meter-square stratigraphic columns illustrated in the diagram of Cut 2,³ as headed by Levels 1, 3, 6, 10, 15, and 21. The data for each 25-centimeter-deep block in these columns are given by Strong in his Table 2. The minute classification of type variations presented in this tabulation was summarized so as to render them comparable to the Virú type, as follows:

Inca Polychrome, total occurrence used
Polished Black, total of plain, incised, and modeled variations used
Modelled Brown, total of variations; relief and pressed relief used
White-on-red, polished and unpolished variations were totaled
Black and white-on-red, occurrence used as given
Pachacamac Interlocking, total of all variations
Pachacamac Negative, total of variations
Total Plain Percentage, used as basis for plainware

Each of the six columns was then graphed

separately. It was expected that, because of the marked slope of the deposit at the point where this cut was made, it would be necessary to shift the vertical relations of the columns to make them comparable before they could be consolidated. Strong's stratigraphic analysis diagram (Strong, Fig. 20) clearly shows the effects of the slope on the cultural deposits. Slight shifting was necessary. The columns were lined up so that the levels having the following numbers (Strong, Fig. 5, p. 43) were horizontal: 35, 36, 30, 11, 7, and 8. Then the type totals of all levels that corresponded horizontally in the six strata columns were added, percentages worked out and graphed according to the system used in this report. The resultant graph was smoothed by inspection and arranged to make the most favorable adjustment with the Virú chronology graph, and is shown in Fig. 8.

Willey's stratigraphic pits excavated at Cerro de Trinidad in the Chancay Valley were on level ground and so present no problems of correlation. All the excavations for which data are given in his Tables 7 to 10 were graphed, and it is clearly apparent that, as Willey says, Pits IV and VII give the best results and agree closely.⁴ Pit IV has been selected for this comparison. In order to compare them with the system used in Virú, some of Willey's groupings have been consolidated as follows:

White-zoned (fine) and White-zoned (coarse),
grouped into White-zoned
White-slipped (fine) and White-slipped (coarse),
grouped into White-slipped

Also, in the interest of simplifying the graph, a number of types that are not comparable to the Virú material have been omitted. Nevertheless, the types that are illustrated are figured as percentages of the total number of sherds in each level. The graph of Pit IV was smoothed by inspection, reduced to the common scale used in Fig. 8, and is shown in that illustration.

In Fig. 8 the smoothed graphs of Virú Valley, Cerro de Trinidad in Chancay, and Pachacamac are placed in their approximate geographical relation, as can be seen by referring to the physiographic diagram drawn beneath them.

¹ Strong and Corbett, 1943.

² Willey, 1943.

³ Strong and Corbett, 1943, 43.

⁴ Willey, 1943, 167.

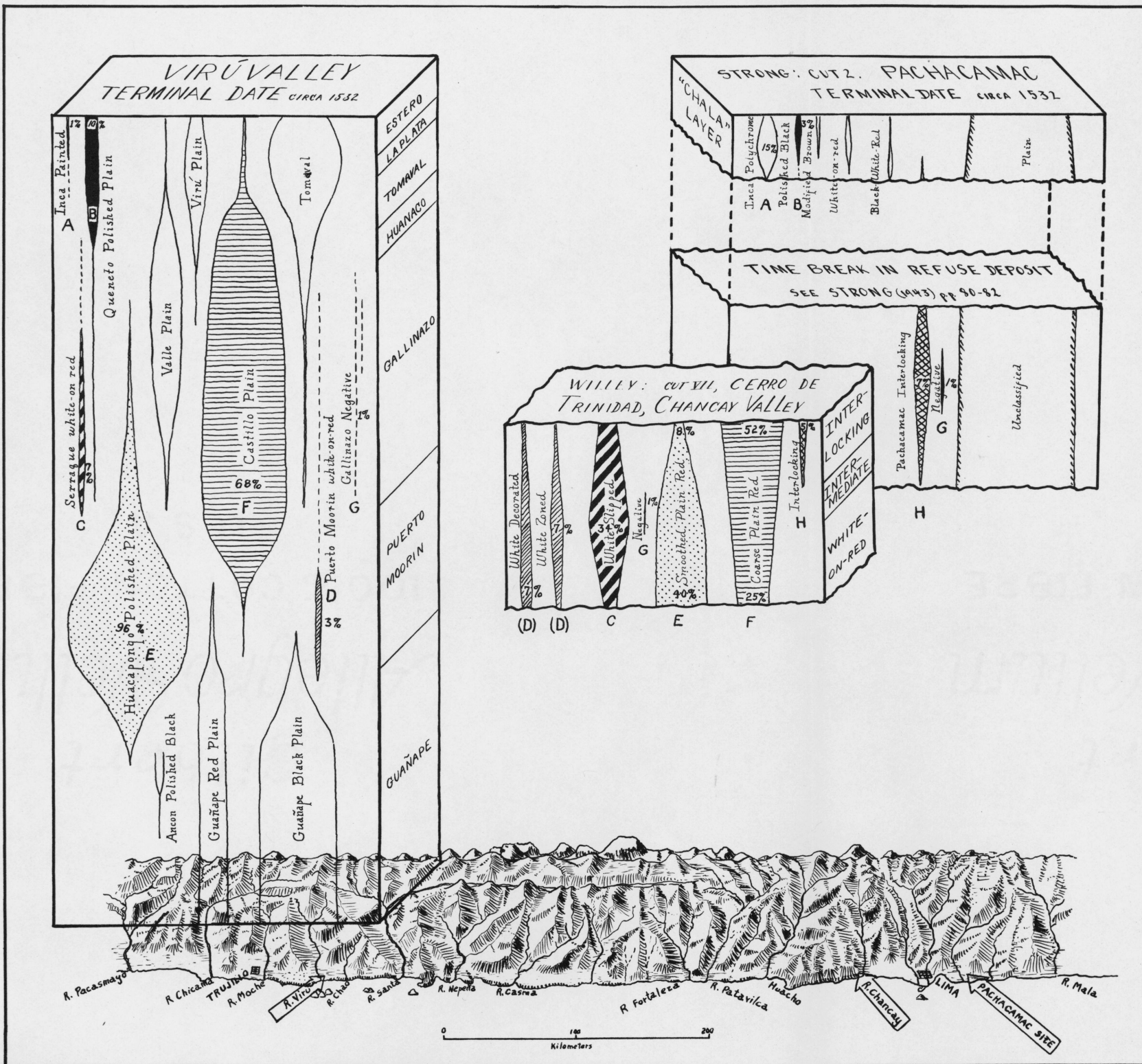


FIG. 8. Diagrammatic comparison of a part of the smoothed ceramic chronology of Virú with the results obtained by Willey and Strong at Cerro de Trinidad in Chancay Valley and Pachacamac, respectively. The geographic position of these areas is shown by the oblique diagram of a portion of the Peruvian coast given below. Comparable type frequency curves in the three columns have similar shading and are further identified by capital letters. The percentage figures are maximum average frequencies.

These graphs have been arranged in vertical position in relation to one another so as to present the best agreement between comparable types. Comparable pottery types are indicated by capital letters "A-A," "B-B," etc., as well as by shading where the percentages were substantial. Peak percentages are indicated by figures.

Comparable types of the three chronologies and details of their resemblance and variation from the types already described in the Virú sequence are given below. Each type is followed by a discussion of the probable significance to be derived from the comparison.

A-A: Inca Painted (Virú) and Inca Polychrome (Pachacamac). The material is virtually identical in all respects. The Inca Painted (Virú) grouping does not show so much variation as at Pachacamac, but the "fern pattern" and "serrate pattern" are predominant in both areas. From the history of the Inca¹ and Rowe's work on their archaeology,² there is no doubt that this type spread from the Cuzco area in the southern Peruvian highlands to the coast and up the coast northward as a result of the Inca conquests. This northward movement of the influence is reflected by the relative percentages of occurrence of the sherds—a maximum of 15 per cent at Pachacamac and a maximum of only 1 per cent in Virú, 460 kilometers to the north. From the historical evidence there is no reason to assume that either area received the type before the other. Both were in the area conquered by Topa Inca about the date 1460.³ Consequently the types in both areas are shown as beginning at about the same time in the chart.

B-B: Queneto Polished Plain (Virú) and Polished Black Style (Pachacamac). These have similar ware characteristics in firing and finish. Strong describes the latter group as including both Inca and North Coast Late Chimú influences, as shown mainly by shapes similar to those from the two areas.⁴ Incaic shapes apparently dominate, but relative percentages cannot be estimated. The Virú type has principally Chimú shapes.

Queneto Polished Plain reaches a maximum occurrence of 10 per cent in Virú, while the Polished Black Style of Pachacamac, compris-

ing the two influences described above, does not rise above 3 per cent. It will also be noted that as the graphs are shown balanced vertically by the life spans of the Inca Painted type, Queneto begins in Virú some time before the polished black ware appears at Pachacamac to the south. Both quantity and relative temporal position indicate that this trait is moving down the coast from the north.

C-C: Sarraque White-on-red (Virú) and White Slipped (Chancay). These types are identical in paste, composition, and slip. Both are tempered with considerable sand and are fired to a brick red. The slip is a carelessly applied, thin, white wash. As the Sarraque type is set up, it also includes some zoned slipped pieces, wide bands around the vessel mouth or wide vertical bands, which Willey has placed in the Chancay group White-zoned coarse and fine. Sarraque and White Slipped shapes differ considerably. The wide-mouthed jar common in Virú does occur in the latter type, but bowls and eccentric "mammiiform" jars are more common. The White Slipped type reaches a maximum of 34 per cent at Chancay, as compared with a maximum of 7 per cent for Sarraque white-on-red in Virú.

D-D: Puerto Moorin White-on-red (Virú) and White Decorated (Chancay). These two types are quite similar in paste features. The ware is tempered with a small amount of sand and was fired in an oxidizing atmosphere to a brick red. Side walls of vessels are thin (average 4 millimeters); they are finished inside by scraping and outside by scraping and polishing. The marks of the polishing tool do not cover the surface evenly and can be clearly seen. Decoration of the two types is also very similar and consists of flat white paint carelessly applied with a brush about 1 centimeter wide. White Decorated has a wider variety of designs than occurs in Puerto Moorin, but the designs of both are simple geometrical combinations of lines, dots, and short dashes. Triangles outlined with paint and filled with dots are common to both. These two types differ almost entirely in vessel form.

The type Puerto Moorin White-on-red reaches a maximum of only about 3 per cent in Virú, while White Decorated rises to 7 per cent. The cross ties between the pairs of types White Decorated-Puerto Moorin White-on-red and White Slipped-Sarraque White-on-red are fur-

¹ Rowe, 1946.

² Rowe, 1944.

³ Rowe, 1946, 205-207.

⁴ Strong and Corbett, 1943, 56.

ther supported by the relative temporal positions of the types in the two regions. Simple line and dot designs in white paint on an unslipped background (White Decorated and Puerto Moorin) are slightly earlier in both Virú and Chancay than is a thin, white wash applied all over the vessel or in broad bands (White Slipped-Sarraque White-on-red). Note the relative positions of the maximums of these types as shown in Fig. 8.

Relative quantities and complexity of a trait cannot be accepted as proof of the direction of distribution. Only the demonstration of relative age is conclusive, and in the correlations made here we do not have such evidence for this type. However, quantitative evidence is suggestive. Here it suggests that the trait of rather careless white painting, which disintegrates into an even sloppier, broad, white banding and all-over wash, might be earlier on the central coast than in the north.

E-E: Huacapongo Polished Plain (Virú) and Smoothed Plain Red (Chancay). These two types are similar in paste, temper, firing, and finish. The vessels of both types are scraped inside and polished outside so that the polishing tracks are rather widely spaced and are clearly visible. This feature was not mentioned in Willey's description of the type,¹ but was determined from an examination of his type material stored in the American Museum of Natural History. The polishing technique characteristic of Huacapongo is found on several varieties of pottery from Cerro de Trinidad.² The two types are similar, but differ in the majority of vessel shapes. Huacapongo emphasizes jar forms; Smoothed Plain Red specializes in bowls and plates.

¹ Willey, 1943, 152-153.

² Willey, 1943, Pls. 1, 2, 6.

The type resemblances just cited, Castillo Plain-Coarse Red Plain and Huacapongo Polished Plain-Smoothed Plain Red, are further supported by the relative positions of the types. At this time, in both Virú and Chancay, carelessly polished ware is in the process of replacement by unpolished thicker red pottery. Owing probably to the slight differences in the criteria used for setting up the types, it is impossible to make an inference as to the direction this polishing trait may have been moving.

F-F: Castillo Plain (Virú) and Coarse Red Plain (Chancay). These types resemble each other in the use of sand tempering in rather liberal quantities, brick-red oxidized firing, and the smoothed, but unpolished surface finish. The range in thickness is similar, but some of the Chancay material is so thick that in Virú it would have been classified as Valle Plain. Large ollas with wide mouths and short, out-flaring necks are common to both types, but in Chancay bowls are in the majority in contrast to the predominance of ollas in Virú. Handles are scarce in Virú and common in Chancay. Ornamental knobs with four punctations and short ornamental appliquéd ridges with indentations are rare in Castillo but common in Coarse Red Plain.

G-G: Gallinazo Negative (Virú), Negative (Chancay), and Pachacamac Negative (Pachacamac). These types seem to be similar and must be placed on about the same horizon, if, as has been done in the diagram, the time position of Interlocking (H-H) is used to correlate the relative ages of Cerro de Trinidad and the lower part of the Pachacamac site. There seems to be little quantitative difference in occurrence, everywhere less than 1 per cent. From this evidence the direction of movement of the trait is not clear.

SUMMARY OF THE CERAMIC HISTORY OF VIRÚ VALLEY AND SOME NOTES ON RELATIONSHIPS

THE OBJECTIVE of this section is to summarize coherently the evidence presented in the preceding pages. It will have been noted that important segments of this evidence have been provided by the work of other participants in the Virú project: Strong and Evans, and Collier. This is particularly true for chronological detail. The observations on material, however, except for the Guañape period, usually refer to the ceramics gathered in the course of the surface survey. I have not studied the material from the excavations. This summary, therefore, is not to be considered a definitive report on the stratigraphic work. The analyses to be presented by Strong and Evans and by Collier will doubtless correct this outline in several details and will refine it in many others.

GUAÑAPE PERIOD

Ceramics appear in the Virú Valley at the beginning of the Guañape period, Time "N" on the chronological graphs (Figs. 4, 5, 6). There is good reason to believe that this period marks the introduction of ceramics on the northern Peruvian coast, at least as far south as the vicinity of Lima.¹ Strong and Evans discovered a site in Virú (Site V-71) where this complex of pottery overlies a preceramic horizon. Bird will report on a similar relationship found in the Chicama Valley at the Huaca Prieta site, where the preceramic deposits were over 12 meters deep. Strong and Willey, following Uhle's earlier work, have made stratigraphic excavations in deep deposits yielding almost this same complex at Ancon and Supe.²

A complex of virtually identical pottery types is found in the lower levels of the site of Chavín de Huántar, located in the North Highlands.³ The name of "Chavín," first applied to the complex by Tello,⁴ was derived from this imposing site. Rafael Larco Hoyle has ably described the burial features of this period from cemeteries excavated in Chicama and Virú, and has given the name "Cupisnique" to the North Coast

variety of the culture that he has examined.⁵

Guañape period pottery is not simple or particularly "primitive" in appearance. It is true that elaborate painted designs are lacking, but the complex as a whole is not the unassisted beginning of a ceramic tradition. The ideas on which it is based seem to be imports into northern coastal Peru. A most interesting problem for future investigation is the source of the cultural influences expressed in Cupisnique-Chavín. Several other features in addition to pottery which appear in Peru at this time suggest the arrival of traits which may have originated in Central America. A hastily compiled list of these traits is as follows: cultivation of maize; rectangular temple mounds; feline, snake, and bird divinities depicted on pottery and engraved and modeled in stone; emphasis of canine teeth in representations of felines and snakes; stone mortars with pestles and metates with manos; shell ornaments inlaid with turquoise mosaics; bone finger rings; elaborately carved bone spatulas; stone mirrors with carved backs; and roller stamps. From the highland site of Chavín de Huántar may be added the trait of stone animal heads projecting from cut stone masonry walls.

The ceramic complex of this period shows most intriguing resemblances to some of the pottery described by Strong from Honduras,⁶ from the recently discovered Archaic period site of Tlatilco in the Valley of Mexico,⁷ and to the pottery of the Marksville-Hopewell culture of the Mississippi Valley.⁸ These resemblances are found mainly in certain common decorative treatments: broad incised lines made when the vessel was leather hard; zigzagged stamping made with a toothed rocker used to roughen line-bordered areas contrasting with smoothed areas; and line-bordered areas painted red which contrast with unpainted areas. Birds with broad bills are a common motive for the decorations so executed. No early Central

¹ Uhle, 1908, 352.

² Strong and Willey, 1943, 12-13; Kroeber, 1925b, 254-256; Strong, 1925, 152-156.

³ Bennett, 1944, 1946.

⁴ Tello, 1943.

⁵ Larco, 1941b; 1945a; 1946, 149-161.

⁶ Strong, Kidder, and Paul, 1938. See references to "Ulva Bichrome" and "Playa de los Muertos Bichrome."

⁷ Covarrubias, 1943, 40-46. All the ceramics from this site have not yet been published.

⁸ Ford and Willey, 1940.

American culture is yet known with which direct comparison can be made. Directly comparable items are widely scattered through that area both in time and space. However, the fact that this early Peruvian period does reveal a number of resemblances, some of which disappear in succeeding culture stages, is highly suggestive of connection and demands more attention.¹

The discussion that follows is based on the chronological charts of Virú pottery types, Figs. 4 and 5; on the graphs of vessel shape changes, Figs. 6, 7; and on the summary diagram, Fig. 9. The history will be much clearer if these diagrams are referred to while reading this section.

The first pottery to appear in Virú was constructed by coiling, was rather thin (average, 5 millimeters), was tempered with grit, and seems to have been poorly controlled in firing. It ranged in color from a solid black, produced by firing with little oxygen, through brown, to a fully oxidized brick red (types Guañape Black Plain and Guañape Red Plain). There was little variation in vessel form. Jars with slightly constricted mouths, high-rounded shoulders, and round-pointed bases were most common (Shape 5). Less common were similar jars with short vertical necks (Shape 19) and small bowls. In Time Periods "N" to "M," the only decoration is in the form of vertically applied appliqué ribs which are either pinched with the fingers or incised on top (types Finger-pressed thick rib and Incised Rib [small]). Modeled decoration also occurs.

The middle part of the Guañape period (Time M-L) saw the introduction of types Ancon Fine-line Incised, Guañape Gouged, Ancon Zoned Punctate, Ancon Brushed, Ancon Engraved, Ancon Broad-line Incised, and polished black ware classified as Ancon Polished Black. At least some of these vessels were mould-made.²

In the latter part of the Guañape period (Time L-K), all these decorated types disappeared. The exact details of their disappearance are obscured here by the fact that Collier was not able to classify the decorated materials from his work in Cut B, Site V-272. However, his totals of "Unclassified Decorated Types," which are listed as decimals opposite the levels

of this cut on the left side of the chronology diagram, outline the story. The surface collection from Site V-100 also supplies part of it. Apparently the two types Ancon Fine-line Incised and Ancon Polished Black attained greater maximums and lasted slightly longer than the other types.

Larco's collections from the tombs of Chicama and Virú valleys are almost entirely composed of the decorated and polished types. Modeled vessels and bottles with massive stirrup-spouts are common. It is evident that these burials, which he has described in "Los Cupisniques,"³ date towards the end of the Guañape period (Time M-K). It becomes obvious, when comparing the cemetery and midden materials, that the custom of selecting and of manufacturing pottery for ceremonial purposes and burial with the dead is already well developed. More of the types used for burial purposes are found in the refuse deposits than in any of the succeeding periods, until after the close of the Huancaco period in Virú, but this percentage is still quite small. The average maximum of decorated sherds does not exceed 4 per cent. The more common utility types are not found in graves,⁴ suggesting that while the utility ceramics were made by the common people, the manufacture of ceramics for use as burial goods was already in the hands of specialists.

The latter phase of the Guañape period (Time L-K) shows the quantitative transition of the plainwares into the type Huacapongo Polished Plain. This is clearly a gradual development. The pottery techniques changed so that all vessels were fired in an oxidizing atmosphere, resulting in a brick-red color. The ware was better fired, is harder (Hardness 3), and vessel walls were made slightly thicker (average, 6 millimeters). Vessel interiors were scraped, and the marks were not smoothed over. On the exterior the vessels were polished, when leather hard, with a smoothing tool which left wide-spaced tracks. Vessels increased in size, and a few new form variations were added. These were the frequent use of an up-curved lip on the egg-shaped jar (Shape 8) and the fairly common application of neatly folded rims on wide-mouthed jars (Shapes 11 and 13). Small pots with short vertical necks and beaded rims (Shape 18) became common. Bowls with a

¹ For a more complete discussion, see Strong, 1943, 31-33.

² Larco, 1941, 35-36.

³ Larco, 1941, 1945a.

⁴ Larco, 1941.

shoulder between side walls and bottom (Shape 31) decreased in popularity. Pots with round pointed bottoms were still used, but the bottoms tended to be slightly more rounded.

PUERTO MOORIN PERIOD

The virtual replacement of the Guañape Plain types by Huacapongo Polished Plain at Time K marks the beginning of the Puerto Moorin period. From the evidence provided by the refuse deposits, this period seems to be dominated by the plainware type Huacapongo. Very small percentages of the type Puerto Moorin White-on-red are the only consistent accompanying decorated type. The latter type is identifiable by the use of crudely painted white lines on the polished red background of the vessel surface. Simple chevrons filled with dots, guilloches, and interlocking frets and broad vertical bands of white are usual designs. It has been suggested that this idea came from the Chancay Valley to the south where it is more popular.

Larco's burial collections demonstrate that this is far from being the complete picture. This period had well-developed specialized burial ceramics which, without a doubt, were made for ceremonial purposes. Larco has described these under the name "Salinar."¹ Some examples of these vessels are copied from Larco's publication in Fig. 9. Modeled human figures, usually seated on bottle bodies, and frequently engaged in sexual activities; modeled birds and cats; modeled fruits and houses, are all common. The usual forms are round bottles or effigy bottles with stirrup-spouts; bottles with one spout and one effigy figure connected by a solid, flattened bridge; and long-necked bottles with large flattened handles. White paint which is sometimes zoned in narrow incised lines, small appliquéd nodes with punctations, and simple pendent incised and punctated triangles are the usual decorations.

This ceremonial ware seems to have developed mainly from the decorated wares of the preceding Cupisnique complex and in turn was partly ancestral to the ceremonial ceramics of the succeeding periods both in Virú, where it was succeeded by the "Negative" or "Virú" culture, and in Chicama, where it was ancestral to Mochica.² Thus we have evidence of two

ceremonial traditions developing along diverging lines in the two valleys.

On the basis of the type Puerto Moorin White-on-red and certain features of vessel form, notably the single spout bottle with flat handle, and the figure and spout forms connected by a bridge, Willey has related the Salinar complex to the White-on-red horizon that he has described in the Chancay Valley³ and has argued for the connection of these two styles with the White-on-red pottery which Bennett found at Chavín de Huántar⁴ and near Huaraz.⁵ Evidence in support of his Virú-Chancay comparison has been detailed above (pp. 58-60).

Figures 4 and 5 show that the Puerto Moorin White-on-red is not confined to the Puerto Moorin period but continues through the succeeding Gallinazo period to about the time the typical Mochica ceremonial complex moved into Virú, here shown as the type Huancaco Decorated. It seems probable that a stricter classification, based on a fuller knowledge of the chronology of the Chicama Valley than we have at present, would transfer many of these later Puerto Moorin sherds into some type which centered in the Chicama Valley and was actually a developmental Mochica White-on-red. However that may be, there is little doubt but that Larco is correct in his conclusion that the common White-on-red decorations of the Mochica complex were derived from the crude White-on-red of Salinar.⁶

GALLINAZO PERIOD

While the early part of the Puerto Moorin period (Time K-J) is almost completely dominated by the pottery type Huacapongo Polished Plain, the latter part (Time J-I) is marked by the development of Castillo Plain out of Huacapongo. The vessel paste is still red from oxidized firing, but considerably more sand has been used for tempering; the walls are thicker (average, 8 millimeters), smoothed, but not polished. Vessel forms change. Bottoms become rounder. Jars with necks which can be traced from the Huacapongo Shape 18 become the most popular form (Shapes 16 and 21). Narrow-necked bottles appear (Shape 22). Jars with wide

³ Willey, 1943.

⁴ Bennett, 1944, 92.

⁵ Bennett, 1944, 36, 98-99.

⁶ Larco, 1945c, 1.

¹ Larco, 1944; 1946, 155-161.

² Larco, 1944.

mouths and folded and thickened rims of the basic form found in the Puerto Moorin period continue to be made (Shapes 9 and 12). The jars with necks occasionally have small modeled animal heads attached to the shoulder, and some have crude human faces on the necks formed by appliquéd eyes and ears and an incision for a mouth (Type Castillo Modelled). The type continued virtually unchanged until Time F, the end of the Gallinazo period.

The second most prominent type of the Gallinazo period, Valle Plain, does not appear in substantial proportions until Time H. It seems to have evolved out of Castillo Plain and is essentially a larger and thicker version of Castillo. The division between the two is based on ware thickness, which averages 20 millimeters for Valle as against 8 millimeters for Castillo Plain. The paste is very sandy, red, and has a hardness of about 2.5 on the Mohs scale. Basically vessels have the same shapes as in Castillo Plain. Large wide-mouthed pots with direct rims (Shape 3) or with folded rim straps (Shape 10) are common for the full time range of the type. Large "porongas" with vertical necks which are sometimes cambered (Shape 17) are late in Gallinazo and center in Time G-F. Other late forms are large, round-bottomed bowls (Shape 30) and pots with nearly vertical sides (Shape 35) or short out-flaring rims (Shape 36). A notable feature of the foregoing Valle rims is that the lips tend to be rectangular in cross-section; they are not rounded. During the Huancaco period (Time F-E), a short vertical rim with rounded lip, a form typical of the later type Virú Plain, appears on Valle type vessels (Shape 7). Bowl-shaped graters are found throughout the range of the type.

Gloria Polished Plain is another type that seems to have evolved out of Huacapongo Polished Plain, beginning at Time "I." This is a redware type that shares shapes with Castillo Plain, but is not numerically popular enough to permit shape analysis. Its distinguishing feature is the smooth polish that covers the vessel surface. Polishing is more carefully done so that tracks are not so clearly distinguishable as in the parent type.

Sarraque White-on-red shares shape and ware characteristics with both Castillo Plain and Valle Plain. The distinguishing feature of this type is a thin, white wash, applied all over the vessel, in a band about the rim, or in wide

stripes which extend from the lip to the base. This type appears to correlate in a general way with Willey's "White Zoned" and "White Slipped" types which have both fine and coarse paste varieties in the Chancay Valley.

The type Castillo Modelled segregates the modeled animal heads which have broken off the shoulders of vessels of the types Castillo Plain and Valle Plain. It also includes the crudely incised and modeled human faces sometimes found on the necks of vessels of these two types. These faces usually have eyes formed of small appliquéd pellets of clay with a punctuation, rather sharp modeled noses, and an incision to indicate the mouth. This type runs through the Gallinazo period in very small percentages.

Gallinazo period painted wares are rare in midden collections, but are a characteristic feature of burials. Most striking are the closely related negative-painted types Gallinazo Negative and Carmelo Negative, Bennett's types "A" and "B," respectively.¹ Both are well illustrated by Larco in "La cultura Virú."² Gallinazo Negative, a true negative technique in which designs consisting of wavy lines and dots are brought out by a dark stained background, is slightly more popular in the refuse than is Carmelo Negative, which is made by negative technique, but on which the stain forms the designs. From the evidence produced here, there seems to be no temporal difference in these types. Both were made during the full range of the Gallinazo period.

The negative decorative technique has a wide distribution in prehistoric Peru, as is discussed by Kroeber³ and summarized by Willey.⁴ Contrary to Willey's conclusions, it does seem probable that the negative technique serves as an approximate horizon marker for at least northern and central Peru.⁵ The farther extent of the technique to the south, as far as Paracas, will not be discussed here. The suggested chronological implication of negative styles in the Chancay Valley and Pachacamac has already been treated.

¹ Bennett, 1939, 72-73.

² This paper (Larco, 1945b) is condensed in Larco, 1946.

³ Kroeber, 1944a, 108-110.

⁴ Willey, 1945.

⁵ Willey's assumption (1945, 54-55) that the negative style was earlier in the south than on the North Coast was based on the misconception that Gallinazo was later than Mochica. He has recently modified these conclusions (Willey, 1948, 11-12).

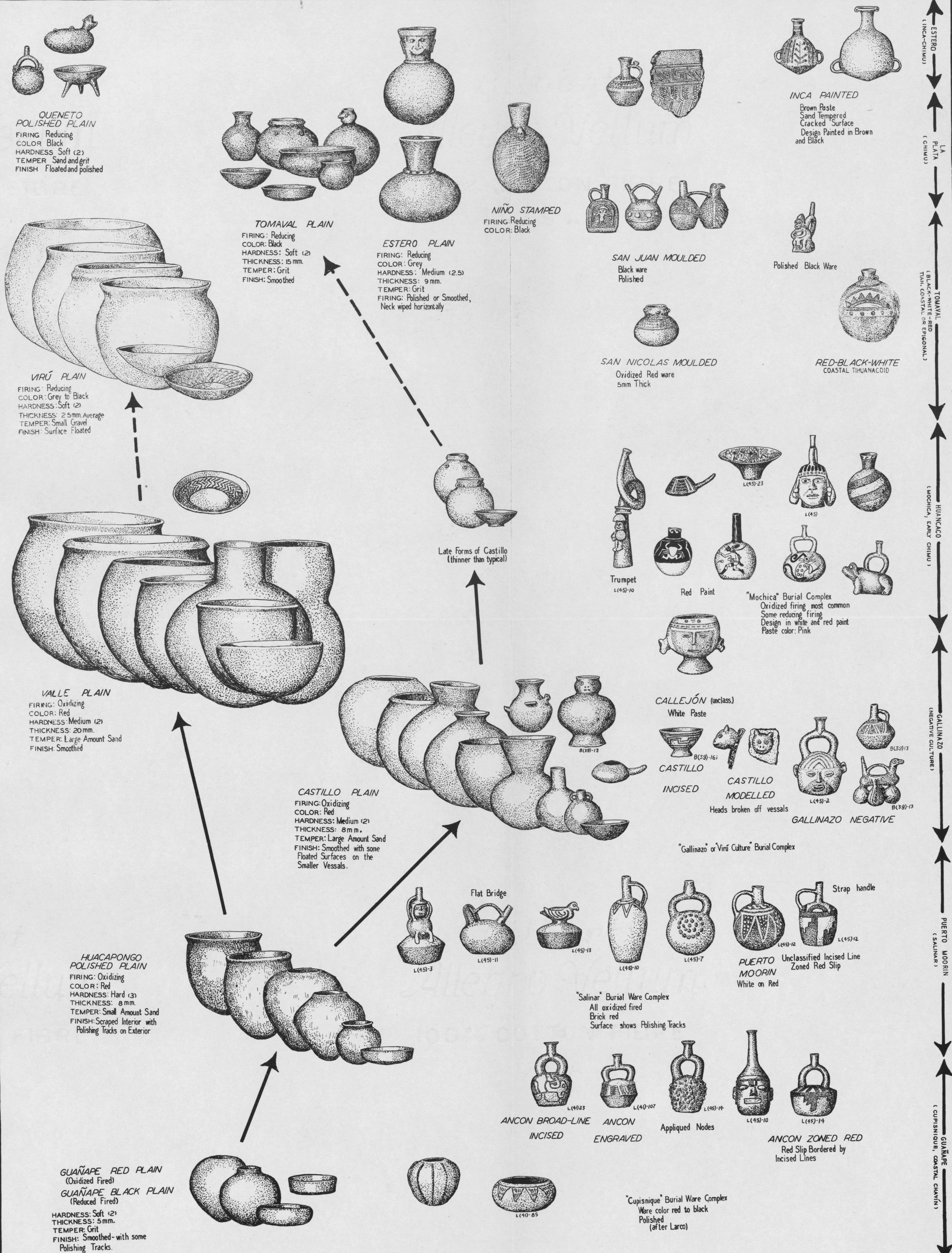


FIG. 9. A diagrammatic summary of the ceramic history of Virú Valley. Scale of the vessels is only approximate, as the decorated vessels are all too large in proportion to the plain. The small letters beneath some of the illustrations are abbreviated references to publications from which they were redrawn; thus "L(45)12" refers to Larco, 1945, page 12; B(39), to Bennett, 1939. No attempt has been made to illustrate the full range of the burial pottery. The few pieces shown (some of which are from Chicama Valley) are included to suggest the styles of the several periods.

In his burial collection from Gallinazo period sites, Bennett¹ found that negative painted pottery comprised 16 per cent of all burial vessels and over half the decorated vessels from graves. Willey did not find negative-decorated vessels as grave goods in Chancay. This may suggest a stronger concentration of this style on the North Coast.

Bennett,² who has worked in both areas, is much impressed by the high degree of similarity between the Recuay negative-decorated types from the Callejón de Huaylas and the vessels that he recovered from Gallinazo period burials in Virú. He points out agreements in both decoration and shape features. This similarity is further strengthened by the presence in Gallinazo period middens, as well as in grave lots,³ of a small percentage of Recuay types, here listed as Callejón (Unclassified). This group of material has a short time range in Virú in the Period "H" to "G."

An interesting and probably significant fact is that the black, reduced-fired, smoothed type Tomaval Plain and its accompanying polished type, Queneto Polished Plain, appear in small percentages at the beginning of the Gallinazo period (Time I) and maintain these proportions until the end of Gallinazo (Time F), after which they increase markedly and become dominant types of the later periods. This is a recurrence of the reducing technique of firing pottery which had vanished from the Virú chronology when the type Guañape Black Plain died out at Time K.

The characteristics of the curves of these two types lead one to suspect that throughout Gallinazo times a center distant from Virú predominated in reduced-fired blackware and exerted a small but persistent influence on the Gallinazo period ceramics. Blackware is not a prominent feature of Recuay, the contemporary culture of the highlands to the east of Virú. The presumably contemporaneous White-on-red horizon examined by Willey⁴ in Chancay includes only about 1 per cent of a polished blackware. Possibly this influence came from the coast to the north, perhaps from a yet undescribed coeval cultural stage in the Lambayeque Valley. Such a conclusion is further

strengthened by the new types that enter Virú after Time F, when the blackware types begin to dominate; they are mainly pressed-ware types that are more common to the north.⁵

HUANCACO PERIOD

The Huancaco Period is the time (F-E) when the Virú Valley was dominated by the burial cult that has been variously called "Early Chimu," "Proto-Chimu" or "Mochica." This "culture" has been described from the valleys of Chicama, Moche, and Virú by Kroeber,⁶ Bennett,⁷ and Larco.⁸ The ceramics are quite characteristic and well executed. In this analysis the several varieties of White-on-red decorated vessels and effigy vessels are grouped as type Huancaco Decorated. In the refuse deposits they do not form more than 5 per cent of the total.

Other changes in ceramics are slight and mainly quantitative. The two negative types disappear. The blackware types Tomaval Plain and Queneto Polished Plain begin to increase substantially, replacing Castillo Plain and Gloria Polished Plain, so that by Time "D" the latter two types have almost disappeared. A new type Virú Plain appears. This is a gray, reduced-fired ware, tempered with small bits of gravel, quite thick (25 millimeters), in the form of large vessels that are as much as 1.25 meters in diameter. The pots always have wide mouths, and the bases are more rounded than those of the comparable type Valle Plain. Lips of Virú Plain vessels are always rounded, and sometimes a narrow strap of clay has been added on the outside parallel to and slightly below the lip. This usually is decorated with cross-hatched incising.

The appearance of rounded lips (Shape 7) on Valle Plain vessels at this time has already been noted. Certain changes also take place in Castillo Plain. The pots with long out-flaring necks (Shape 21) decrease markedly in popularity. Small globular pots with short, strongly cambered necks (Shapes 25 and 26) and bowls with low annular bases (Shape 32) usually have thinner side walls than earlier Castillo material; nevertheless they have been included in this class.

¹ Bennett, 1939, 63.

² Bennett, 1939, 72-73.

³ Larco, 1945a, 11-13; Bennett, 1939.

⁴ Willey, 1943, Tables 7-10.

⁵ Bennett, 1939, 94-123.

⁶ Kroeber, 1925a.

⁷ Bennett, 1939, 1946b.

⁸ Larco, 1938, 1939, 1945c, 1946.

At several sites in Virú where the Mochica-decorated types are best represented in midden material, notably Huaca de La Cruz (Site V-162) and Huancaco (Sites V-88, V-89), the types Valle and Castillo seemed to be decidedly pinker than at other sites in the valley. An attempt was made to isolate this difference as a type, but the color gradation was too subtle for consistent handling. On the basis of architectural features, there is reason for suspecting that at least the latter of these sites was occupied by actual migrants from Moche or Chicama valleys to the north.

REMARKS ON MOCHICA

After completing the work in the Virú Valley, I ran surface-collecting surveys in the Santa and Chicama valleys, collecting from about 60 sites in each. The materials accumulated have not yet been analyzed, but from observations in the field it is apparent that the sequence at Chicama will basically parallel that so far discussed in Virú. Midden materials throughout the time of the Gallinazo period of Virú are predominantly types Castillo and Valle Plain, but vary slightly in proportions. The burial complex in that period was dominated by a relatively simple White-on-red decorated pottery, already identified by Larco as Mochica I, although he has not yet published definitive descriptions. Negative-decorated ware and vessels painted in a positive technique with designs typical of the negative style are a minor element. Some tombs being opened by Señor Larco on the south flank of Cerro Santander, which I was invited to observe, showed this burial complex very nicely. Bird will report on other burials of this period that he uncovered at Huaca Prieta in Chicama.

There is good reason then to believe that the ceremonial complex of Mochica developed from the Salinar complex common to both Chicama and Virú (Puerto Moorin period). It underwent a long process of local development in Chicama, and possibly also in Moche, at a time when the ceremonial ceramics of Virú were principally concerned with negative painting techniques. Then, fully developed and in its final stage, the Mochica ceremonial complex dominated Virú and spread south along the coast as far as the Nepeña Valley. While the utilitarian ceramics of Virú changed little, adding some traits that seemed to be coming from

the north, the ceremonial complex shows a sharp break.

Architectural and community-plan evidence, collected and to be presented by Willey, indicates that throughout the history of Virú, to the end of the Gallinazo period, there was an increase in population and an accompanying trend towards centralization of political control. This control was strongly religious in nature, as is shown by the placement of temple pyramids or "huacas" in strategic military locations and the increasing emphasis on peculiar burial cult ceramics. The best explanation for these cult ceramics, with their tradition so separated from utilitarian ware, is that these vessels were actually made by a class of priest-potters who were identified with the ruling class. The average man may have worked all his life to acquire the necessary pottery for his grave. By the end of Gallinazo it is almost certain that the Virú Valley was a single integrated political unit.

My survey of the Chicama Valley and, particularly, the examination of Larco's magnificent collection suggest that a similar political unification was in process in Chicama. It is probable that the same thing was happening in the intervening Moche Valley, but its history is not clear since there are few data from sites other than the Temples of the Sun and Moon.

Chicama seems to have won the local race for political cohesion and military potential. The movement that spread the Mochica ceremonial complex to Nepeña was almost certainly military in nature. Strong central control of the ceremonial ceramics is shown by the amazing similarity of complicated pieces from valleys as distant from each other as Chicama and Santa. If many of these pieces were not made by the same artist or from the same mould, they were at least produced by artists who were trained side by side in the same school.¹

TOMAVAL PERIOD

In the Tomaval period, after Time "E," the full weight of the reduced-fired blackware and moulded ware, presumably originating in the north, is felt in Virú. Tomaval Plain becomes the dominant type. It features small pots with cambered necks and rather thin side walls (5 millimeters), with bottoms thinner than the sides (Shape 24); small, wide-mouthed pots (Shape 15); bottles with high shoulders, nar-

¹ Larco, 1939, 131-138; discussion of these points in detail.

row necks, and flat bases (Shape 20); round-bottomed bowls (Shape 28); bowls with an angle between base and side walls (Shape 33); and bowls with thickened rims (Shape 34).

The large, wide-mouthed, gravel-tempered, gray paste vessels of the Virú Plain type replace Valle Plain. This replacement was complete by the end of Tomaval, and apparent persistence of this type (Fig. 4) is caused by the upward migration of sherds in deep middens which were started in earlier periods. Vessel forms of Virú Plain are shown in Fig. 6. Direct rims with rounded lips on large globular pots (Shape 1), short vertical rims (Shape 6), slightly outflaring rims (Shape 14), cambered rims (Shape 23), and large, round-bottomed bowls (Shape 27) are all found. Bowl-shaped graters with deep incised lines are fairly common.

Queneto Polished Plain, the reduced polished ware that has already been mentioned, becomes a substantial feature of the ceramic complex at the beginning of the Tomaval period (Time E). Prior to this time the vessel forms seem to have been fairly simple, not unlike the forms of Gloria Polished Plain and Castillo Plain. Now it shares forms with Tomaval Plain: small, globular pots with small mouths and cambered collars, often with punched appliquéd pellets of clay arranged around the shoulders, round-bottomed bowls, and flattened-globular *cántaros* with short necks and two pierced lugs on the shoulders. In addition, stirrup-spout bottles, tripod bowls, and effigy vessels made of this ware became common in midden refuse.

While to some extent the types of the Tomaval period just described do suggest relationship in details of form to those earlier types that they replace, the classifier gains the impression that this evolutionary process has not taken place in Virú. The transition from type Castillo Plain to Tomaval Plain is not comparable with that from Huacapongo Polished Plain to Castillo, or from Guañape Plain to Huacapongo. In the latter cases, the division was clearly made by the classifier, and the artificial distinction between the types required considerable care to achieve consistency. The divisions between Castillo Plain-Tomaval Plain, Valle Plain-Virú Plain, and Gloria Polished Plain-Queneto Polished Plain are much sharper and are inherent in the material. There is very rarely any doubt as to whether a vessel belongs in earlier or later classes.

The situation suggests that these types have evolved from a ceramic base somewhat similar to that which existed in the Virú Valley during the Gallinazo period.¹ Minor influences were exerted on Virú through Gallinazo times, as already pointed out. These became stronger in the Huancaco period, the time of Mochica dominance. Now, at the beginning of Tomaval (Time E), either extraordinarily strong cultural influences are exerted or, more likely, an actual change in the population of the valley has occurred. Certain evidences on house construction and pattern of land occupation, which will be published by Willey, seem to favor the latter hypothesis. It has already been suggested that the source of these changes may be the coastal area to the north.

At Time "E" the sudden introduction of some new pottery types, which have no suggestion of ancestry in Virú, lends emphasis to the break in tradition. These new types are primarily mould made. Estera Plain, the fourth most popular type of the later periods, is a well-smoothed, fine-textured ware with a hard, steel-gray paste that indicates complete mastery of reduced firing technique. There is little variation in shape. Bodies are globular, sometimes flattened from two sides into a melon-like shape, and the moderately wide neck generally out-flares slightly. On about one-sixth of the vessels, a well-modeled human face has been cast on the side of the neck. Hair is indicated by parallel ridges, and a raised clay collar at the base of the neck is quite common. Estera Plain enjoyed its greatest popularity in Virú during the Tomaval period, immediately after its introduction. After Time D it appears to decrease slightly in frequency.

The three pressed-ware types, San Nicolas Moulded, San Juan Moulded, and La Plata Moulded, seem to show a developmental sequence in Virú. This is suggested in the chronological diagram based on strata cuts (Fig. 4), but shows most clearly in the seriation of surface collections (Fig. 5). San Nicolas Moulded is an oxidized-fired redware, rather thin, generally found in the shape of annular base bowls or small pots with cambered collars. The pressed decoration, confined to the shoulder in about 50 per cent of the examples, usually consists of fairly large, raised dots bordered above and

¹ Kroeber, 1925a, 253.

below by a raised line. The type first appears late in the Huancaco period (Time F-E), where it is most popular, and continues with decreasing frequency until about Time C. This is the first appearance of pressed ware in Virú, and it may be a direct importation. However, it is also possible that this is a crude local imitation of the blackware type San Juan Moulded, which comes into Virú in full force at the beginning of Tomaval (Time E).

San Juan Moulded is a reduced-fired black or grayware, polished, and fairly thin. Its typical decorations are found on a number of shapes: cambered-neck pots, double vessels, double-spout bottles with bridge handles, flattened bottles with long necks and strap handles, bowls with low annular bases, canteen-shaped bottles, and fairly large, melon-shaped pots with two pierced lugs on the shoulders. The designs may be confined to a band, but usually cover the entire vessel and are even more varied than the shapes. Small, neat nodes usually form the background for slightly raised figures. Geometric design units are stepped, rectangular frets, or curvilinear scrolls. Naturalistic figures are small men holding staffs, fighting men, cats, or moons. On some vessels the entire design is composed of rectangular or curvilinear scrolls. Designs frequently vary on two sides of a vessel, showing that different moulds were used.

San Juan maintained about the same proportions in the midden refuse from the time of its appearance at Time "E" to the end of the chronology, Time "B."

The type La Plata Moulded seems to be confined to Time "D-B" and has a maximum frequency of around 1 per cent. Actually, this classification group was set up to mark the occurrence of fully half-round moulded small ears of corn, small fruits, and small curled-up animals which resemble casts of fetuses. Small, modeled, half-round or full-round projecting human heads are also in this category. Apparently most of these impressions have been made by pressing a small ear of corn or similar object into the wall of a mould, which was then hardened and used to make the vessel decoration. So far as can be told, the vessels in this class share shapes with San Juan Moulded.

Niño Stamped is a minority type which centers in the Tomaval period and seems to be confined to it. Blackware pots with cambered collars are the usual form. The diagnostic fea-

tures of the type are small rectangular grid impressions which in other areas have been called check stamping.

Corral Incised also seems to be confined to the Tomaval period and is found in very small percentages. The paste is reduced fired, and the most frequent shape is the pot with cambered collar so typical of Tomaval Plain. The decoration is on the shoulder area and consists of incised cross-hatching carelessly executed when the vessel paste was damp.

Both the "Coast Tiahuanaco A" and the "Black-white-red geometric," or derived Tiahuanaco styles, are found in the surface collections from Virú. These types have already been described from burial collections by Kroeber¹ and Bennett.² They are widespread in Peru and mark what has been referred to as the "Middle Period."³ Unfortunately they were not found in the excavations on which the chronological chart was based, so the exact temporal relationships of the two varieties of design are not well defined. The types are found in surface collections, mainly from looted cemeteries, and there is not much doubt that the range of both is confined to the Tomaval period. If a time differentiation exists between them, it is minor.

The burial pottery complex of the Tomaval period is comprised of selected vessels of the types just described. The difference from the midden material seems to be one of proportions. Some plain types are found in the graves, but the majority of the vessels are decorated. Apparently the distinction between utilitarian and ceremonial-mortuary ceramics, which was already apparent in Guañape times and became progressively more pronounced through the Puerto Moorin, Gallinazo, and Huancaco periods, has now somewhat collapsed. Religious mortuary pottery is also used in the households. This merging of secular and ceremonial life may be a product of the trend towards urbanization that begins at this time, a subject that will be treated more fully by Willey.

RELATION OF THE TOMAVAL OCCUPATION TO THE HUANCACO IN VIRÚ

The marked break between burial ceramics from the Huancaco to the Tomaval period sug-

¹ Kroeber, 1930, 100-101.

² Bennett, 1939, 73.

³ For a summary, see Bennett, 1946b, 122-136.

gests that a change in the religio-political control of Virú took place at the beginning of the latter period. The ceremonial customs were intentionally altered. The new ceremonial complex consists primarily of blackware types of possible northern derivation, with a minor element of the "Tiahuanacoid" and "Epigonal" painted wares, which are much more abundant at this time along the Central and South Coast. Simplified white and red "Degenerate Mochica" types are retained in small quantities.

The suggestion that there was a replacement of at least a part of the Virú population, as indicated by the change in household ceramics, has already been discussed. If such a change did occur, there does not seem to have been any great lapse of time between the occupations, for at several places it was noted that where a cemetery containing graves of the Huancaco period with the Mochica burial complex had been located on the lower slopes of a hillside, just above and bordering this cemetery were found numerous graves containing the "Tiahuanacoid" complex of the Tomaval period. Such a situation was found at several cemeteries¹ in Virú and was even more commonly found during the surveys made in the Santa and Chicama valleys. This indicates that the people of the Tomaval period were well aware of the positions of the earlier graves and were continuing to use the same cemeteries.²

"Tiahuanacoid" or "Epigonal" ceramic influences and a few other traits which can be related to the highland site in Bolivia appear throughout both highland and coastal Peru. Recent summaries by Kroeber³ and Bennett⁴ trace the extent of these influences. It has been suggested several times⁵ that the Tiahuanacoid horizon of the coast represents a period of political unrest and possibly the establishment by military force of the first pan-Peruvian empire which later was copied and improved by the Inca. This explanation would fit the Virú chronology very nicely. The possible partial shifting of population that brought the strong elements of blackware from the north may be an early

example of the intentional shifting and mixing of populations as was practised by the later Inca conquerors.⁶ Strong military measures necessary to conquer the little Mochica Empire, which, as outlined above, seems to have extended from the Chicama Valley south to Nepeña in the Huancaco period, might explain why the conquerors shifted the population and also account for the sudden disappearance of the Mochica religio-political ceramic complex.

LA PLATA PERIOD

The close of the Tomaval and the beginning of the La Plata period at Time "D" are not defined by any sudden change in refuse ceramics. The dominant type Tomaval Plain achieves its maximum popularity, about 60 per cent. Virú Plain reaches a maximum of 20 per cent. Queneto Polished Plain remains unchanged, but I have the impression that it is at the beginning of this period (Time D) that stirrup-spout bottles, with spouts that are rectangular in cross-section, become a minor shape in this type. Small human or animal figures are found at the bases of these spouts. This form is also shared by the type San Juan Moulded which also continues at unchanged frequency. Estera Plain and Rubia Plain are also unchanged in popularity. The minor type La Plata Moulded seems to be the only addition to the complex, and San Nicolas Moulded, Niño Stamped, and Corral Incised disappear. These details are not too clear from the stratigraphic evidence available, but are obvious from the seriation of surface collections.

In the chronological graphs (Figs. 4, 5, 6), the La Plata or Chimu period has been drawn as the short span of time between the virtual disappearance of such earlier types as Castillo Plain and Valle Plain and the arrival of definite Inca pottery types in Virú. Without more careful studies at such known Chimu sites as Chanchan in Moche Valley, it is difficult to see how this period can be defined more clearly.

Kroeber points out that the Chimu ceremonial complex (which prevailed in Virú from Times "D" to "C") was in part a revival of old elements that are found in Mochica (Early Chimu).⁷ I have also gained the impression that Chimu is a refocalization resulting from

¹ Sites V-15, V-16.

² This situation was called to our attention by Señor Enrique Jacobs, who has excavated a number of such cemeteries.

³ Kroeber, 1944a.

⁴ Bennett, 1946b.

⁵ See Kroeber, 1944a, 68; Willey, 1948, 13.

⁶ Rowe, 1946, 272.

⁷ Kroeber, 1930, 111-114; 1935a, 213-224.

the combination of local older elements from Mochica with the strong block of blackware influences that have arrived in this area in the preceding Tomaval period.

ESTERO PERIOD

Only slight percentage changes in the plainwares mark the Estero period, the time of Inca domination of Virú. Both Tomaval Plain and Virú Plain appear to be decreasing slightly in popularity. The limits of the period are based on the appearance of Inca type painted wares. Though the total percentage of these wares does not exceed 1 per cent, their occurrence is fairly constant. Both Cuzco Polychrome

as described by Rowe¹ and a more generalized Inca Polychrome were found. Typical Inca aryballoids are the only shape. These types have been grouped as Inca Painted in the chronology graphs.

The Estero period seems to represent the span of time between the conquest of the Chimu kingdom by Topa Inca, an event which Rowe estimates occurred between 1463 and 1471,² and the coming of the Spaniards in 1532 or soon after. This is a matter of some 60 or 70 years and the shortness of the time may account for the relative scarcity of Inca materials in the valley.

¹ Rowe, 1944, 47.

² Rowe, 1946, 205.

APPENDIX I. DESCRIPTION OF POTTERY TYPES

IT IS NOT THE PURPOSE of this section to describe formally pottery types that were set up in the course of the Virú Valley ceramic studies. These descriptions will be given in some detail in the reports of Strong and Evans and of Collier and will be based on the material secured from their stratigraphic cuts and burial excavations. The descriptions in this section are brief condensations intended to assist the reader in visualizing the pottery. It will also be seen that in a few instances, notably that of Huancaco Decorated, several of the groupings set up by Strong and Evans and described in detail are here treated as a single unit. While their procedure is justified on the basis of the quantity of the material they have handled and is essential for laying the groundwork for a study of Mochica ceremonial ceramics, it did not seem necessary here.

INCA PAINTED¹

Plate 1a-c

This class of pottery, fairly rare in Virú, includes all the varieties of Inca painted wares found there. The material usually has a hard, gray, reduced-fired paste and on the exterior has a cream or dull pink slip. Painted decoration is applied in a dark reddish brown or black, and the use of three colors is common. The surface is usually crackled. The range of design described by Strong and Corbett at Pachacamac has no parallel in Virú. The typical aryballoids appear to be the most common forms. Most of these have three-color bands painted around the necks and on the body either in the form of the "fern" pattern or complicated designs consisting of painted triangles and lines. All the Inca Painted ware from Virú is of the late or "Cuzco series" described by Rowe.²

TIAHUANACO BLACK, WHITE, AND RED³

Plate 2e-g

The North Coast "Tiahuanacoid" painted ware fragments are not very common in the Virú surface collections. It is probable that

almost, if not all, the pieces listed in this study have derived from graves through the work of *huaqueros*. The ware is tempered with a small amount of sand, is oxidized fired, resulting in a reddish paste color, and the walls have been smoothed or, infrequently, slightly polished. Two methods of painting are included in this decoration group. In one, broad white bands of dull cream paint bordered by narrow black lines have been applied to the red background provided by the vessel surface to form the designs. The second and more popular technique was to put paint areas of white on the vessel surface to serve as background for designs, usually geometric, painted in red bordered by narrow black lines, or simply in narrow black lines. The sherds from the surface collections are too fragmentary to reveal the complete designs, but suggest that the examples illustrated by Bennett from Virú are typical.

TIAHUANACO NORTH COAST BLACK-ON-ORANGE

Plate 2h

A very small number of sherds that can be classed as Black-on-Orange were found. These exhibit simple geometric designs drawn with narrow black lines on the orange paste of oxidized-fired vessels. All the sherds appear to be fragments of small, flaring-sided bowls, several of which had ring bases.

RUBIA PLAIN

Plate 2i-l

Rubia is tempered with a small amount of sand and is a fairly thin (4-6 millimeters) oxidized-fired ware. The oxidation is not so complete as for the similar but earlier type Castillo Plain, so that the surface colors are shades of smudged brownish-red or grayish-red, often with a purplish tinge. Sherd interiors and the inside paste of almost closed bottles are frequently only partially oxidized. The exterior surfaces are smoothed, but not polished. Bottles, pots with cambered rims, and simple bowls appear to have been the common forms. The cambered rims are wiped and tend to flare outward more than in the accompanying type Tomaval Plain. The Rubia Plain category was set up in an attempt to measure the latest phase of the oxidized-fired tradition. It merges im-

¹ Kroeber, 1925a, Pl. 60j.

² Rowe, 1944.

³ Bennett, 1939, Figs. 9b, 10a, c, j; Kroeber, 1925a, Pl. 62a-d.

perceptibly into the earlier Castillo Plain which seems to have been the ancestral type.

ESTERO PLAIN¹

Plate 2a-d

The paste of Estero Plain is a distinctive, bluish-gray, reduced-fired material, quite hard compared with the accompanying wares. There is a small amount of sand tempering, and the paste is well mixed and wedged. The thickness varies from 6 to 20 millimeters for the rims and averages somewhat thinner for the body sherds. The shapes of this type vary very little, as fully 98 per cent of the sherds are fragments of globular-bodied, wide-mouthed bottles. The necks are always slightly outflared and are generally wiped horizontally both inside and out. Fully half the vessels have a raised collar at the base of the neck which may or may not have punctations in it. In about one-quarter of the vessel necks, human faces are cast in well-modeled relief on one side. Most of these have appliquéd modeled ears; on the opposite side of the vessel neck ridges simulate the hair. The bodies of Estero Plain vessels are globular and range in size from 40 to as high as 80 centimeters in diameter. Some are flattened globular or melon shaped. Apparently at least some of the Estero Plain vessels were made in moulds. It seems probable that some of the body sherds have carried mould-impressed designs and these have been included in the type San Juan Moulded. The only other shape indicated for this type is the open bowl, but so few fragments are available that little can be deduced as to its shape.

SAN NICOLAS MOULDED

Plate 1l-p

San Nicolas Moulded is a fairly thin (4 to 6 millimeters) ware tempered with a small quantity of sand and fired in an oxidizing atmosphere. The resulting colors range from reddish brown to pink. The surfaces are smoothed but rarely polished except for occasional bowl interiors. These vessels were made in moulds, which imparted the decoration to the vessel wall, but in contrast to the later type San Juan Moulded, only single-piece moulds appear to have been used. There are no small-mouthed

bottle forms which would have made the two-piece mould essential.

The common forms are pots and bowls. The pots are normally small, 12 to 24 centimeters in diameter, with rounded bodies, wide mouths, and short necks which either flare outward or are almost vertical and cambered. About half the vessels with outflaring rims have two loop handles. A variation of the outflaring rim has a raised ridge at the base of the neck. This shape nearly always has handles.

On about half the pots the impressed decoration is applied in a band around the shoulder. The balance of the pots are decorated from shoulder to near the base. The mould-made bowls are round-bottomed simple, round-bottomed carinated, and ring base. The last form comprises about 8 per cent of the bowls. Decoration on the bowls is usually found in a panel around the outside.

The most common decoration imparted to these vessels by the moulds was a panel filled with small raised pimples, bordered top and bottom by a raised line. In contrast to the similar decoration of the later San Juan Moulded type, the pimples on San Nicolas tend to be larger, and the background out of which they rise is not depressed beneath the surface of the vessel. About 5 per cent of San Nicolas decorations are panels of geometric design: scrolls, triangles, and stepped figures. These do not tend to be so delicate or so complex as the similar designs in San Juan Moulded.

SAN JUAN MOULDED²

Plate 1h-k

This type has the same paste as Tomaval Plain. It is a slightly sand-tempered, fairly thin pottery, fired in a reducing atmosphere to shades ranging from dark gray to black. Where undecorated the exterior surfaces were smoothed; about 4 per cent of this class were polished. Typical decorations are arranged either in bands around the shoulders (about 30 per cent) or in two vertical panels formed by a two-part mould (70 per cent). The common designs are areas of small rounded pimples rising from a sunken background, frequently separated by straight raised lines and geometric figures; circles, stepped figures, crosses, etc.,

¹ Kroeber, 1925a, Pl. 66a-c.

² Bennett, 1939, Figs. 9c-e, 10i; Kroeber, 1925a, Pl. 60b, i, l, 61b-c, e-f, h-j, 62f, 64b-f, j-k, 65a, c-l.

slightly raised from the sunken background which is usually filled with small pimples. Least common are naturalistic figures of monkeys, men holding staffs, or moons, treated in a similar fashion. On a small percentage of the vessels the entire design is composed of raised or depressed geometrical figures, such as meanders, frets, or linked triangles.

The bottle is the most common form for San Juan Moulded, and strap handles are found on some examples. The bodies of the bottles were apparently moulded in two parts, and after they were joined the necks were added by the coiling process. Globular bodies are usual, but many are flattened from opposite sides so that they are canteen shaped. Other vessels are moulded in imitation of vegetables. In addition to the strap handles found on bottles, small pierced nodes were frequently located on the vessel shoulders. Bowls form only about 4 per cent of the fragments. These are rather consistently of two shapes: simple, round-bottomed bowls and ring base bowls. The moulded decoration is either outside, inside, or, rarely, on both. These vessels are medium in size, the bottles ranging from 16 to 50 centimeters in diameter. The bowls are smaller, 8 to 16 centimeters in diameter.

LA PLATA MOULDED¹

Plate 1d-g

The paste of La Plata Moulded is the same as that of Tomaval Plain and Queneto Plain—fine grained, lightly tempered with sand, and fired in a reducing atmosphere to produce shades of dark gray to black. While the bodies of the vessels were probably mould made and the paste sometimes shows laminations, the shoulders and necks of bottles were added by coiling. The distinguishing mark of La Plata Moulded is the use of small half-round fruits, ears of corn, animals (often monkeys), or small human or animal heads attached to the vessel shoulder. In some cases these are casts of the actual objects. Bottles seem to have been the most common form. This is a rather specialized late development in North Coast pottery moulding.

VIRÚ PLAIN

Plate 3a-f

Virú Plain is a thick (2-3 centimeters),

hand-modeled ware tempered with rather large particles of gravel. The outer surface is smoothed, and the vessel rims and necks frequently have wiping marks, but erosion of the surface often exposes the gritty texture of the paste. Vessels were fired in a reducing atmosphere, and the paste colors range from reddish-browns to grays. It is fairly soft. The vessels are very large; some jars are 1.5 meters high, with corresponding diameters. Vessel bases are consistently rounded. Shapes and their popularity are as indicated in Fig. 6.

TOMAVAL PLAIN

Plate 2n-o

This ware is tempered with a small amount of sand and fired in a reducing atmosphere so that the colors of both surface and paste range from dark gray to dull black. The sherds are usually rather thin, about 2 to 5 millimeters. The paste is fairly soft and friable as compared with the earlier oxidized-fired pottery. The vessels are hand modeled and were coiled, at least around the upper walls, on bottles where the coils are plainly visible. The most common shapes and their frequencies are as given in Fig. 6. The vessels range from 12 to 25 centimeters in diameter. Cambered rims are common on pots in the later phases of the type, and these usually tend to rise vertically or outflare only slightly from the junction with the vessel wall. Small loop and strap handles are frequent, and small appliquéd buttons are found applied to vessel shoulders. Some of the sherds in this class have come from the human or fruit effigy vessels that characterize the later horizons, but these are usually polished and the majority of such sherds have been classified in the coeval type Queneto Polished Plain.

CORRAL INCISED

The paste of this rare incised type is identical with that of the common plainware Tomaval Plain which also seems to share shapes with it. The decoration is the distinguishing feature of Corral Incised. Narrow lines, incised while the vessel paste was wet, form a simple cross-hatched pattern. Ordinarily pots have a band of this decoration around the upper shoulder. The few simple bowl forms have a band of cross-hatching that begins at the rim and extends down the sides.

¹ Bennett, 1939, Fig. 4a, c.

NIÑO STAMPED¹

The paste of Niño Stamped is consistently reduced-fired blackware, fairly thin and unpolished. Small pots with globular bodies, large mouths or straight and cambered necks are the most common form. The decoration is that commonly called "check stamping" in North America. It was produced by pressing the vessel surface with a paddle carved with a grid of incised lines so that a waffle-like design is produced. These impressions cover the exteriors of the vessels except for the rim.

QUENETO POLISHED PLAIN²

Plate 2m

Queneto Polished Plain is a reduced-fired ware tempered with a small amount of sand. It averages about 5 millimeters in thickness, with a range of from 3 to 8 millimeters. The most common forms are small-necked bottles and bowls, either carinated with a more or less sharply defined side wall angle and very slightly outcurved walls, or shouldered "seed bowl" forms with a rounded shoulder angle. These latter forms frequently have beaded lips. A few simple bowls were indicated. The open bowl forms appear to have been made in moulds and, while they are well polished on the interior, the outside is left rough as it came from the mould. Globular pot forms with outslanting or cambered rims are fairly rare for the type. One variation has rounded protuberances formed in the side walls by pressing the soft clay from the interior.

Included in the Queneto Polished Plain class are fragments of moulded effigy vessels representing human figures in different positions and, particularly, fruits and vegetables. These effigies all seem to belong to the late phase of the type, as they are not found earlier than the Tomaval period.

HUANCACO DECORATED³

Plate 4a-d

The class Huancaco Decorated was set up to include the several varieties of Mochica or "Early Chimú" painted wares that are found in Virú Valley. The sherds that have been

handled in this study of surface collections probably all derived from graves and are too fragmentary to warrant detailed description. Such descriptions were published by Bennett (1939) and will appear in the report of Strong and Evans. The ware, tempered with a small quantity of sand, was well fired in an oxidizing atmosphere. The resultant color is orange, a deeper shade than the paste of the oxidized-fired wares of the Gallinazo period. Side walls average about 5 millimeters thick, and most of the vessels are carefully smoothed and polished. Either a dark red or a cream-white slip was added to the vessel surface on which the decorations were painted in both narrow and wide lines. White-on-red, red-on-white, and black-on-white are the common combinations, in order of their popularity. There is a great range in decorative motives, from simple vertical bands of white, through complicated geometric patterns consisting of scrolls and frets, to extremely naturalistic representations of men and animals which suggest and rival some of the better examples of early Grecian vase painting. Vessel form is even more varied. In addition to the relatively simple forms, such as single-spout and stirrup-spout bottles and vase-shaped *floreros*, there is a wide variety of modeled forms representing humans, animals, vegetables, and complex scenes.

VALLE PLAIN⁴

Plate 3g-l

Valle Plain is a 12- to 40-millimeter thick, hand-modeled ware tempered with large amounts of sand. The vessels were oxidized fired, the resultant colors ranging from brick red to light orange. The surfaces were smoothed but not polished, and horizontal wiping marks are common at the rims. The vessels are quite large, some pots being as high as 1.5 meters. The range of shapes is shown in Fig. 6. The vessel lips are often rectangular in cross-section, in contrast to the rounded lips that characterize the later type, Virú.

CASTILLO PLAIN⁵

Plate 4h-m

Castillo Plain is a somewhat loosely defined plainware type which includes the thinner por-

¹ Kroeber, 1925a, Pl. 61 l; Bennett, 1939, Fig. 4b, c, h.

² Bennett, 1939, Fig. 4f.

³ Kroeber, 1925a, Pls. 53-59; Bennett, 1939, Fig. 7; Larco, 1945c, all ceramics.

⁴ Bennett, 1939, Fig. 3e.

⁵ Bennett, 1939, Fig. 4g.

tion of the sand-tempered, oxidized, plain pottery that formed the bulk of the ceramics in Virú through a long period of time. Valle Plain represents the larger and thicker vessels of this same tradition. In its early phases, Castillo is quite sandy and ranges in thickness from 6 to 12 millimeters. Globular-bodied bottles with wide mouths and flaring necks are most common. This and other forms are shown in Fig. 6. In its late phase Castillo tends to be slightly less sandy, is somewhat thinner, and shares some forms with Tomaval Plain, as is shown by Forms 25 and 32 in Fig. 6. In contrast, early Castillo never has handles, and the very rare modifications consist of human faces crudely incised on the side of vessel necks, or appliquéd knobs representing owl heads or simply punctated, as is described under the type Castillo Modelled.

GLORIA POLISHED PLAIN

Plate 4e-g

Gloria Polished Plain is a sand-tempered, oxidized-fired, reddish ware that is mainly a polished version of its companion type, Castillo Plain. The polishing is generally on the exterior of the vessels and in contrast to the earlier polished type, Huacapongo, is well done, so that the tracks of the polishing tool are not apparent. While most of the forms are similar to those of Castillo Plain, the vessels are somewhat smaller. This group also includes some material which probably came from graves and consists of bottles with stirrup-spouts and solid bridges. Such vessels have been found accompanying Gallinazo period burials.

GALLINAZO NEGATIVE¹

Plate 5a-b

This is the negative-painted type that Bennett has described as "Negative A."² The paste is a fairly compact and hard reddish gray. Bottles and effigy vessels on which these decorations are generally found are smoothed and slightly polished on the exterior. The designs are formed by the vessel surface in contrast to a black-stained background on which the black stain is often so badly faded that in places it can be seen only with difficulty. Designs are simple

arrangements of straight and wavy lines in panels, and small scroll elements.

CARMELO NEGATIVE³

Carmelo Negative was originally described from Virú by Bennett as "Negative B."⁴ This type is much less frequent than Gallinazo Negative and, so far as observable, it resembles Gallinazo in all respects except the method of decoration. Gallinazo Negative utilizes the typical negative painting technique in which the designs are produced by exposing the base color where it was protected to resist wax or similar material. On Carmelo Negative, narrow lines of the dark paint were applied over the resist to produce the designs; the white or cream base color of the vessel surface provided the background.

CASTILLO INCISED⁵

Plate 5e-i

This is a rare incised type of the Gallinazo period. The paste and finish are more often similar to those of its companion type, Gloria Polished Plain, than to the more common and coarser Castillo Plain. The incised designs, made while the paste was soft, are geometric figures, scrolls, and frets, usually formed by several parallel lines. Bowl and bottle shapes are both indicated by the few fragments of this type.

An uncommon variant of this type consists of triangular punctations arranged in a band about the upper shoulder, usually on pot-shaped vessels. Sometimes these punctations are placed in pendent triangles bordered by incised lines.

CASTILLO MODELLED

Plate 5j-m

This is one of those convenience types that are set up to cope with the limitations imposed by a study of potsherds. Castillo Modelled includes small decorative elements that occur rarely on vessels of the Castillo Plain. There is not much variety in these decorations, and virtually the entire range is illustrated in Pl. 5: modeled owl heads placed on vessel shoulders, modeled and incised human faces on vessel necks, and small raised nodes on vessel shoul-

¹ Bennett, 1939, Figs. 12d, j-n, 13g, j, k; Larco, 1945c, frontispiece, 2, 4, 5, 7, 8.

² Bennett, 1939, 73.

³ Bennett, 1939, Fig. 12a-c.

⁴ Bennett, 1939, 68.

⁵ Bennett, 1939, Fig. 11a-f, i.

ders. The range of features included in this class in the surface collection study was slightly more restricted than as applied to the excavated material of Strong and Evans.

CALLEJÓN UNCLASSIFIED¹

This category was set up to include the wares that are clearly of Recuay types native to the Callejón de Huaylas. The paste is usually gray with two- and three-color negative painting in red, black, and white. The few fragments recovered in surface collecting were too small to indicate shapes.

SARRAQUE CREAM

Sarraque, similar in paste features to the accompanying types, Castillo Plain and Valle Plain, is tempered with a large percentage of sand, fired in an oxidizing atmosphere to various shades of red, and fairly hard. The thickness covers the full range of the plainware Castillo and Valle types and like these it varies with the size of the vessels. Surface finish and shapes are also shared with the two plainware types of the Gallinazo period. The distinguishing feature of Sarraque Cream is the application of a thin white wash. This is sometimes applied in a broad band around the necks of the vessels; on other examples it forms broad vertical bands on the sides. The thickness and consequent opaqueness of this wash varies considerably. Usually it is so thin that the base color of the vessel surface shows through, producing a mottled effect.

HUACAPONGO POLISHED PLAIN

Plate 5n-q

The paste is well mixed and contains a relatively small proportion of sand tempering. The pottery is oxidized fired, and both paste and exterior are a brick red. This ware is harder than other Virú pottery, producing a clear ring when struck. Thickness varies from 3 to 6 millimeters, and the side walls of even very large jars are quite thin. Distinguishing traits of Huacapongo are the scraped interior surface and the scraped and polished exterior. Characteristically, the polishing is done so that the tracks of the tool are separated and can easily be seen. Possibly the makers considered these tracks to be a decoration. The vessel shapes of

this type are fairly standardized, as shown in Fig. 6.

PUERTO MOORIN WHITE-ON-RED²

Plate 6a

A very small quantity of this decorated type was found in the surface collections. The ware is similar in respect to temper, firing, and finish to Huacapongo Polished Plain. However, the vessel forms, particularly as they are found in graves, seem to differ from the accompanying utility ware. Bottle forms often with stirrup-spouts, or single-spout bottles with strap handles attached to the body and neck are common grave forms. These are decorated with simple geometric designs of lines and dots drawn with a wide brush. The material included in this class, primarily from refuse collections, has the olla form so common in Huacapongo Polished Plain. The white slip that marks the types is sometimes applied in rather broad vertical bands down the sides of the vessel, an arrangement that is very similar to that of Sarraque Cream.

GUAÑAPE RED PLAIN

Plate 6d-e

This type is tempered with a moderate amount of sand containing large grains of quartz. These large sand grains often show through the vessel surface where the sherds are eroded and are a peculiar feature of the utility wares of the Guañape horizon. The vessels were hand made, and the surfaces were floated. This material was fired in an oxidizing atmosphere, but the firing was frequently incomplete so that there is a dark core in the sherds. The pottery is not quite so hard as the succeeding type, Huacapongo Polished Plain, but it is even thinner; the average is 3 to 5 millimeters. Vessel forms are as indicated in Fig. 6.

This type is ancestral to Huacapongo Polished Plain. The division between these two types is purely arbitrary. For pottery made during the period of "transition," the assignment of sherds to one type or the other is difficult.

GUAÑAPE BLACK PLAIN

Plate 6b-c

Guañape Black Plain is similar in all respects to Guañape Red Plain except that it was fired

¹ Larco, 1945b, 13.

² Larco, 1944, 12, 13, Fig. 327.

in a reducing atmosphere and the ware tends to range in color from dull black to shades of dark gray. Owing apparently to poor control of reducing conditions and the often incomplete oxidation of the reddish ware of the red plain variety, the two types grade into each other, and the line of separation is entirely arbitrary.

ANCON ZONED PUNCTATE¹

Plate 6f-g

The paste of this decorated type is the same as for the two accompanying plain types, Guañape Red Plain and Guañape Black Plain, but the ware has a polished finish. The surface collections do not provide enough data on vessel shapes to admit a full description, but a small, round-bottomed bowl with insloping upper walls is one form noted. The decoration, applied while the vessel paste was soft, consists of punctations with a pointed instrument confined by narrow incised lines in pendent V's or incurving or angular bands.

ANCON POLISHED BLACK

Plate 6h-j

The paste of this type shows the large grains of sand tempering that characterize the pottery of the Guañape period, but the ware fired under well-controlled reducing conditions is gray in paste color and fairly hard. The interior surfaces are poorly smoothed and show finger marks. The exterior is black, possibly smoke blackened, and has been polished to a dull gloss. Polishing marks do not show. The common forms for this type seem to be bottles with either single or stirrup spout and probably effigy form.

"COARSE WARE"

The few fragments of this category found in surface collecting were too small to permit any discussion of vessel shapes. The paste with its large grain sand tempering is similar to the more common, accompanying plain type, Guañape Red and Black Plain. The notable feature of this class is the thickness. It ranges from 8 to 20 millimeters.

ANCON FINE LINE INCISED

The paste of this type is similar to both the common plainware types of the Guañape period

and ranges in color from reddish brown to black. The surface is smoothed, but not polished. The decoration, generally arranged in bands about the shoulder of bowls, consists of narrow incised lines forming cross-hatching, arranged parallel, in curvilinear designs, or rarely in line-filled triangles.

ANCON BROAD LINE INCISED²

Plate 6k-l

Ancon Broad Line Incised has the paste and vessel shapes that have been briefly described for Ancon Polished Black. Like that type most of the vessels seem to have been bottles, and the interior of the sherds has the careless, finger-marked finish that characterizes closed and perhaps mould-made vessels. The exterior surface has a pattern of broad, round-bottomed lines made when the vessel paste was leather hard. Occasionally, hemiconical punctations are used in conjunction with the lines. Rectilinear and curvilinear designs are indicated, but the scanty material at hand provides few suggestions as to the popular patterns. After being incised, the exterior surfaces were polished.

ANCON ENGRAVED³

This is another of the pottery types of the Guañape period that are basically similar to Ancon Polished Black. After the exterior surfaces of the bottle forms had been polished, narrow-line designs were cut through the surface with a sharp-pointed instrument. The designs are fairly simple in composition, but the few fragments available do not permit a description of the motives.

ANCON BRUSHED⁴

Plate 6m-n

The paste of this type is sometimes similar to that of Guañape Red and Black Plain, but more often it is tempered with small amounts of fine sand and fired under reducing conditions to produce a hard ware in shades of cream or gray. The interior surface has been scraped and the exterior has been either scraped or brushed, so that striations show plainly. The few fragments available do not suggest vessel forms.

¹ Larco, 1941, Figs. 23-24, 41, 62, 64, 108.

² Larco, 1941, Figs. 27, 57-58, 107, 109.

Larco, 1941, Figs. 116-117.

³ Strong, 1925, Pl. 48a.

GUAÑAPE INCISED RIB (SMALL)

Plate 6o

The paste characteristics of this type are similar to both Guañape Red and Black Plain. The most common form for the type seems to be the egg-shaped vessel that is also most popular for the plain types. Distinguishing features of the type are small raised ribs on the exterior vessel surface. Most of these were arranged vertically, extending from near the vessel mouth almost to the base. Small notches were incised in the tops of these ribs at frequent intervals with a sharp instrument.

FINGER-PRESSED THICK RIB

Plate 6p

In paste, firing, and shape features this type resembles the two plainwares of the Guañape period. However, in thickness the sherds tend towards the thicker end of the range of the plainwares, and the vessels bearing this decoration apparently were large. Distinguishing features are fairly large appliqué strips of clay which were pressed with the fingers at regular

intervals to produce a rope-like effect. These ribs run vertically from near the rim to the base of the vessels, and in some cases there may have been cross ribs arranged to simulate netting.

GUAÑAPE MODELLED

This somewhat flexible group includes small, plain, rounded nodes that have been pushed out from inside of vessels and fragments of small animal heads appliqué on vessel surfaces. Very few sherds of this type were found.

GUAÑAPE GOUGED

The paste of Guañape Gouged is similar to that of the Red and Black plainware of this period. The surface is smoothed, but rarely polished. Decoration consists of parallel rows of punctations ranging from very delicate dots to deep gouges made by a stick held at an angle. The rows of punctations usually run horizontally around the vessels and are common on the rims. The small amount of material reveals very little as to vessel shapes.

APPENDIX II. LIST OF SITES

THE FOLLOWING PAGES tabulate the site collections on which this study has been based, briefly describe the sites, show how each collection has been handled, and give the dates assigned. After some hesitation it has been decided best to omit a tabulation of type occurrences in each collection, for it is very doubtful if this infor-

mation is sufficiently valuable to most students to justify the rather considerable expense. This information will be kept on file at the American Museum of Natural History and will be available to anyone who may wish to check the conclusions in this paper or use the data for comparative purposes.

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM-PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALIDITY
1	D2	A	1		Looted cemetery, with approximately 200 open graves (Selected collection)	51	E-F	Poor
		B	253		(Unselected collection, made at later date)	349	E-F	Exc.
2	D2		2		Looted cemetery, 100 by 50-m. area, 175 m. W. of an occupation site			
				(a)	(Dates cemetery)	17	A-F	Poor
				(b)	(Earlier occupation of area)	161	L-M	Exc.
3	D2		3		Looted cemetery from which Mochica vessels are reported to have come	78	E-F	Exc.
4	D2		4		Single stone-wall building	67	D-E	Av.
5	D2		5		Stone-wall building	114	D-E	Exc.
6	D2		6		Looted cemetery, 15-m. diameter; reported to be Mochica by Jacobs			
				(a)	(Dates cemetery)	20	E-F	Poor
				(b)	(Earlier occupation of area)	5	J-K	Poor
7	D2		7		Large stone-wall building, 15 or more rooms	68	D-E	Exc.
8	D2		8		Extensive habitation site, stone-wall houses on terraces on hillside	109	D-E	Av.
9	D2		9		Single large stone-wall house	150	D-E	Exc.
10	D2		10		Small stone-wall habitation unit	21	E-F	Poor
11	D2		11		Worked cemetery from which both Mochica and Tiahuanaco vessels came			
				(a)	(Dates cemetery)	101	D-F	Exc.
				(b)	(Previous occupation of area)	36	J-K	Av.
12	D2		12		Worked cemetery, 300 m. S. of Site 11	15	E-F	Poor
13	D2		13		Cemetery in occupation area with stone-wall houses			
				(a)	(Probably dates both cemetery and buildings)	132	D-F	Poor
				(b)	(Probably earlier occupation)	8	H-L	Poor
14	E2	A	14		Multi-room building constructed of large stones (Surface collection)			
				(a)	(Probably dates structure)	16	E-F	Poor
				(b)	(Probably earlier occupation)	32	K-L	Av.
		B	41		(Collection excavated from a room in structure) (Probably earlier material)	22	K-L	Av.
15	E2		15		Reported Mochica cemetery with approximately 40 opened graves	99	E-F	Exc.
16	E2	A	16		Stone-walled hilltop fort (Collection from all over site—selected)	46	E-F	Poor
		B	185		(Collection from pyramid that occupies highest point of site)	993	F-G	Exc.
17	D1	A	187		Massive stone-wall building; Queneto Temple (Dates structure)	217	B-D	Exc.
		B	17		(Dates structure)	48	B-C	Exc.
18	E2		49		Stone and adobe structure	323	F-G	Exc.
19	E1		19		El Corral, multi-room, stone-wall building	145	E-F	Av.
20	E1		20		Large stone-wall quadrangle	44	D-I	Poor
21	E1		21		Stone-wall structures; both large and small rooms			
				(a)	(Dates large-room buildings)	287	D-E	Exc.

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM-PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALIDITY
				(b)	(Dates small-room structures)	59	J-K	Av.
22	E1		22		Stone quadrangle			
				(a)	(Uncertain which component dates structure)	52	D-E	Av.
				(b)	(Uncertain which component dates structure)	13	J-K	Poor
23	E1		23		Two stone-wall, multi-room houses			
				(a)	(This component dates structures)	181	A-B	Av.
				(b)	(Previous occupation of area)	20	J-K	Poor
24	E1		24		Stone-wall houses			
				(a)	(Uncertain which component dates structures)	205	D-E	Poor
				(b)	(Uncertain which component dates structures)	111	J-K	Poor
25	E1		25		Stone-wall houses	217	D-E	Exc.
26	E1		26		Stone-wall houses			
				(a)	(Uncertain which component dates houses)	608	D-E	Exc.
				(b)	(Uncertain which component dates houses)	28	J-K	Av.
27	E1		27		Stone-wall houses	227	D-E	Exc.
28	E1		28		Large stone-wall quadrangle			
				(a)	(Probably dates structure)	102	E-F	Exc.
				(b)	(Earlier occupation)	19	J-K	Av.
29	E1		29		House sites with destroyed stone walls			
				(a)	(Uncertain which component dates structures)	28	D-E	Poor
				(b)	(Uncertain which component dates structures)	103	J-K	Exc.
30	E1		30		Large-room houses built over small-room houses			
				(a)	(Dates large-room houses)	121	E-F	Av.
				(b)	(Dates small-room houses)	53	J-K	Av.
31	E1		31		Group of stone-wall houses			
				(a)	(This component dates houses)	177	C-D	Av.
				(b)	(Earlier occupation)	28	J-K	Av.
32	E1		343		Small stone-wall house unit			
				(a)	(Probably dates structure)	101	E-F	Exc.
				(b)	(Probably earlier occupation)	65	K-L	Exc.
33	E1		32		Stone-wall houses with small rooms			
				(a)	(Uncertain which component dates structures)	182	E-F	Av.
				(b)	(Uncertain which component dates structures)	149	J-K	Exc.
34	E1		33		Small stone-wall house	84	F-G	Exc.
35	E1		34		Stone-wall house	93	D-E	Exc.
36	E1				(No collection)			
37	F2				Stone and earth pyramid with flat top			
		A	35		(Collections A and B made from same area at different times)	263	D-E	Av.
		B	327			214	D-E	Exc.
38	C4		266		Collection from small area, 50-m. diameter, on south side Huancaco Castillo, Site 88	1009	F-G	Exc.
39	E2				Stone-wall house unit with 15 rooms			
		A	102		(Collection excavated from a room)	1189	F-G	Av.
		B	36		(Surface collection from site)	200	E-F	Av.
40	E2		37		Single-room stone-wall house	183	F-G	Av.
41	E2		38		Small stone-wall house	264	E-F	Exc.
42	E2		39		Small stone-wall house	138	E-F	Av.
43	E2		40		Stone-wall building	152	F-G	Exc.
44	E2		183		Stone-wall building	146	C-D	Av.
45	E2		43		Multi-room stone-wall house	391	D-E	Exc.
46	E2				Group of stone-wall houses on hillside			
		A	104		(General surface collection)	631	C-D	Av.
		B	107		(Second surface collection, same area)	187	C-D	Av.
					(Strata excavation in a house room):			
			105		Level 1; 0-10 cm.	285	C-D	Poor
			106		Level 2; 10-20 cm.	2002	C-D	Poor
			108		Level 3; 20-30 cm.	1269	C-D	Poor
			109		Level 4; 30-40 cm.	748	C-D	Poor
			110		Level 5; 40-50 cm.	42	C-D	Poor
47	E2		44		Stone-wall house	50	C-D	Poor

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM- PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALIDITY
48	E2				(No collection)			
49	E2		45		Small group of one- to three-room houses	60	D-E	Av.
50	E2		111		Small group of stone-wall houses	535	D-F	Poor
51	E2				Castillo de Tomaval, excavated by Strong (see Fig. 4)		F-I	Exc.
52	D2		125		Large multi-room stone-wall structure	86	C-D	Av.
53	E2		46		Stone-wall houses	157	E-F	Exc.
54	E2		47		Rock-wall house group	67	D-E	Av.
55-58	E2				(No collection)			
59	B4				(No collection)			
60	D2				Group of stone-wall houses in sloping floor of small wash.			
					Strata excavated in rubbish heap below structures:			
			112		Level 1; 0-20 cm.	444	D-E	Exc.
			113		Level 2; 20-40 cm.	531	D-E	Exc.
			114		Level 3; 40-60 cm.	633	D-E	Exc.
			115		Level 4; 60-75 cm.	85	D-E	Exc.
61	D2				Hilltop dwelling site; 30-40 stone-wall houses			
		A	176		(Room excavated in one house)	340	D-E	Av.
					Strata excavation, 3.5 by 2.5 m., made in terrace where refuse was deposited:			
			116		Level 1; 0-20 cm.	370	D-E	Av.
			117		Level 2; 20-40 cm.	507	D-E	Av.
62	E2		184		Adobe castillo on San Juan ridge adjacent to Site 16	1865	E-F	Exc.
63	E1		186		House units on NE slope San Juan ridge	1208	F-G	Exc.
64	E3				Extensive midden in pampa south of Virú village			
		A	188		(SW end of site)	1230	E-F	Av.
		B	189		(NE end of site)	1498	H-I	Av.
		C	192		(Adobe foundations to NE of site)	418	D-E	Exc.
65	E3		190		Midden area in edge of pampa	406	D-E	Av.
66	B3		304		Extensive cemetery and midden area	273	K-L	Av.
67	D3		191		Virú Castillo; large adobe structure	1082	E-F	Exc.
68	E2		193		Napo Castillo; large adobe structure	791	F-G	Exc.
69	E2		194		Small midden in pampa	802	D-E	Exc.
70	E2		195		Small cemetery of 20 graves			
				(a)	(Dates looted graves)	178	D-E	Exc.
				(b)	(Earlier occupation of area)	15	J-K	Poor
71	A3				Large midden near Guañape excavated by Strong and Evans, Fig. 4. (Also pre-pottery)		L-N	Exc.
72	E2		196		Terrace on point of Sarraque	791	I-J	Av.
73	E2		197		Stone and adobe Castillo on Sarraque	796	F-G	Exc.
74	E2		198		Adobe structure S end Sarraque ridge	740	F-G	Exc.
75	E2				Large adobe structures at W foot of Sarraque ridge			
		A	199		(Collection from upper structures)	1652	F-G	Exc.
		B	200		(From lower buildings of group)	242	F-H	Poor
76	E2		251		Stone-wall houses at foot of Sarraque	584	F-G	Exc.
77	E2		252		San Juan mound; large pyramid	1109	F-G	Exc.
78	E4		254		Stone-wall house in pampa; cemetery near-by			
				(a)	(Possibly dates near-by looted cemetery)	137	D-E	Exc.
				(b)	(Possibly dates house structures)	313	J-K	Exc.
79	D4		255		(No collection)			
80	D4				Large rock-walled hilltop fortress on Cerro Bitín			
		A	256		(About pyramid in W end of fort)	523	J-K	Exc.
		B	257		(About pyramid in E end of fort)	567	J-K	Exc.
81	D4		258		Large adobe and stone-wall building at SW base of Bitín Hill	271	C-D	Poor
82	D4		259		Midden area at S base of Bitín	222	E-F	Exc.
83	D5				Two small groups of one-room houses with small rooms; corners rounded			
		A	260		(First collection from site)	174	K-L	Exc.
		B	265		(Second collection from site; not graphed)	11	K-L	Poor
84	D5		261		Terraced knoll with small stone-wall houses	99	K-L	Exc.
85	D5		262		Group of small stone-wall houses	58	K-L	Exc.

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM- PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALID- ITY
86	D5		263		Small, scattered stone-wall houses	73	I-J	Exc.
87	D5		264		Small stone-wall houses	425	J-K	Exc.
88	C4				Part of large Huancaco site			
		A	267		(Collection from top of W part)	607	E-F	Av.
		B	268		(Collection from W courtyard)	846	E-F	Exc.
88, 89	C4		317		Selected collection from Huancaco	43	E-F	Exc.
89	C4				E part of Huancaco site			
		A	309		(From pampa to E of building)	1255	G-H	Exc.
		B	312		(From pyramid at E end of structure)	321	F-G	Exc.
		R1	318		(Excavated from a room)	47	E-F	Poor
90	C4				(No collection)			
91	C4				(No collection)			
92	C4		311		Small, well-preserved adobe pyramid, 400 m. E ¹ / ₂ of Huancaco	40	E-F	Poor
93	C4		269		Midden area NE of Huancaco	106	E-F	Av.
94	B3		270		Small cemetery S of Purpur Dune			
				(a)	(Dates burials)	2	B-F	Poor
				(b)	(Earlier occupation)	37	I-J	Poor
95	C3		271		Sand and earth mound, possibly natural			
				(a)		49	D-F	Poor
				(b)		48	J-K	Poor
96	C3		272		Cemetery on edge of cultivated land	84	D-F	Poor
97	C3		273		Looted cemetery on edge of pampa	329	E-F	Exc.
98	B3		274		Purpur cemetery at S base of dune	229	E-F	Exc.
99	B3		275		Large cemetery on edge of pampa	232	E-F	Exc.
100	B3		301		Small midden area	334	L-M	Exc.
101	B3		302		Large midden and cemetery			
				(a)	(Dates part of cemetery)	15	E-F	Poor
				(b)	(Dates midden and some graves)	955	J-K	Exc.
102	E2		48		Refuse area just below (E of) Site 18. Two cemeteries in site. (Time range of site probably from E to K)			
				(a)		257	E-F	Exc.
				(b)		38	J-K	Av.
103	E2		201		Pyramid built of stone and conical adobes			
				(a)	(Dates later occupation of the site)	112	B-C	Poor
				(b)	(Dates pyramid)	30	J-K	Av.
104	D2		202		Large well-worked cemetery			
				(a)	(Grave material dates cemetery)	224	D-E	Exc.
				(b)	(Earlier occupation)	142	J-K	Exc.
105	B3		303		Thin but extensive midden on edge of valley	683	J-K	Exc.
106	B5		306		Huaca de la Plata. Burial material	57	B-E	Poor
107	B5		307		Thin shell midden near beach	284	C-D	Exc.
108	B5				Chimu-type adobe wall quadrangle. (See strata excavations by Collier)			
		A	308		(General surface collection, dates site)	368	C-D	Av.
		B	206		(Second surface collection)	569	C-D	Av.
					Site 108 excavated by Collier, see Fig. 4			
109	C4		310		Worked cemetery	305	E-H	Av.
110	D5		313		Large stone-wall quadrangle			
				(a)	(This component may date site)	129	E-F	Exc.
				(b)	(Possibly earlier occupation of area)	39	J-K	Av.
111	E5		314		Rectangular stone-wall building	226	D-E	Av.
112	D5		315		Group of stone-wall houses, each with several rooms			
				(a)	(Dates multi-room buildings)	259	B-C	Exc.
				(b)	(Earlier occupation of area)	15	J-K	Poor
113	D5		316		Stone-wall structures	111	E-F	Poor
114	C5		319		Midden area with small amount of shell	613	F-G	Av.
115	C6		320		Collection too small for dating			
116	C6		321		Thin midden on sand dune	97	C-D	Poor
117	C6		322		Thin midden on sand dune	147	F-G	Poor
118	C6		323		Shell midden on old beach line	241	C-D	Av.

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM- PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALID- ITY
119	C6		324		Collection too small for dating			
120	B6		325		Collection too small for dating			
121	B5		203		Thin midden in beach area	143	F-G	Av.
122	B5				No collection			
123	B5		204		Chimu-type adobe wall rectangle	272	B-C	Poor
124	B5				No collection			
125	B5		205		Large looted cemetery near beach	295	D-E	Poor
126	C4		207		Midden with conical adobe buildings; cemetery also in area			
				(a)	(Dates cemetery)	162	E-F	Exc.
				(b)	(Dates midden and structures)	156	J-K	Exc.
127	C4				Large conical-adobe structure			
		A	210		(General surface collection)	244	K-L	Exc.
		B	209		(Test Pit 3 by 3 m., 50 cm. deep)	4	K-L	Poor
128	C4		225		Extensive thin midden on ridge top	254	J-K	Exc.
129	C4		427		Cemetery near Huancaquito; well worked			
				(a)	(Dates cemetery)	201	D-F	Exc.
				(b)	(Earlier occupation)	35	J-K	Av.
130	C4		426		Huancaquito. Large tapia structure	250	E-F	Av.
131	C4		451		Small adobe building	355	F-G	Exc.
132	C4				Rock wall guarded site on Cerro de Piña			
		A	452		(Collection from N end of enclosure)	177	J-K	Av.
		B	453		(Collection from S end of fort)	184	H-I	Av.
133	C5		454		Cemetery on S slope of Cerro de Piña			
				(a)	(Dates cemetery)	192	E-F	Exc.
				(b)	(Earlier occupation)	34	K-L	Av.
134	C4		455		Four rectangular pyramids	109	D-E	Exc.
135	C5		456		Cemetery on W side Cerro de Piña	134	E-F	Av.
136	C4		457		Midden area on NW side of Cerro de Piña	197	F-G	Exc.
137	C5		458		Stone houses along top of high ridge	27	I-J	Poor
138	C4		459		Pyramid on prominent high hill over Huancaco	60	F-G	Av.
139	C6		460		Cemetery on old beach, well worked	273	E-F	Av.
140	F2		326		Complex of pyramids and stone-wall houses	611	C-D	Av.
141	F2		328		Small rock and dirt pyramid			
				(a)	(Mainly on top of mound, later occupation)	135	E-F	Exc.
				(b)	(Mostly about flanks; dates mound?)	242	J-K	Av.
142	F2		212		Looted cemetery (excavations by Willey)	195	D-E	Av.
143	E1				Superimposed large room over small-room, stone-wall houses; small group			
		A	329		(Surface collection)			
				(a)	(Dates large-room house)	158	D-E	Av.
				(b)	(Dates small-room foundations)	376	J-K	Exc.
		B	330		(Collection from rubble fill of walls of large-room structure)			
				(a)	(Material from later occupation)	45	E-F	Av.
				(b)	(Dates small-room foundations)	148	J-K	Exc.
144	E1		331		Group of small-room houses, stone walls			
				(a)	(From near-by, large-room structures)	85	C-E	Poor
				(b)	(Dates small-room structures)	316	J-K	Exc.
145	E1				Large-room structure just up slope from Site 144			
		A	332		(Collection from lower part of house towards Site 144)			
				(a)	(Dates large-room house, Site 145)	226	C-D	Av.
				(b)	(Material from near-by Site 144)	24	J-K	Poor
		B	333		(Collection from upper part of house farther from Site 144)			
				(a)	(Dates large-room house, Site 145)	150	C-D	Av.
				(b)	(Material from near-by Site 144)	37	J-K	Poor
146	E1		334		Small-room houses on hill slope			
				(a)	(Later occupation of area)	28	A-F	Poor
				(b)	(Dates structures)	359	K-L	Exc.
147	F2		335		Series of rooms built against stone defense wall	278	D-E	Exc.

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM- PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALID- ITY
148	F2		214		Rubble pyramid, Huaca la Gallina			
				(a)	(Possibly dates pyramid)	45	D-E	Poor
				(b)	(Possibly earlier occupation)	3	J-K	Poor
149	F2				Large stone and earth pyramid, El Gallo; also smaller pyramid to E			
		A	340		(Collection from E end site where there are no open graves)	272	E-F	Exc.
		B	215		(Surface collection from all parts site)	391	E-F	Exc.
		C	341		(Collection from E of smaller pyramid)	142	G-H	Exc.
150	E1		336		Small group of large-room stone-wall houses built on terraces			
				(a)	(Dates structures)	158	E-F	Exc.
				(b)	(Earlier occupation of area)	118	J-K	Exc.
151-161	B4				Used by Bennett in Gallinazo area; no collections			
162	D3				Huaca de la Cruz excavated by Strong, see Fig. 4		E-I	Exc.
163, 164	B4				Used by Bennett in Gallinazo area; no collections			
165	C4		439		Small earth and adobe mound group	180	F-G	Exc.
166	C4		440		Adobe brick pyramid, Huaca Carranza	149	E-F	Exc.
167	C4		441		Two small adobe brick pyramids (excavated by Collier, see Fig. 4)	299	F-G	Av.
168	D4		442		Adobe brick pyramid	264	E-F	Exc.
169	C3		443		Small mound in field with structure on top	351	H-I	Exc.
170	C3		444		Small midden area, no construction			
				(a)		187	E-F	Av.
				(b)		40	J-K	Av.
171	C4		445		Two large tapia-wall quadrangles (excavated by Collier, see Fig. 4)	626	B-C	Exc.
172	C4		448		Remains of large tapia-wall structure	106	D-E	Av.
173	C4		449		Small midden area	188	D-E	Exc.
174	C4		450		Small adobe building	191	D-E	Av.
175	C4		223		Group of three large earth pyramids	492	F-G	Exc.
176	F1		651		Stone-wall houses on terraces	267	J-K	Exc.
177	F1		652		Stone-wall houses on terraces	204	I-J	Exc.
178	E2		653		Two-room rock-wall building	134	E-F	Av.
179	F2		434		Extensive multi-room stone-wall house	285	B-C	Exc.
180	F1		435		Small-room stone-wall structures (collection by Collier)			
				(a)	(Probably later occupation)	10	E-F	Poor
				(b)	(Probably dates structures)	25	K-L	Av.
181	F1		436		Extensive house terraces	12	E-F	Poor
182	F2		655		Stone-wall rectangle with small pyramid	109	D-E	Av.
183	F1		656		Stone-wall large-room buildings			
				(a)	(Dates structures)	191	D-E	Exc.
				(b)	(Earlier occupation of area)	86	J-K	Exc.
184	F1		657		Both large- and small-room structures			
				(a)	(Possibly dates large-room buildings)	183	D-E	Av.
				(b)	(Possibly dates small-room buildings)	83	J-K	Exc.
185	F2				Stone-faced pyramid, medium size			
		A	658		(General surface collection)			
				(a)	(Probably dates structures)	85	D-E	Av.
				(b)	(Earlier occupation of area)	44	I-J	Av.
		B	659		(Small cut in mound top)	32	J-K	Poor
186	F2		660		Looted cemetery on hilltop			
				(a)	(Dates burials)	271	E-F	Exc.
				(b)	(Dates refuse)	75	J-K	Exc.
187	G1		661		Small mound with graves in summit			
				(a)	(Dates opened graves)	217	E-F	Exc.
				(b)	(Dates mound structure)	52	J-K	Exc.
188	G2		662		Small mound with burials in summit, near Site 187			
				(a)	(Dates opened graves)	172	E-F	Exc.
				(b)	(Dates mound structure)	146	J-K	Exc.
189	G2		663		Large stone- and tapia-wall compound			

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COMPONENT	DESCRIPTION	COLL. TOTAL	DATE	VALIDITY
				(a)	(Dates structure)	197	D-E	Exc.
				(b)	(Earlier occupation of area)	8	J-K	Poor
190	G2		664		Group of stone-wall houses	134	D-E	Exc.
191	G2		665		Stone-wall compound	177	D-E	Av.
192	E1		666		Large house group on hill slope			
				(a)	(Dates structures)	367	E-F	Av.
				(b)	(Earlier occupation of area)	14	J-K	Poor
193	E1		667		Small hillside platforms near Site 192	103	J-K	Exc.
194	E1		668		Houses near-by and similar to Site 192	129	D-E	Av.
195	E1		669		Stone-wall houses and pyramids	119	D-E	Exc.
196	F2		438		Small pyramid with ramp			
				(a)	(Probably dates mound)	39	E-F	Poor
				(b)	(Possibly earlier occupation of area)	3	J-K	Poor
197	G2		670		Stone-walled compounds	285	C-D	Exc.
198	G2		671		Two pyramids with burials in summits			
				(a)	(Dates opened graves)	167	D-E	Av.
				(b)	(Dates mound structures)	178	J-K	Exc.
199	G2		672		Well-preserved stone and earth pyramid			
				(a)	(Probably dates structure)	202	E-F	Av.
				(b)	(Probably earlier occupation)	116	J-K	Exc.
200	G2				(No collection)			
201	E1		337		Stone-wall houses on terraces			
				(a)	(Uncertain which component dates structures)	69	E-F	Exc.
				(b)	(Uncertain which component dates structures)	146	J-K	Exc.
202	E1		338		Rooms in compound, stone walls			
				(a)	(Uncertain which component dates structures)	38	E-F	Av.
				(b)	(Uncertain which component dates structures)	179	J-K	Exc.
203	E1		339		Small room building. Opened grave			
				(a)	(Dates looted burials)	275	C-D	Av.
				(b)	(Dates construction)	104	J-K	Exc.
204	E1				(No collection)			
205	E1		342		Numerous small-room buildings			
				(a)	(Later occupation, possibly graves)	117	C-D	Poor
				(b)	(Dates constructions)	60	J-K	Exc.
206	E1		344		Small pyramid with looted graves			
				(a)	(Dates opened graves)	195	E-F	Exc.
				(b)	(Dates pyramid)	127	J-K	Exc.
207	E2				(No collection)			
208	E2		345		Small stone-faced pyramid	105	E-F	Av.
209	E2		346		Single-room stone-wall house			
				(a)	(Probably dates structure)	167	D-F	Av.
				(b)	(Probably earlier occupation)	16	J-K	Poor
210	E2		347		Terraced house platforms on ridge above Site 209			
				(a)	(Dates platforms)	508	J-K	Exc.
				(b)	(Probably later occupation)	194	D-E	Av.
211	E2		348		Stone-wall house unit			
				(a)	(Dates structure)	205	D-E	
				(b)	(Earlier occupation)	26	J-K	
212	E2				Terraced stone-wall houses			
					(From platforms, dates houses)	86	D-E	Poor
					(From slopes below platforms)			
				(a)	(Refuse from houses above)	35	A-E	Poor
				(b)	(From earlier occupation)	25	J-K	Poor
213	E2		446		Terraced houses on ridge, large rooms			
				(a)	(Dating of structures in doubt)	50	D-E	Av.
				(b)	(Dating of structures in doubt)	332	J-K	Exc.
214	E2		447		Terraced houses on ridge near Site 213			
				(a)	(Dating of structures in doubt)	30	D-E	Av.
				(b)	(Dating of structures in doubt)	135	J-K	Exc.
215	E2		462		Small stone and dirt pyramid	79	G-H	Av.
216	E2		464		Small rock and earth mound	71	F-G	Av.

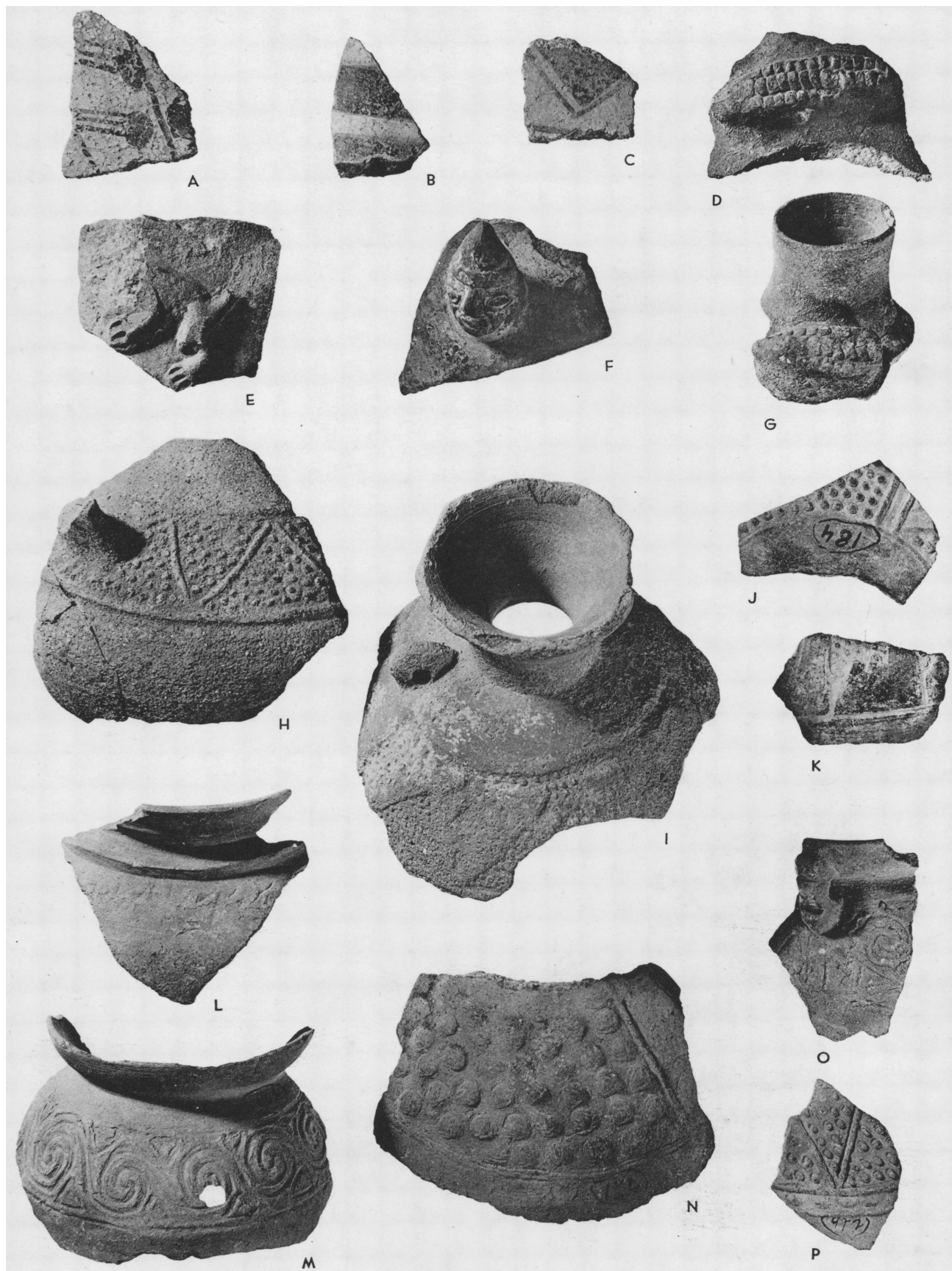
SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM- PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALID- ITY
217	E2		463		Well-worked cemetery	336	D-E	Av.
218	E2		465		Cemetery on talus slope			
				(a)	(Probably dates cemetery)	40	D-E	Poor
				(b)	(Probably earlier occupation, or graves)	96	J-K	Av.
219	E2		466		Stone house foundations	284	F-G	Exc.
220	E2		467		Large, well-worked cemetery	294	E-F	Exc.
221	F2		468		Small pyramid and stone walls	214	G-H	Exc.
222	F2		469		Well-preserved stone-wall building	55	D-E	Poor
223	F2		470		Large rectangular house foundations			
				(a)	(Probably dates structure)	156	D-E	Exc.
				(b)	(Probably earlier occupation)	193	J-K	Exc.
224	F2				No collection			
225	F2		471		Two-room stone-wall house. Large stones	183	D-E	Av.
226	F2		221		Large stone-wall building	191	D-E	Poor
227	F2		222		Terraced house group	273	D-E	Exc.
228	F2				Terraced house group on ridge			
		A	472		(Collection from inside buildings only)			
				(a)	(Dates structure)	195	E-F	Av.
				(b)	(Earlier occupation)	141	J-K	Exc.
		B	473		(Collection from small house platforms below terraced house group)			
				(a)	(Dates houses above)	35	D-E	Poor
				(b)	(Dates small platforms where made)	130	J-K	Exc.
229	F2				Group of stone-wall houses on talus slope			
		A	474		(Small-room houses in lower part of site)	314	J-K	Exc.
		B	475		(Large-room houses above collection. A area)	119	F-G	Exc.
230	G2		673		Large low pyramid with looted graves			
				(a)	(Dates looted graves on top)	189	E-F	Exc.
				(b)	(Dates pyramid)	71	J-K	Av.
231	E3		674		Virú Viejo Castillo. Large adobe building	265	G-H	Exc.
232	E3		675		Worked cemetery on old sand dune	131	E-F	Exc.
233	D4		626		Dome-shaped mound in valley floor	513	E-F	Av.
234	D4		627		Dome-shaped saltpeter mound, looted burials			
				(a)	(Late phase of occupation)	132	C-D	Exc.
				(b)	(Early phase of use)	45	J-K	Av.
235	D3		628		Occupied old dune; no structures	324	H-I	Exc.
236	D4		629		Midden on stabilized sand dune			
				(a)	(Late phase of occupation)	129	D-F	Av.
				(b)	(Early phase of occupation)	78	J-K	Exc.
237	D4		630		Sand hill with structures and graves	310	E-F	Av.
238	D4		631		Extensive stabilized dune with graves	354	F-G	Exc.
239	D3		632		Huaca de la Cruz. Small adobe pyramid	162	F-G	Exc.
240	C3		224		Huaca Amarilla or Mochan. Large adobe pyramid	324	F-G	Exc.
241	C3		564		Dome-shaped saltpeter mound	73	F-G	Exc.
242	C3		565		Dome-shaped saltpeter mound	29	E-F	Poor
243	C3		566		Flat-topped mound of earth	16	A-E	Poor
244	C3		567		Earth mound, possibly rectangular	192	D-E	Exc.
245	B3		568		Earth mound, pyramidal	98	E-F	Exc.
246	C3		569		Large tapia-wall quadrangle	56	D-E	Poor
247	C3		570		Dome-shaped saltpeter mound	236	F-G	Av.
248	C3		571		Small saltpeter mound, possibly rectangular	64	E-F	Poor
249	C3		572		Small earth mound, burials	204	E-F	Av.
250	C3		573		Small earth mound with burials in top	143	E-F	Av.
251	B4				Dome-shaped earth mound excavated by Willey			
		A	650		(Trench 1 in W end; depth 0-2.50 m.)	229	G-H	Exc.
		B	676		(Trench 2, N end; depth 0-1 m.)	53	G-H	Exc.
		C	648		(Trench 2; depth 1-2 m.)	755	F-G	Exc.
252	B4		624		Excavated by Bennett, Collier, and Willey; do not have collection			
253	B4		679		(No collection)			
254	B4				(No collection)			

SITE No.	MAP LOCATION	COLL. No.	FIELD CAT. No.	COM-PONENT	DESCRIPTION	COLL. TOTAL	DATE	VALIDITY
255	B5		688		Cemetery with remains of buildings	262	C-E	Av.
256	B5				Cemetery in a midden area			
		A	687		(Collection from W end of site)	92	B-D	Av.
		B	689		(Collection from E end of site)	191	D-E	Exc.
257	B4				(No collection)			
258	B4		691		Oval sand mound capped by cemetery	200	F-G	Exc.
259-263					(No collections)			
264	B4		692		Thin shell midden on low sand dunes	126	D-E	Exc.
265	B4		693		Building and cemetery on earth mound	147	F-G	Exc.
266	B4		694		Thin shell midden on sand dune	105	G-H	Exc.
267	B4		695		Shell midden on low sand dune	195	E-F	Exc.
268	B4		696		(No collection)			
269	B5		697		Quadrangle with tapia and adobe walls	239	C-D	Av.
270	C4		698		Dome-shaped earth mound	305	G-H	Exc.
271	C4		699		Small dome-shaped earth mound	78	E-F	Av.
272	C4		633		Small dome-shaped earth mound; excavated by Collier (see Fig. 4)	87	K-L	Av.
273	C4		700		Group of small earth mounds	101	F-G	Exc.
274	C4		634		Two small earth mounds, dome shaped	132	G-H	Exc.
275	C4		635		Earth mound with apron	204	F-G	Exc.
276	B4		636		Medium-sized earth mound with burials	203	E-F	Exc.
277	B4		637		Earth mound, some building foundations	169	G-H	Exc.
278	C4		638		Thin shell midden on sand dune	255	F-G	Exc.
279	B4				(No collection)			
280	B3		701		Group of earth and adobe pyramids	331	E-F	Exc.
281	B3		702		Midden on bluff over beach (sherds possibly late occupation)	46	F-G	Poor
282	B2		703		Stone-wall quadrangle	101	D-E	Av.
283	A3		704		Midden on sand dunes near beach	93	C-D	Av.
284	B4		705		Shell midden on sand dunes	231	F-G	Exc.
285	B4		706		Small earth mound with flat top	112	F-G	Exc.
286	B4		707		Refuse on walls of agricultural basins	15	A-E	Poor
287	B5		639		Dome-shaped earth mound	110	D-E	Exc.
288	B4		754		Large dome-shaped earth mound, adobes	116	E-F	Av.
289	B4		751		Dome-shaped earth mound	103	F-G	Av.
290	B4		647		Earth pyramid with two aprons	208	I-J	Exc.
291	B5		752		Oval rounded earth mound	293	C-E	Av.
292	B5		753		Several low earth mounds, rounded	165	D-E	Exc.
293	B5		640		Rounded earth mound	132	F-G	Exc.
294	B4		641		Small earth mound with apron	411	F-G	Exc.
295	B4		642		Three small earth mounds	137	E-F	Exc.
296	B4		643		Large earth mound	531	F-G	Exc.
297	B5		644		Compound with massive tapia walls	115	D-E	Exc.
298	D3		645		Large stone and earth pyramid	55	D-E	Av.
299	D3		646		Smaller pyramid near Site 298	122	D-E	Exc.
300	D3		755		Pyramid near Site 299			
		(a)			(Dates construction)	151	D-E	Av.
		(b)			(Earlier occupation of area)	13	J-K	Av.
301	B5				Excavated by Collier, see Fig. 4		D-E	
302	C4				Excavated by Collier		E-L	
303	B4				Excavated by Collier			
304	B5				Excavated by Collier			
305	B5				Excavated by Collier, see Fig. 4		C-E	
306-310	C4				Excavated by Collier			
311	D3				Excavated by Bird; river stratified deposit		M-C	
312	D2				Excavated by Bird; cave with stone structure. No material			
313	F4				Excavated by Bird; cave shrine with llama burials. Scattering of Guafíape period sherds in vicinity.		Est. C-E	
314, 315	A3				Excavated by Bird; before Time M, mostly preceramic			

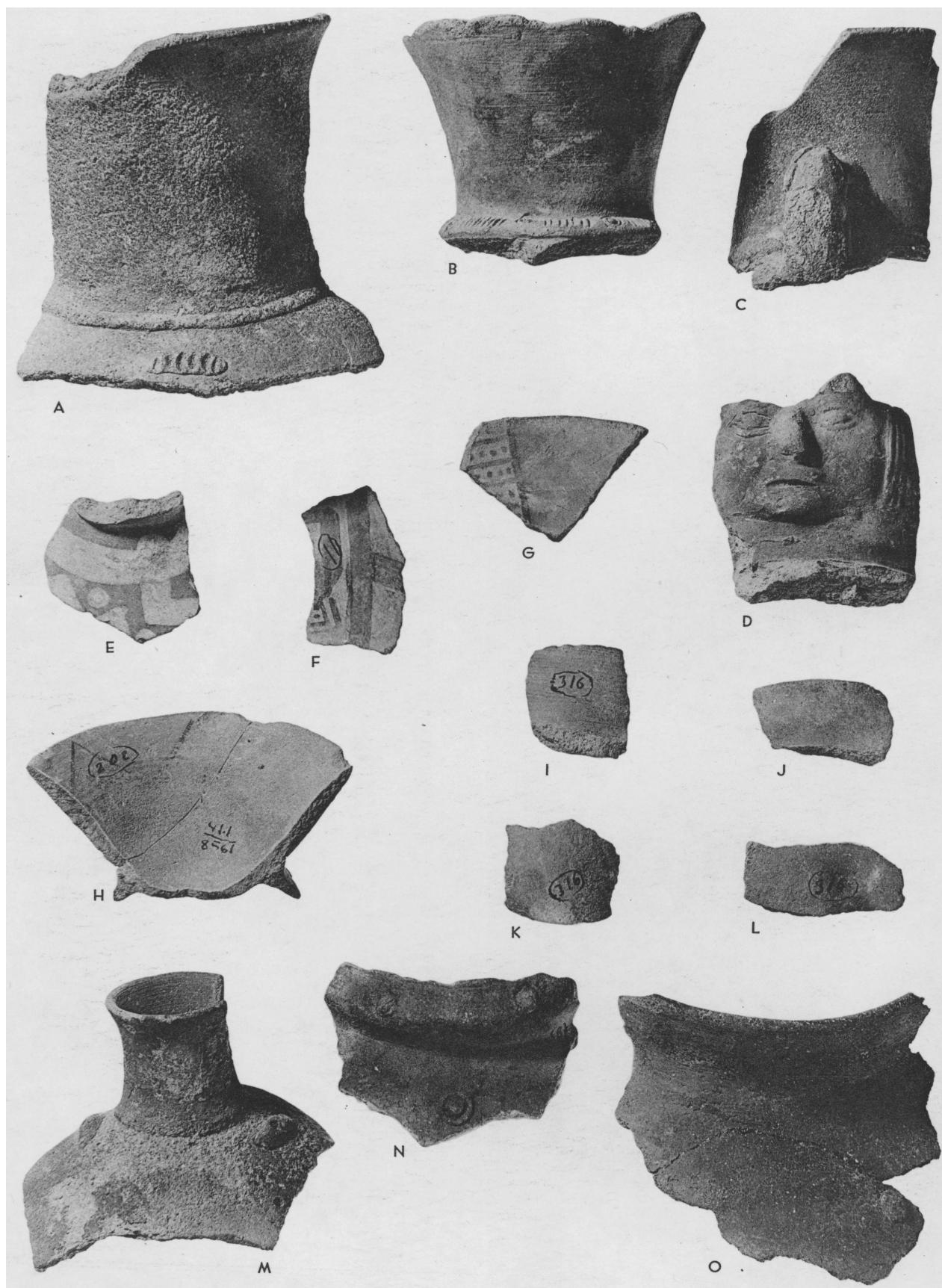
LITERATURE CITED

- BENNETT, WENDELL C.
 1934. Excavations at Tiahuanaco. *Anthrop. Papers Amer. Mus. Nat. Hist.*, vol. 34, pt. 3.
 1939. Archaeology of the north coast of Peru. *Ibid.*, vol. 37, pt. 1.
 1944. The north highlands of Peru. Excavations in the Callejón de Huaylas and at Chavín de Huántar. *Ibid.*, vol. 39, pt. 1.
 1946a. The Andean highlands: an introduction. *In Handbook of South American Indians. Vol. 2. The Andean civilizations. Bull. Bur. Amer. Ethnol.*, no. 143, pp. 1-60.
 1946b. The archeology of the central Andes. *Ibid.*, no. 143, pp. 61-147.
 1948. A reappraisal of Peruvian archaeology. *Mem. Soc. Amer. Archaeol.*, no. 4.
- BOSWORTH, T. O.
 1922. Geology of the Tertiary and Quaternary periods in the northwest part of Peru. With an account of the palaeontology by Henry Woods, T. Wayland Vaughan, J. A. Cushman, and others. London.
- BREW, JOHN OTIS
 1946. Archaeology of Alkali Ridge, southeastern Utah. *Papers Peabody Mus. Amer. Archaeol. and Ethnol., Harvard Univ.*, vol. 21.
- COVARRUBIAS, MIGUEL
 1943. Tlatilco, archaic Mexican art and culture. *Dyn.*, the review of modern art, Coyoacan, no. 4-5, pp. 40-46.
- FISK, HAROLD N.
 1944. Geological investigation of the alluvial valley of the lower Mississippi river. Vicksburg, Mississippi, War Department, Corps of Engineers, U. S. Army.
- FORD, JAMES A.
 1936. Analysis of Indian village site collections from Louisiana and Mississippi. *Anthrop. Study, Dept. of Conservation, Louisiana Geol. Surv.*, no. 2.
- FORD, JAMES A., AND GORDON R. WILLEY
 1940. Crooks site, a Marksville period burial mound in LaSalle Parish, Louisiana, *Anthrop. Study, Dept. of Conservation, Louisiana Geol. Surv.*, no. 3.
- FUHRMANN, ERNST
 1922a. Reich der Inka. *Hagen.*
 1922b. Peru II. *Hagen.*
- GILLIN, JOHN
 1947. Moche, a Peruvian coastal community. *Inst. Social Anthropol., Smithsonian Inst., Publ. no. 3.*
- HAURY, EMIL W.
 1937. Pottery types at Snaketown. *In Gladwin, H. S., et al., Excavations at Snaketown. I. Material culture. Medallion Papers*, no. 25, pp. 169-229.
- JAMES, PRESTON E.
 1942. *Latin America.* New York.
- KIDDER, ALFRED V.
 1931. The pottery of Pecos. Vol. I. The dull-paint wares. *Papers of the Southwestern Expedition*, no. 5, Robert S. Peabody Foundation for Archaeology, Phillips Academy.
- KOSAK, PAUL
 1947. The mysterious markings of Nazca. *Nat. Hist.*, vol. 56, pp. 200-207.
- KROEBER, A. L.
 1916. Zufi potsherds. *Anthrop. Papers Amer. Mus. Nat. Hist.*, vol. 18, pt. 1.
 1917. The superorganic. *Amer. Anthropol., new ser.*, vol. 19, pp. 163-213.
 1919. On the principle of order in civilization as exemplified by changes of fashion. *Ibid.*, new ser., vol. 21, pp. 235-263.
 1925a. The Uhle pottery collections from Moche. *Univ. California Publ. Amer. Archaeol. and Ethnol.*, vol. 21, pp. 191-234.
 1925b. The Uhle pottery collections from Supe. *Ibid.*, vol. 21, pp. 235-264.
 1926. Archaeological explorations in Peru. Pt. I: Ancient pottery from Trujillo. *Field Mus. Nat. Hist., Anthropol. Mem.*, vol. 2, pp. 1-43.
 1927. Coast and highland in prehistoric Peru. *Amer. Anthropol., new ser.*, vol. 29, pp. 625-653.
 1930. Archaeological explorations in Peru. Pt. II: The northern coast. *Field Mus. Nat. Hist., Anthropol. Mem.*, vol. 2, pp. 47-116.
 1944a. Peruvian archaeology in 1942. *Viking Fund Publ. Anthropol.*, no. 4.
 1944b. Configurations of culture growth. Berkeley and Los Angeles.
- KUBLER, GEORGE
 1948. Toward absolute time: Guano archaeology. *In A reappraisal of Peruvian archaeology. Assembled by Wendell C. Bennett. Mem. Soc. Amer. Archaeol.*, no. 4, pp. 29-50.
- LARCO HOYLE, RAFAEL
 1938. *Los Mochicas. Lima*, vol. 1.
 1939. *Los Mochicas. Lima*, vol. 2.
 1941. *Los Cupisniques. Lima.*
 1944. *Cultura Salinar. Buenos Aires, Sociedad*

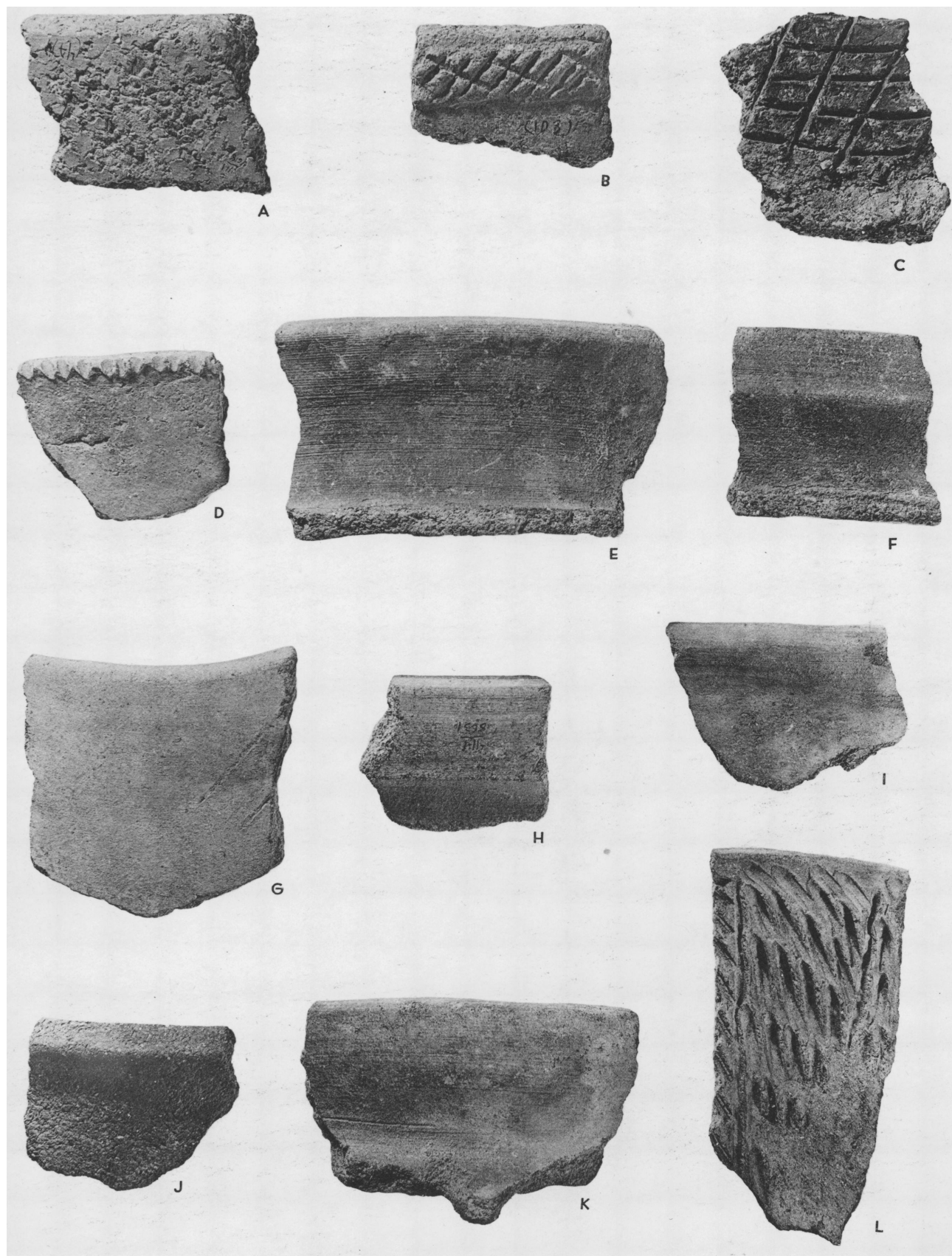
- Geografica Americana.
- 1945a. Los Cupisniques. Buenos Aires, Sociedad Geografica Americana.
- 1945b. La cultura Virú. Buenos Aires, Sociedad Geografica Americana.
- 1945c. Los Mochicas. Buenos Aires Sociedad Geografica Americana.
1946. A culture sequence for the north coast of Peru. *In* Handbook of South American Indians. Vol. 2. The Andean civilizations. Bull. Bur. Amer. Ethnol., no. 143, pp. 149-175.
- LEHMAN, WALTER, AND HEINRICH DOERING
1924. The art of old Peru. New York.
- MIDDENDORF, E. W.
1893-1895. Peru. Berlin, 3 vols.
- MURDOCK, GEORGE PETER
1932. The science of culture. *Amer. Anthropol.*, new ser., vol. 34, no. 2, pp. 200-215.
- RICHARDSON, J., AND A. L. KROEBER
1940. Three centuries of women's dress fashions: A quantitative analysis. *Anthrop. Records*, Univ. of California, vol. 5, no. 3.
- ROUSE, IRVING
1939. Prehistory in Haiti. *Yale Univ. Publ. Anthropol.*, no. 21.
- ROWE, JOHN HOWLAND
1944. An introduction to the archaeology of Cuzco. *Papers Peabody Mus. Amer. Archaeol. and Ethnol.*, Harvard Univ., vol. 27, no. 2.
1947. Inca culture at the time of the Spanish conquest. *In* Handbook of South American Indians. Vol. 2. The Andean civilizations. Bull. Bur. Amer. Ethnol., no. 143, pp. 183-330.
- SCHMIDT, MAX
1929. Kunst und Kultur von Peru. Berlin.
- SELER, EDUARD
1893. Peruanische Alterthümer. Berlin.
- SPIER, LESLIE
1917. An outline for a chronology of Zuñi ruins. *Anthrop. Papers Amer. Mus. Nat. Hist.*, vol. 18, pt. 3.
- SQUIER, E. GEORGE
1877. Peru. Incidents of travel and exploration in the land of the Incas. New York.
- STRONG, WILLIAM DUNCAN
1925. The Uhle pottery collections from Ancon. *Univ. California Publ. Amer. Archaeol. and Ethnol.*, vol. 21, no. 4, pp. 135-190.
1943. Cross-sections of new world prehistory. *Smithsonian Misc. Coll.*, vol. 104, no. 2.
1948. Cultural epochs and refuse stratigraphy in Peruvian archaeology. *In* A reappraisal of Peruvian archaeology. Assembled by Wendell C. Bennett. *Mem. Soc. Amer. Archaeol.*, no. 4, pp. 93-102.
- STRONG, WILLIAM DUNCAN, AND JOHN M. CORBETT
1943. A ceramic sequence at Pachacamac. *In* Archeological studies in Peru 1941-1942. *Columbia Studies in Archeol. and Ethnol.*, vol. 1, no. 2.
- STRONG, WILLIAM DUNCAN, ALFRED KIDDER, II, AND A. J. DREXEL PAUL, JR.
1938. Preliminary report on the Smithsonian Institution-Harvard University archeological expedition to northwestern Honduras, 1936. *Smithsonian Misc. Coll.*, vol. 97, no. 1.
- STRONG, WILLIAM DUNCAN, AND GORDON R. WILLEY
1943. Archeological notes on the central coast. *In* Archeological studies in Peru, 1941-1942. *Columbia Studies in Archeol. and Ethnol.*, vol. 1, no. 1.
- STÜBEL, A., AND MAX UHLE
1892. Die Ruinenstaette von Tiahuanaco. Leipzig.
- TELLO, JULIO C.
1943. Discovery of the Chavín culture in Peru. *Amer. Antiquity*, vol. 9, pp. 135-160.
- UHLE, MAX
1903. Pachacamac: report of the William Pepper, M.D., LL.D., Peruvian expedition of 1896. Trans. by C. Grosse. Philadelphia, University Pennsylvania, Dept. of Archaeology.
1908. Über die Frühkulturen in der Umgebung von Lima. *Verhandl. des 16 Internatl. Amerikanisten Kongr.*, Vienna, 1908, pp. 347-370.
1912. Die Muschelhügel von Ancon, Peru. *Proc. 18th Internatl. Congr. Americanists*, London, 1912, pp. 22-45.
1913. Die Ruinen von Moche. *Jour. Soc. Amer.*, Paris, vol. 10, pp. 95-117.
1920. Los principios de las antiguas civilizaciones Peruanas. *Bol. Soc. Ecuatoriana Estudios Hist. Amer.*, vol. 4, pp. 448-458.
- WASSERMANN-SAN BLAS, B. J.
1938. Cerámics del antiguo Peru de la colección Wassermann-San Blas. Buenos Aires.
- WILLEY, GORDON R.
1934. Excavations in the Chancay valley. *In* Archeological Studies in Peru, 1941-1942. *Columbia Studies in Archeol. and Ethnol.*, vol. 1, pt. 3.
1945. Horizon styles and pottery traditions in Peruvian archaeology. *Amer. Antiquity*, vol. 11, pp. 49-56.
1948. A functional analysis of "horizon styles" in Peruvian archaeology. *In* A reappraisal of Peruvian archaeology. Assembled by Wendell C. Bennett. *Mem. Soc. Amer. Archaeol.*, no. 4, pp. 8-15.



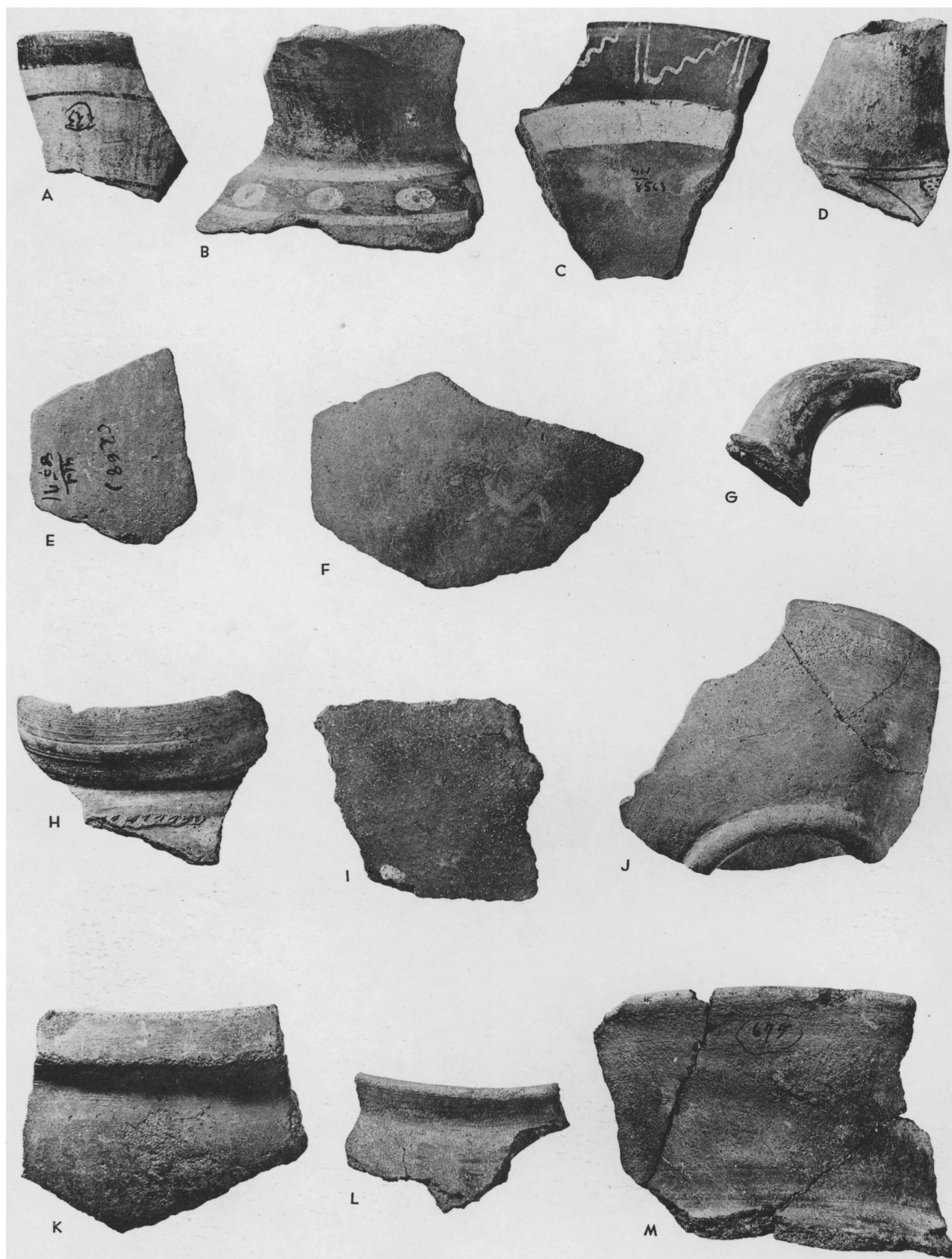
Sherds from Virú Valley. a-c, Inca Painted; d-g, La Plata Moulded; h-k, San Juan Moulded; l-p, San Nicolas Moulded



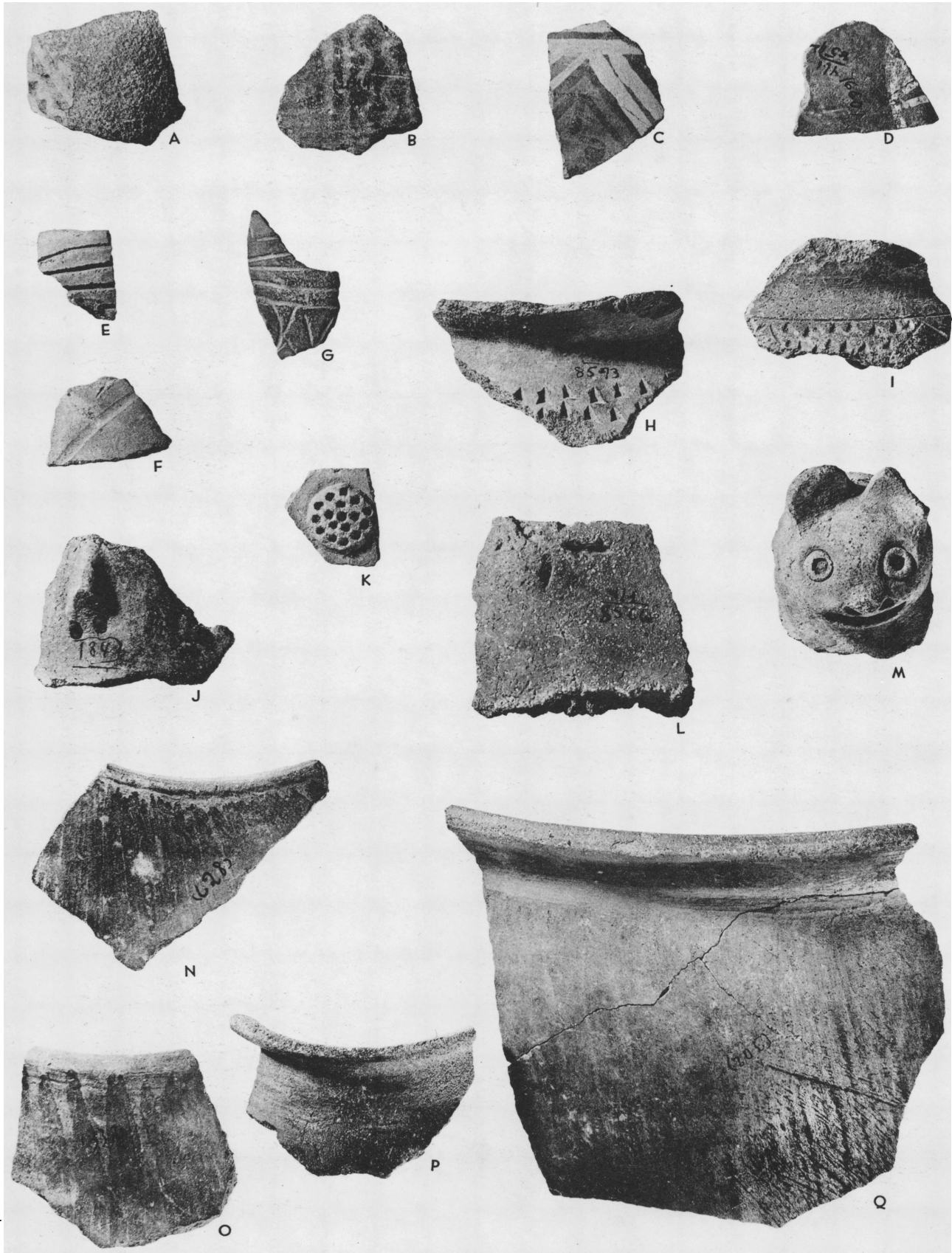
Sherds from Virú Valley. a-d, Estero Plain; e-g, Tiahuanaco Black White and Red; h, Tiahuanaco Black on Orange; i-l, Rubia Plain; m, Queneto Polished Plain; n-o, Tomaval Plain



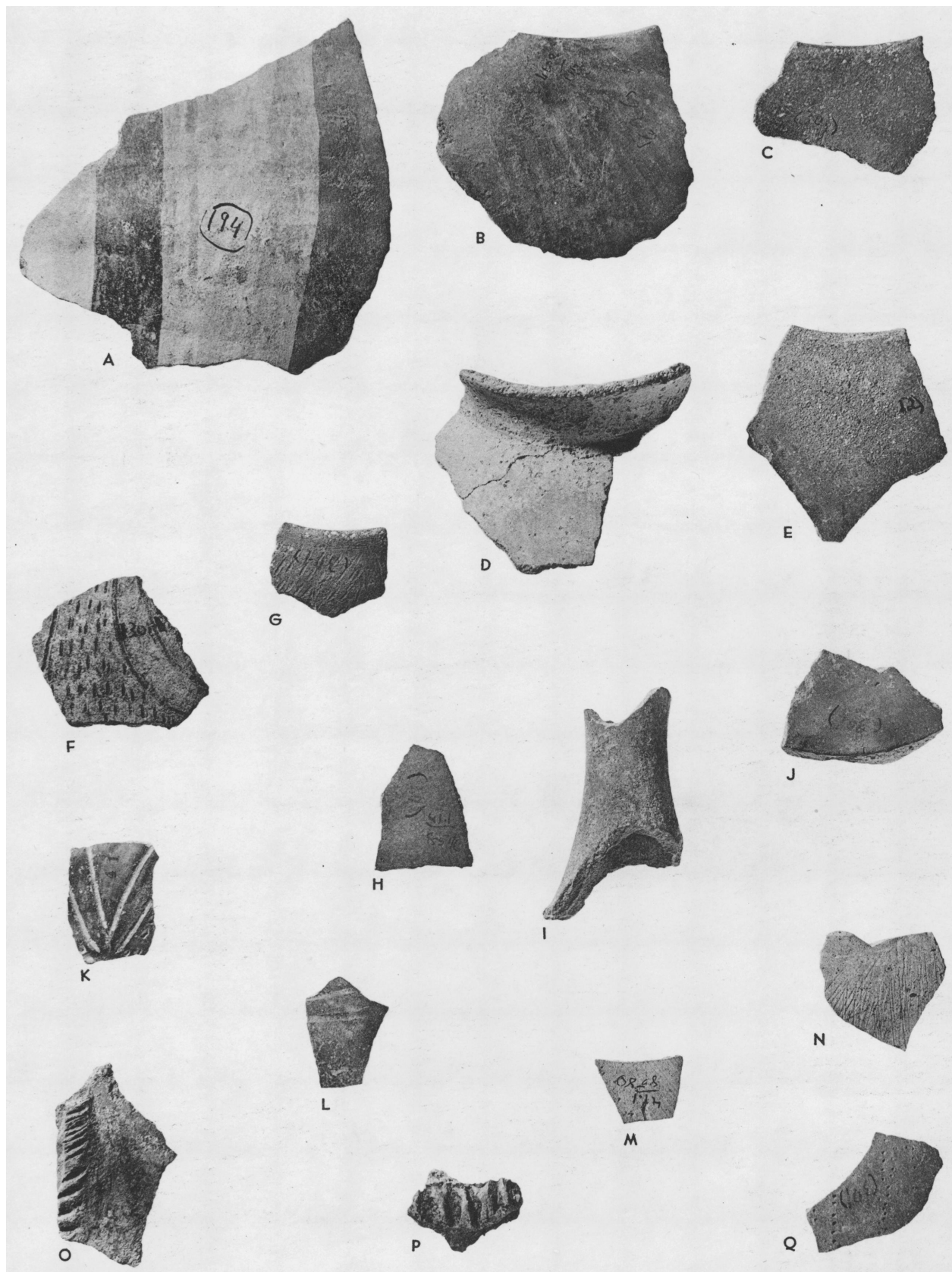
Sherds from Virú Valley. a-f, Virú Plain; g-l, Valle Plain



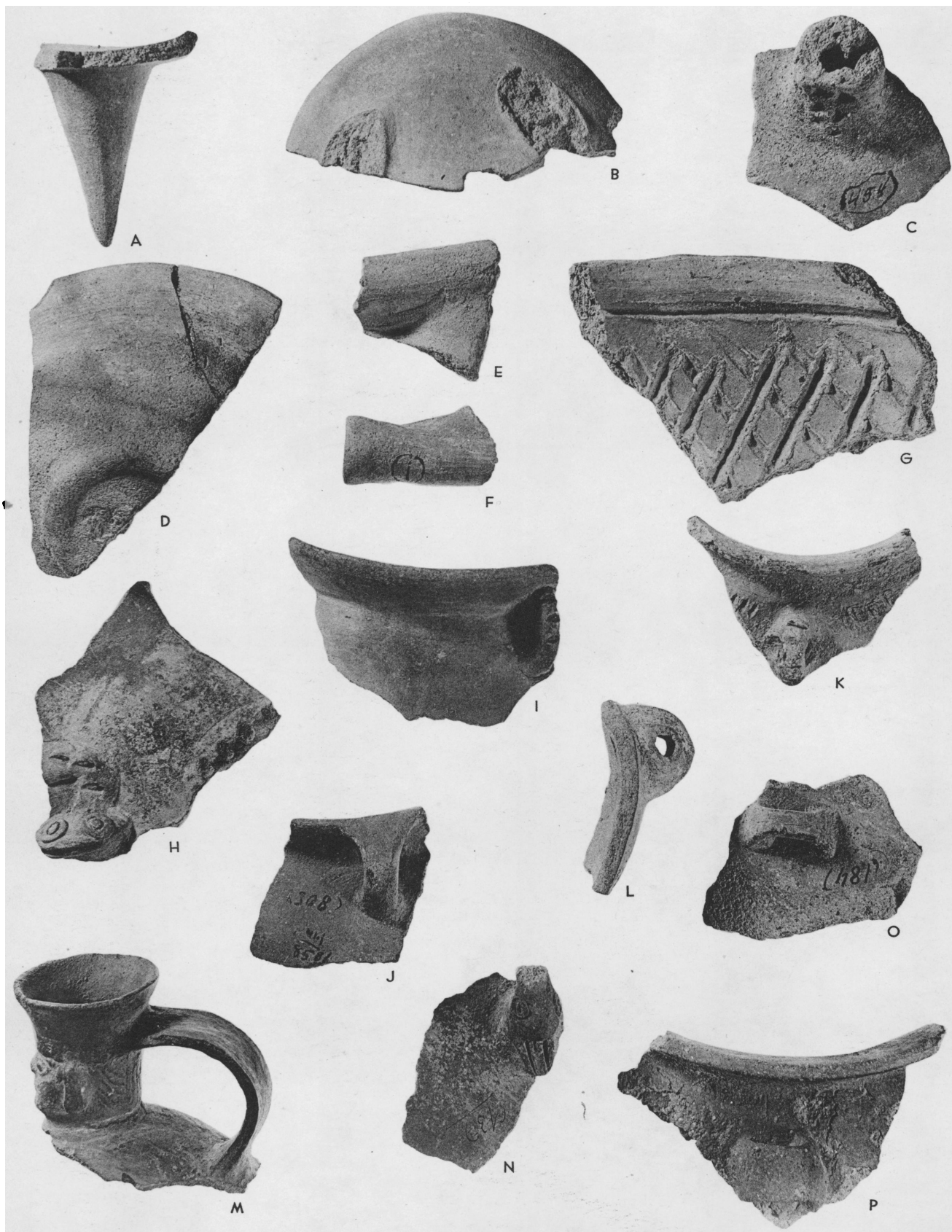
Sherds from Virú Valley. a-d, Huancaco Decorated; e-g, Gloria Plain; h-m, Castillo Plain



Sherds from Virú Valley. a-b, Gallinazo Negative; c-d, Black, White and Red of the Gallinazo period; e-i, Castillo Incised; j-m, Castillo Modelled; n-q, Huacapongo Polished Plain



Sherds from Virú Valley. a, Puerto Moorin White-on-Red; b-c, Guañape Black Plain; d-e, Guañape Red Plain; f-g, Ancon Zoned Punctated; h-j, Ancon Polished Black; k-l, Ancon Broad-line Incised; m-n, Ancon Brushed; o, Guañape Incised rib (small); p, Guañape finger-pressed thick rib; q, Ancon Stippled



Features of Virú Valley ceramics which are treated chronologically in Fig. 7. a-b, tripod bowls; c, "corn popper" handle; d, ring base bowls; e-f, trumpet fragments; g, graters; h, appliqué snakes; i-j, small vertical loop handles; l, small horizontally pierced nodes; m, large strap handles attached vertically; n, large loop handles attached vertically; o-p, strap handles attached horizontally

ANTHROPOLOGICAL PAPERS
OF THE
AMERICAN MUSEUM OF NATURAL HISTORY

Volume 43

PART 1. Surface Survey of the Virú Valley, Peru. 1. Virú Valley: Background and Problems. By James Alfred Ford and Gordon R. Willey. 2. Cultural Dating of Prehistoric Sites in Virú Valley, Peru. By James Alfred Ford. Pp. 1-90, 7 plates, 9 text figures. Price \$1.50.

PART 2. *In preparation.*